76th Pittsburgh Regional Science & Engineering Fair

Intermediate Division Student Project Abstracts

March 27, 2015

Notes to Judges

Students prepare Abstracts limited to 100 words that include the following:

- **Purpose of the experiment**
- **Procedures used**
- **Data**
- **Conclusions**
- **Possible research applications**
- **Minimal reference to previous work**
- **For continuation projects, the abstract should focus on work done since the last PRSEF**
- **Should not include: a) acknowledgments, or b) work or procedures done by the mentor**

Many students continue their research after the Abstract is submitted, and therefore the Abstract may not fully represent the Project.

Abstracts are available to the Judges prior to the Science Fair as an aid in pre-screening the Projects. Judging is to be based on the actual Project as presented by the student.

Project Numbers are assigned as XYYABC

- **X: M – Intermediate Division (7th and 8th grade)**
- **YY: Intermediate Division Category Names**
  - **BS – Behavioral and Social Science**
  - **BI – Biology**
  - **CH – Chemistry**
  - **CM – Computer Science and Math**
  - **CS – Consumer Science**
  - **ES – Earth/Space/Environment**
  - **ER – Engineering/Robotics**
  - **MH – Medicine/Health/Microbiology**
  - **PH – Physics**

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Intermediate – Behavioral and Social Science (MBS), 7th & 8th Grade

MBS100: Does latitude affect tempo?

My experiment asks, “Which material is the better heat conductor?” Knowing this information, architects and engineers will be able to construct better buildings that are effective against Mother Nature - Methods/Materials - In this experiment, I will be using three test subjects with variables. The materials are a slab of wood, a ceramic dish and a metal lid. The results delighted me. My hypothesis was right! Metal is the best heat conductor and wood is a good heat insulator. From this I learned ceramic is also both. While the metal dish melted at 1:15 the ceramic dish melted in 1:45.3. From this experiment I learned that metal is the best heat conductor. I also learned that wood is a good heat insulator. Ceramic is somewhere in the middle.

MBS101: Music Genres and Test Scores

Listening to music while studying has been doubted to whether it helps concentration or if it causes distraction from the task at hand. The experiment “Music Genres and Test Scores” helps identify which music genre is better to listen to while studying math and English. The genres involved are no music, classical, country, rock, and pop music. The hypothesis is that while listening to classical music, students will have the highest scores out of everything. Classical music is predicted to be the best because it helps with concentration, verbal skills, and it calms the nerves. The procedure used is, first, write five different English and math test. Next, find a classroom and students who have permission to participate. Then, pass out the first test and play no music for ten minutes. When the ten minutes is over, give the students a break for two minutes. When the break is done, pass out the second test and play classical music. After finishing, repeat the cycle with different genres playing. The data collected from this experiment proved that country music is the best to listen to while studying English, with a 94.91% average score. In math, the highest average was 78.70% for no music. In the end, the hypothesis was refuted because classical music was not the best, but it was the third best type of music to listen to while studying.

MBS102: What is Your Motor-Vation?

Cell phone use while driving is one of the leading causes of car accidents. I wanted to see if cell phone use could affect motor skills. To perform this experiment, I had participants bounce a tennis ball for one minute, with and without engaging on a cell phone. I counted the number of bounces with and without the cell phone and found the percentage of decrease between the amount of bounces. Based on my results, my experiment proves that motor skill proficiency decreases while talking on a cell phone, thus proving my hypothesis.

MBS103: Stressed Out!

The project I designed tests the subjects ability to complete math problems and how accurately they were completed and comparing that to how much time was needed to complete and the stress they felt before the tests and after. The data I collected included the time taken to complete each test, the accuracy of their answers, and the stress level they felt before and after the test. My purpose in doing this project comes from previous experience in testing and how time limits can have effects on it. In doing my test, I had my subject first scale their current stress on a scale from one to five. After doing that, they completed the tests in order of unlimited time, eight minutes, and finally four minutes. After they have completed all of the tests I had them rate their stress again on the same scale. I had assumed that with less time, they would become more stressed, therefore become less focused, and their overall accuracy score would fall.

MBS104: Typoglycemia

How sensitive are humans to typoglycemia? This topic will be investigated to see if phonics needs to be taught as heavily. First, give the student a typoglycemic sentence with 40% of the letters missing and have the student try to read the sentence out loud. Continue adding 10% of the sentence’s letters until the participant can read the sentence. The hypothesis for the project is if a student reads a typoglycemic sentence, then the student will be able to read it clearly at 100% of letters. Results will be available on fair day.

MBS105: B&W vs Color

The purpose of this experiment is to see of changing the color of a custom built videogame affects the participant’s completion time. To conduct this experiment, I will examine the participant’s completion time with the different color videogames. The experimental results were measured by comparing the participant’s completion time with the different color videogames. The results of the experiment showed that the participants had a better completion time in the black and white videogame than in the full color videogame. The results indicate that the hypothesis should be rejected because the participants had a better completion time in the black and white videogame than in the full color videogame. A new hypothesis will be accepted which states, if you have a black and white videogame and a full color videogame, then the participants will have a better completion time with the black and white videogame.

MBS107: Video Game Reaction Time
For my project, I tested if experienced video game players have faster reaction times than a non-experienced player. I used an online game designed to test reaction time. I put all subjects (volunteers) through this game to test their reaction time. They were either someone who plays video games on a regular basis or someone who plays rarely. I recorded their specific data. After I had enough information, I found the total average in time for each group, experienced or non-experienced.

MBS108: Does practice make perfect?
Does hands-on practice, mental practice, or no practice at all leads you to be a better shooter?. Does practice really makes perfect. So I will have to get 3 groups and I will make them shoot 10 free-throws for ten minutes every day for two weeks. I will ask the first group of three volunteers to practice shooting free-throws for ten minutes every day for a period of time. I will ask the second group of three volunteers to only mentally do themselves practicing free-throws for ten minutes every day for a period of time. I will ask the third group of three volunteers, your control group, not to do any practicing of any kind for a period of time. My results and conclusions will be available at the fair.

MBS109: String Theory
In my experiment, I set out to determine how well humans could interpret guitar chords in terms of learning a new language. First, I would play “A” five times. Next, I would play a jumble of five random chords, one being “A”. If they picked out “A” on their first try, they would get a better score. I did nine tests per subject (A, B, C, D, E, F, G, A where the subject covered their ear that was closest to the amp, and A where the subject was not given any guide.) Older test subjects heard better, especially B.

MBS110: Do Distractions Affect Freethrow Shooting?
The title of my project is “Which Distraction Affects Free Throw Percentages Majorly?” I chose this project because I have been playing basketball for 7 years and know that distractions in basketball can affect your shot. My problem is which distraction dramatically affects the amount of shots an individual makes from the free throw line? Sound distraction? Movement distraction? Sound and movement distraction? To execute my problem I had to do the following:
First, I collected Human Informed Consent Forms from participants in my project. Then, I had participants shoot forty free throws with various distractions. The results and conclusion will be located on my project at the day of the fair.

MBS111: Does calling or texting affect reaction time more?
The purpose of this investigation was to test whether reaction time was affected by talking on a cellphone more or less than while texting on a cellphone. Subjects, starting at 0cm, were to catch a meter stick as the experimenter dropped it from 100cm. First, a baseline score was done on each subject: five drops with no apparent distractions. Then five drops were done while the subjects were talking on the cellphone. Finally, five drops were done while subject were texting on the cellphone. The results supported that talking affected reaction time less than texting.

MBS112: Puppy, do you speak English?
Most dogs listen to commands given to them. But did you know that many dogs actually don’t understand half of the commands given? As a dog owner, I wanted to find out how much my dog really comprehended of what I told him. To do that, I tested several dogs by telling them words that are similar to common commands, such as “fit” instead of “sit,” and altering the tone of the command to see if the dogs still obeyed. The results showed that dogs only obey to words they have been taught, not similar sounding words or altered tones.

MBS113: Baller Status
Please visit student's exhibit on Fair Day for abstract.

MBS114: Flour Power
Please visit student's exhibit on Fair Day for abstract.

MBS115: Feature Face Off
I have designed an experiment to test which feature is most recognized on a face.

MBS116: Color Vs Color
The purpose of this experiment was to see if eye color could affect the ability to identify colors in low light. To conduct this experiment, I asked my subjects to identify all five of the colors of the construction paper on the wall, after the colors have been identified they waited two minutes and identified the colors again seeing if they wanted to make any changes to the choices. The experimental results were measured by how many colors in each trial combined, the subjects got correct. The results of the experiment showed that blue-eyed subjects were most successful in my project. The results indicate that the hypothesis should be considered both correct and incorrect, I believed that, in some cases eye colors can affect the ability to identify colors, and it did, but I also predicted that brown-eyed subjects would be more successful in my project, which was incorrect.

MBS117: The Hot Spots
As a basketball player, it is interesting for me to learn if an average person can make a basketball shot without using the backboard. If the average person can shoot a basketball and shoot at the backboard then it will increase their shooting accuracy because you will learn how to shoot the basketball better and more accurate. After giving out human consent forms, gather subjects between the ages of 12-14. Ask subjects to shoot a basketball from a chosen spot on the court. (Time involved is about 10-15 minutes) for each trial. My final results will be available the day of the science fair.

MBS118: Tricks For Treats
For this years science fair I wanted to do something with my new Yourkee Poo, Lily.My science fair is called Tricks for Treats. This project involved my dog learning a series of new tricks, they are :sit, roll over, paw, lay down and dance.If she responds to all of the commands she gets a whole treat, if she responds to some she gets half a treat. She is progressing nicely, but still needs more training

MBS119: Power or Placebo
Do Power Balance Technology bracelets work? My experiment tested whether these bracelets, which claim to help you maintain balance, work, or if wearing them causes a placebo effect. I tested how long subjects could balance on one foot wearing the power bracelet, wearing no bracelet, and wearing a placebo bracelet. My hypothesis was that the power bracelet and the placebo bracelet would trick the subjects' minds into believing they would balance longer than when wearing no bracelet. My testing supported my hypothesis. These findings show that the placebo effect does occur when wearing a Power Balance Technology bracelet.

MBS120: Does the Color Affect What You Eat
We wanted to see if the color of food affected what people chose to eat. We made the cookies four different colors and left one plain. Then, we asked the participants which they would rather eat. We found that the girls in each age group mostly chose the normal color and the boys in each age group choose blue or green for the most part. We found that our hypothesis was some what correct. We thought that the older you were the less appealing color was to you and that the younger you were the less you would want a plain cookie.

MBS121: What is the best way to pace yourself while running?
My science fair project is "What is the best way to pace yourself while running?" The reason that this is important to, me is because it can show others and me the best way to pace ourselves while running. My participants will go a set distance. There will be four trials with four different methods of pacing. The first method is just walking for the base. The other three will consists half of walking and either jogging, running, or sprinting as the other half of the pacing speed. I will have my results and conclusion the day of the fair.

MBS122: Mighty Mentor
My experiment is about playing educational games with first graders. It asks the question, "Do educational games actually help students improve their grades or are they just another way for them to fool around?". In the end, the games did help them improve, but the control group also improved. I came up with the conclusion of inconclusive because there is no concrete evidence to say the games were the reason my groups scores did increase. They did improve, but everybody else did, too.

MBS123: Does Music Help Test Scores?
The purpose of my project is to find out how music effects test scores. I choose to do this project because I wanted to know if music would help with testing habits. This could help people get higher test scores. If I give a math test and music to listen to then their very likely to concentrate because it will help them stay focused. My procedures: give permission form to the school students, get permission form from school students, give the math quiz to participants, let participants choose music, give them limited time, pick quizzes up and grade, give other math quiz to participants, have participants choose a different song from the lists. The results and the conclusion will be stated at the science fair.

MBS124: Face the Music
Concentration is a big problem when doing homework, especially with all the distractions we have today. I wanted to find out if the type of music you listen to while working affects your performance, so I chose a generic instrumental song and a pop song and had 10 different adult and child volunteers complete a set of math and reading problems, while I scored them on time and answers correct. After experimenting, I found out that the pop music produced better results in 8 of 10 participants, showing that it kept them focused on their work and not the music.

MBS125: Who Works Better in a Timed Task Children or Adults
To find out if children perform better in a timed task children or adults. The first I test the participants, they will have an unlimited amount of time to complete the game Perfection. During this time I will be recording how long it will take each participant to complete the game on a stopwatch. I will wait one week and test the participants again. This time, however I will be using the sixty second game timer. After sixty seconds of play the board pops up, all pieces in the participants hand will have to be placed on the table next to them. I count the remaining pieces on the table and determine how many pieces will be left.

MBS126: The Stroop Effect
The purpose of my experiment was to test the stroop effect between seventh and eighth grade males and females. I tested them on reading words and recognizing colors of the words. My data shows how long it took for them to read the words and recognize the colors. The males had a shorter amount of time to read the words by 0.3 seconds. The females had a shorter amount of time for recognizing the colors of the words by 0.73 seconds

MBS127: Screens vs. Technology: Is Technology Hurting Your Reading Comprehension
Is technology hurting our reading comprehension? I performed two tests – the subject had to read a short story on an iPad and answer comprehension questions after. Then they had to read a short story printed on paper and answer comprehension questions. Each student had a time limit of 5 minutes. I considered the total time taken and their test scores on both tests. I compared these test scores to their current reading comprehension grades. My data supported my hypothesis: better scores on paper.

MBS128: Comparing Stress Components in a Teen's Life
If you are or have at one point been a teenager, then you would understand that teenagers get stressed all the time. Whether it's schoolwork, friend, family or something else-all teenagers find some way to stress about nearly everything. Now, me being one of the teens who really can find stress under any circumstance and gets frustrated or stressed very easily, I decided to conduct an experiment in which I compare the stress components in a teen girl and a teen boy's everyday life. Throughout my original research, I discovered that under different surveys that were conducted, girls and boys had different stress components, and girls seemed to be more stressed.

MBS129: Do Certain Sirens Relate to Certain Emergencies?
This researcher will test to see if various siren sounds effects correspond to certain emergencies. The purpose of this experiment is to see if the correct sirens are being used for emergencies. Each participant will be given a survey which it asks them what siren is being heard. My hypothesis is that 90% of people will get the siren sound effect right. All data will be expressed as an average. Data will be available on fair day.

MBS130: Maze Runner
Please visit student's exhibit on Fair Day for abstract.

MBS131: The McCullough Effect
The purpose of this project was to determine if age affected how long a subject would experience the McCullough Affect. Hypothesis: I predict that the 25-27 age group will have the longest amount of time experiencing the McCullough

MBS132: Does personality affect a person's preference for dogs or cats?
The purpose of my experiment is to see if dog and cat people have a similar personality variable. To conduct this experiment, I will have all participants complete the "Myers Briggs Personality Test." The experimental results were measured by the different personality variable. The results of this experiment shows that dog people and cat people have different personalities. The results indicate that the hypothesis should be accepted because the dog and cat participants had different personality variables.

MBS133: Images or Facts: Which will Persuade us not to Smoke?
In this project, I will be looking at how we can improve our anti-smoking message. I will be surveying my fellow eighth graders electronically to get an idea of what messages might be more powerful in dissuading them from even starting smoking. I will ask the test subjects to pick whether images of health effects vs. statistical data provoke a more powerful anti-smoking sentiment. Perhaps we will be able to get a better understanding of what content should be in anti smoking ad campaigns and can save thousands of future adults from smoking related deaths and illness.

MBS134: Hot or Cold?
The purpose of this experiment is to find out if student test scores will be higher in a warm or cold room. To conduct this experiment I tested students in a warm and cold room, and compared the results. The experimental results were measured by observing which temperature room had the highest test score. The results indicate that my hypothesis should be rejected, because my hypothesis stated that: If testing students in a warm and cold room then the warm room would be higher. The cold room had a higher test score so therefore my hypothesis is inaccurate.

MBS135: The Power of Music
For my experiment this researcher will be testing 18 students; six from each grade: three males and three females. This is to determine whether or not music will enhance running performance. The hypothesis is that when music is used, the time of the run will improve. The participants will run three laps around the outside of a normal basketball court with no music. This will be repeated with music. The length of time will be recorded. Data will be analyzed and expressed as an average. Results will be available on fair day.

MBS136: Memory Method Madness
The purpose of this experiment was too see which study method works best out of the five different types: audio, visual, mnemonic, repetition, and note taking. I am always trying to find new and efficient ways to memorize things. I tested participants in 5 groups. Each was assigned a different method. They were told to memorize a list of eleven objects. I hypothesized that repetition would work best because that's what works best for me, but mnemonic had the highest average score. Note taking came out with the lowest score. Mnemonic is the best way to list memorization.

MBS137: Contagious Love
I did this project to see if smiles were contagious. There were three procedures executed. With subject A, I made no eye contact with the person, then recorded their age to the nearest ten, gender, and if they smiled. With subject B, I made eye contact but had no facial expression, then recorded the information. With subject C, I made eye contact and smiled, then recorded the information. I repeated each procedure until I had enough to support a conclusion. Procedure A, 0% of people smiled. Procedure B, 12.5% smiled. Procedure C, 39% smiled.

MBS138: How Does Gender Affect the Way Color Shade is Seen?
This researcher will test 60 students to see if gender affects ability to see shades of a color. 30 male and 30 female participants will be asked to look at a series of 20 shades of the color red in gradient format. The number of shades identified will be recorded. The purpose is to see if a certain gender is better at art. The hypothesis is that females will be able to see more because they hit puberty first and have a brain that is further developed. Data will be available on fair day.

MBS139: Which Font Give the Best Memory?
It is hypothesized that a simple font style will allow a person a better chance to memorize written information. Middle school students will be tested to confirm or deny this hypothesis.

MBS140: Does Appearance Matter
My science project is on how people are attracted to different appearances. I surveyed a group of ten people, five girls in one group and five boys in another group. They are all different ages. I took three different pictures of a girl, one with a darker appearance, one with a girly appearance, and one with a sporty appearance. I asked which person /appearance they would say, "Hi" to. Even though it's the same person in all three pictures, they all looked different. I recorded the data to conclude if appearance matters. The outcome of my experiment was different than expected. Part of my hypothesis was correct. The darker appearance was rejected the most, but the girly appearance was selected the most.

MBS141: Does Stress Affect Body Temperature?
In my experiment I tested 9 students, ages 11-14, to see if their body temperature changed when they were put under a stressful situation, such as a difficult test. I found this experiment easy to relate to and wanted to see how anxiety affected the body. On my Stress Level chart, the temperatures before the test are lower than the ones after the test. On my Temperature Change chart, the temperatures of the students went up significantly after being tested. In conclusion, when a person is afraid or stressed, their body temperature rises.

MBS142: The Bouba Kiki Effect
The purpose of this experiment is to see do people associate certain symbolic characteristics, like sharpness and roundness, with certain sounds. To conduct this experiment I will ask participants to match certain sounds with certain shapes. The experimental results were measured by associating sharpness and roundness with Bouba and Kiki. The results of the experiments is that people do match certain symbolic characteristics with certain sounds. The results indicate that the hypothesis should be accepted. My hypothesis stated that people would be able to match certain shapes with sounds.

MBS143: Choose Your Treat
My project was to test whether or not my dogs have a preference when it comes to treats. I did my project to see if out of the variety of treats we gave them which was their favorite. I took our three more frequently bought treats, put them on a cookie sheet, and let them choose. I did this for both dogs ten times. Dog 1 and Dog 2 chose different treats, but chose those treats over and over. If I were to do this again I would include more dogs.

MBS144: The Power of....Nothing
The purpose of this experiment is to see if the placebo effect can influence the amount of time a person can keep their hand in ice water. To conduct this experiment, the test subjects were asked to place their hand in ice water for as long as they could, with and without a placebo. The experimental results were measured by the amount of time the test subjects hands were kept in the ice water. The results of this experiment showed that the placebo effect worked on fifty percent of the test subjects. This hypothesis should be partially accepted and partially rejected because the placebo effect worked on half the test subjects.

MBS145: Does a customized freethrow routine affect shooting percentage?

The title of my project is, "Does a Customized Basketball Routine Affect Your Percentage at the Free Throw Line?" The purpose of this project is to find out if a customized free throw routine can affect the percentage of shots made at the free throw line in basketball. I chose this project because I play basketball and I would like to know if a routine actually helps you. First, I will collect human consent forms. Next, I will have subjects shoot 10 shots with both routines. Finally, I will record the data into my data table. The results and conclusion will be presented in my final project.

MBS146: Does crossed hand/eye dominance affect basketball shooting percentage?

My project tests the effects that crossed hand/eye dominance has on shooting free throws in basketball. Crossed hand/eye dominance is having your dominant hand and your dominant eye on the opposite side of your body. My project will decide if this helps or hurts your free throw percentage. I will use 8-10 subjects and will perform 10 trials. They will be asked to shoot 10 free throws during each trial. My final conclusions and results will be posted at the fair.

MBS147: Does the Color Affect What You Eat?

We wanted to see if the color of food affected what people chose to eat. We made the cookies four different colors and left one plain. Then, we asked the participants which they would rather eat. We found that the girls in each age group mostly chose the normal color and the boys in each age group choose blue or green for the most part. We found that our hypothesis was some what correct. We thought that the older you were the less appealing color was to you and that the younger you were the less you would want a plain cookie.

MBS148: Get My Good Side!

Purpose: To see if people can look more appealing from different angles.
Procedure:

1. Take 2 pictures (one from left side one side and one from the left side) of males and females
2. Choose judges who do not know the people in the photos.
3. Print pictures and judges questionnaire sheet.
4. Ask a judge from which angle does each person look more appealing and to fill out the questionnaire sheet.
5. Collect data.
6. Put data in bar graphs.

MBS149: Enjoy it Now, or Later

I did my science fair project on delayed gratification. I wanted to find out if it developed at a young age, faster in males or females, and if having an iPhone present effects delayed gratification. I split a group of preschool student into two groups. Each subject could play one level of Angry Birds then or three in ten minutes and to ring a bell if they chose to play immediately. I found out that most of the students chose to ring the bell and play the one level, and that an equal amount of males and females waited ten minutes.

MBS150: Tough for Kids But Easy for Grandma; Child Resistant Caps

The ease with which safety caps can be removed will be studied in both young children and older adults.

MBS151: Ruler Drop

For my science fair project I chose the ruler drop test because reaction time is a topic that has interested me for a while. I used my family as my test subjects because I could access them throughout the entire day, which was the Independent variable in this test. The test was meant to answer whether or not the time of day affected reaction time. When I completed my testing, I made 2 graphs (under results) based on the distance the ruler fell and the number of times a family member dropped the ruler. My results did not really give any evidence towards one time of day being the better time for reaction time.

MBS152: Classical vs. Pop

Music has always been a part of everyone's lives. Whether it is used to pump us up for a sports game, calms us down to go to sleep, or to make us feel better after troubling times, music has the ability for us to do many things. But what if music had the ability to help us study? Perhaps a certain kind of music would be more beneficial. In my experiment, I want to test if classical music is more beneficial in studying compared to popular music.

MBS153: Music to my Heart

The purpose of my experiment is to determine if different types of music genres affect a person’s heart rate. I first collected three music genres. I then assembled 20 test subjects. Eleven were middle school students, and the other nine are adults. Each person rested three minutes, and then heard two minutes of each song. There was a two minute resting time period between each song. Out of the all the test subjects, heavy metal created the greatest increase of the pulse rate. I conclude that the majority of the heart rates increased to most of the songs.

MBS154: Testing Bias in a Photo Lineup

The purpose of this experiment is to see if hearing a description of a suspect affects results of a police lineup. This may validate police lineups. Four participants will view a picture of the prime “suspect” separately, have twenty seconds to study the photo, and then have one minute to write a description of the suspect. The description will be read by fifty other participants before selecting a suspect from a lineup of six individuals. This researcher’s hypothesis is that after hearing the description, the participants will identify the correct suspect. Results will be displayed on fair day.

MBS155: Font Effect on Memory

Whether it’s for a spelling test, a final, or just day-to-day information, remembering information can be an issue for everyone. This experiment was designed to learn if the font style of text has any effect on the memory of the information. A list of words was typed in two different fonts. One font was typical and legible while the other was slightly unusual and illegible. Students were tested on their memory of these words in both fonts after having read them for the allowed time. Results showed that the more unusual font led to better memory of the words.

MBS156: Hot or Not

"Will the swimming pool with black lining or blue lining have the greater temperature? I hypothesize that the swimming pool with the black lining will have the greater temperature."
To conduct this experiment, cut and glue the linings to fit the pans. Fill the pans with water and place in direct sunlight. Place a thermometer in each pan. Record the water temperatures every hour for three hours. I have found that the minipulated variable is the pool lining's color. The responding variable is the water's temperature. My conclusion is "After conducting my experiment, I have found my hypothesis to be accurate."

MBS157: Does the Shape of the Frame Surrounding a Picture Affect Short Term Memory

Purpose: Will a subject remember more objects enclosed by curved or straight lined shaped frames?
Hypothesis: Test subjects will remember more objects enclosed by strait lined shaped frames than curved line shaped frames.
Procedure:

1. Select the frame that will be tested and explain directions to a female test subject
2. Permit the subject to view and memorize as many pictures as possible in 30sec.
3. Turn computer off and record the number of pictures remembered
4. Repeat steps3-5 for the remaining frames
5. Repeat steps1-6 for 29 more females test subjects and 30more males test subjects

Conclusion: Final results will be available at fair

MBS158: Y Won't U Play Wit Me

My science experiment is based on the Clark Doll Test. This experiment illustrated effects of stereotyping on children. My test required the children to answer questions similar to those of the Clark Doll Test. The results showed the white dolls were associated with positive qualities while the black dolls were associated with the negative qualities. I hypothesize the percentage of kids associating the white doll with positive qualities will be higher than the black doll. This experiment demonstrates the affect off stereotyping on children. I wanted to prove that issues that were relevant during Clark's Doll Test are relevant today.

MBS159: Lefties vs. Righties

What is the effect of people writing with their opposite hand? Are left-handed people more proficient at writing with their opposite hand than right handed people?
I first decided to conduct this experiment when I was playing baseball. I was playing with two left handed players and after observing them, I tried to throw the baseball with my non-dominate hand (left). After throwing the ball, I was so thrown off guard, I almost fell over. Since this happened, my curiosity instantly sparked about right and left handed people and their ability to use their non-dominate hand. I thought it would be interesting to see if what happened to me might also happen to other people with an everyday aspect; writing.

MBS160: What Makes you Scared?

For my experiment to test fear, I created a survey. I wanted to see what fears people had at their current age, and the fears that they had when they were younger. At the beginning of the survey, the subject had to write their age. The survey had two sections to fill out. The first section was where the subject would have to circle the fears they have at their current age. Then, at the bottom, there was another section where the subject had to circle any fears they had through their childhood. I then put the most common fears into a graph, to see the comparisons.

MBS161: Colorful Feelings

Colors are communication tools signaling action and causing physiological reactions. I tested boys and girls reactions to different colors. I hypothesize that subjects seeing red or yellow will feel excited, while seeing blue or purple will make them feel calm. I found that boys associated warm colors with madness and happiness. Boys associated cooler colors with anxiety. Girls associated warm colors with madness and happiness, while cooler colors were associated with calmness. In conclusion, for most of my results the warmer colors were seen as exciting and the cooler colors were seen as calming, so my hypothesis is correct.

MBS162: Learning in a New Age: Which is Better, Writing or Typing Notes?
It is hypothesized that taking notes using a computer (typing one's notes) will result in better retention when compared with note-taking using paper and pen.

MBS163: Do Clothing Choices Impact Behavior?
My project is testing how clothing choices impact the behavior of others around you. Basically what I did for my experiment was take one female and one male and dress them in business apparel and also inappropriate apparel. They were to ask a stranger what time it was and get their reaction on how they answered the question. They asked several people that were various ages. They did the same exact thing for the business aspect of the experiment. My hypothesis was that when they were dressed inappropriately they would get a negative response like disapproving of the subject.

MBS164: Can Males or Females Multitask Better?
Please visit student's exhibit on Fair Day for abstract.

MBS165: Bounce Me
This experiment's purpose was to test whether athletic shoes rather than sock-covered feet produce a higher vertical jump. To conduct this experiment, I will take 6 vertical jumps; 3 while wearing only socks on my feet and 3 wearing socks and athletic shoes. Before the jumps, baselines will be established by standing on flat feet with socks only and then with socks and athletic shoes and extending my right arm up to the wall to measure the heights reached. The experimental results were measured by extending my right arm straight up and touching a point on the wall above me at the peak of the jump. This point of contact was the measure of the height reached. The differences between the baseline measurements and jump measurements together determined the experimental findings. The results of the experiment revealed that the hypothesis should be accepted that wearing socks and athletic shoes produce higher vertical jumps than wearing only socks.

MBS166: Reward vs. Punishment
The purpose of this experiment is to test whether reward or punishment is a better method. To conduct this experiment I administered a test and bribed half of my participants with a reward and threatened the other half with a punishment. The experimental results were measured by comparing the praise vs. the threats and the effort put forth. The results of this experiment show that the punishment group performed better on the multiplication sheet, while the reward group had fewer disallowed movements. The results indicate that the hypothesis was inconclusive as shown by my data.

MBS167: How Do You Beat to The Music?
Music is a huge part of daily life. This project tested if different genres of music affect heart rate. The test subjects listened to five different genres of music for one minute each. Their heart rate was recorded after each song. The data proved that loud, fast music like heavy metal raised heart rate greatly. Soft, calming music like classical made heart rate drop most. This data may explain why certain restaurants use certain genres of music. It also may help people find certain music that can calm them down or pump them up.

MBS168: Do Left-Handed People Have Similar Personalities?
The purpose of this experiment was to determine if left-handed people have similar personalities using the Myers-Briggs Type Indicator. I predicted that left-handed people would have similar personalities (from the Myers-Briggs Type Indicator) in that the areas of introversion, intuition, feeling, and perceiving will more commonly appear on the four letter "code" that contains the result.
Procedure:
1) Print out 20-26 copies of to Myers-Briggs Type Indicator
2) Make a list of subjects for the experiment
3) Give the test to approximately 10-13 left-handed adults and 10-13 right-handed adults
4) As you give the tests to the subjects, enter their name onto your list
5) Administer the test to all of your subjects
6) When all testing is completed, look over the results
7) Calculate by percentages, if left-handed people had similar results in the certain categories of the indicator(introversion/extraversion, sensing/intuition, judgment/perception, thinking/feeling)
8) Make a table/graph for the result percentages

Results will be discussed at PRSEF

MBS169: What Affects Gender Bias?
Can time pressure affect someone's implicit gender bias? This was my question for the science project. I hypothesised that a person with less time (five minutes specifically) to rate four job resumes for civil engineering would be more gender biased than a person with more time (ten minutes). I thought this because they would take shortcuts instead of being fair. I tested participants by having two sets of resumes and giving participants them to sort. The difference between the sets are the first names' genders. My result was that my hypothesis was mostly supported by the data I collected.

MBS170: Memorization
The purpose of this experiment is to see if certain genders are better at memorizing. The researcher will show 50 males and 50 females a list of 15 words for 60 seconds and ask them to recall I as many words in 60 seconds as possible. After testing, results will be expressed as an average to answer the problem: Does gender affect memorization? The hypothesis is that males will be able to memorize more than females. Results will be available on fair day.

MBS171: Does It Help?
The purpose of my project was to see if people can run faster with or without music. First, I got my testers one at a time. Before they started I started my stopwatch. They had a limit of six laps. Then I stopped and wrote down their time. I did this twice for each person with and without music. Then, I compared their times to see which was better! Do this as many time as needed/ wanted. I did 5 testers, 3 females and 2 males.

MBS172: What do kids fear the most?
What do kids fear the most? I gave a survey to third graders and eighth graders, and I was really surprised at several things. The most common fears were death and darkness. I was also very surprised that many of the little girls in the third grade were scared of evil dolls. I personally thought that more of the younger kids were going to be scared of being lost. There were no eight graders that were scared of public speaking, which is another surprise but overall I thought it was a fun and interesting experiment.

MBS300: Music Memory
Our project, Music Memory, included testing eight different subjects to see if music affected memory in a positive way. We tested each subject by having them study a list of words for a maximum of ten minutes. We then had them study an excerpt from a song for a maximum of ten minutes. We also gave them an electronic device with the song so they could listen to the song repeatedly if chosen to do so. Our results were that music affects memory in a negative way, causing most test subjects to remember the tune instead of the actual song.

MBS301: Warp Speed
The purpose of this project is to determine what perspective is better for maneuvering a remote controlled car. To conduct this experiment we will test the participants' ability to maneuver the remote controlled car. The experimental results were measured by how many seconds it took for the participants to complete the course. The results of the experiment showed that the first hand perspective was the best perspective. The results indicate that the hypothesis should be accepted because the participants received a better score on the first hand perspective.

MBS302: Memory With Age
The purpose of this experiment is to see if age affects the mind's ability to read off a piece of paper. For this experiment, we asked for permission from all participants. Our test consisted of 30 items. Our participants received these lists and were allowed to study for 10 minutes before we took the lists away. After the study period they were allowed to do whatever they wished for 1.5 hours before we called them in one at a time and asked them what they remembered. Our testing results will be provided at the fair.

MBS303: Influence of Packaging on Children
Project : the influence of packaging on children
I wanted to see if putting a bright and colorful box on a healthy food like carrots, or any other nutritional food, would make a child choose that over a plain, nondescript package. I ran two different surveys. The first was just snacks by name to see which the preferred snacks were. The snack with the least amount of votes was given the brightest box design and the most popular snacks were given a plain package. I think that the children will go for the brighter box instead of the plain boxes.

MBS304: The Blind Test
To Be Added

MBS305: Texting and Reaction Speed
Are you afraid of getting hit while driving? We know we are. That's why we constructed an experiment that tests people who drives reaction speed. We would drop a yard stick into someone's hand while they are texting, after they finish texting, while reading a text and after they finish reading a text. We measured in centimeters with the yardstick. We documented it on surveys we made that ask questions like: How long have you been driving? How much do you text while driving? How far do you have to drive to work?

MBS306: How Commercials Affect Our Decisions
Is advertising really worth all the hype that it gets? We decided to test if our decisions are really influenced by commercials by making a survey of twelve questions with answer choices being numbers one through five and then giving it to three groups of fourth graders, after taking the survey, two of the groups were given a commercial to watch, one group a McDonalds commercial and one group a Subway commercial and then retook the survey. We looked over the results and after making several charts and graphs, we concluded that commercials do, in fact, effect our decisions.

MBS307: Music Madness

The purpose of this experiment is to find out if people will remember events in a chapter of a book a book better with or without music. To conduct the experiment we will have the participants read a chapter of a book with and without music and write a summary of what they read. The experimental results were measured by how accurate the summaries were. The results of the experiment show that if you are reading without music then you will understand what you are reading better than you would with music. The results indicate that the hypothesis should be accepted because people did better on their summaries without music.

MBS308: Right Vs. Left

The purpose of this experiment is to find the similarities and differences between right and left handed people. To conduct this experiment we will compare right handed people to left handed people. The experimental results were measured by the similarities and differences between different handedness people. The results showed that left handed people have more similar personalities as other left handed people, and right handed people have more similar personalities as other right handed people.

MBS309: Dominance

We are testing to determine the dominance of your brain.

MBS310: On the Minds of the Impatient

The purpose of our project was to test delayed versus instant gratification, somewhat like the Stanford marshmallow experiment. However, we asked people a few hypothetical questions concerning money rather than food. We were testing to see if gender and age made a difference in our results, which it did, and we came up with several theories as to why people might have answered how they did. We used graphs and charts to analyze our data and to help us understand the minds of the impatient.

MBS311: ParaTweet

We have a bird and we want it happy. For our experiment we wanted to see if the color a bird is surrounded in affects its behavior. Some behavioral changes we were looking for were more or less singing, squawking, or staying silent. We took Styrofoam boards and covered them in colored papers and put them around the bird's cage for 1 hour each color. We tested red, black, yellow, and white. Our results showed that the bird acted the same with every color. So, the color a bird is in does not affect the behavior of the bird.

Intermediate – Biology (MBI), 7th & 8th Grade

MBI100: You Cool?
Do mints actually change the temperature or is it the sensation in your mouth? I hypothesize that the mint is just a sensation because when you see things with mint on it, it seems that they have ice crystals on it. Put mint in room temperature water and record the temperature after 5, 10, 15, and 20 minutes. I concluded that my hypothesis was correct; it is the sensation in your mouth. If I were to do this project again, I would use different types of mints or record the temperatures out of someone's mouth.

MBI101: fingerprints R us
Please visit student's exhibit on Fair Day for abstract.

MBI102: The Effects of BPA and Triclosan on Planarian Memory
The purpose of my experiment is to find out if Triclosan and Bisphenol A (BPA) affect the memory of planaria. To conduct my experiment, I will first expose some of the planaria to different levels of BPA and Triclosan. Next, I will compare their memory to the memory of a Control group. I will use the collected data to form my conclusions. The results will be available on fair day.

MBI103: Are your eyes playing tricks on you?
The purpose of my experiment was how afterimages worked and how the cone receptors in our eyes adjust to stimulation. Our eyesight is important and color perception helps us identify objects and understand our world. My problem was, what images are left on your eye after you stare at a colored object and then look away? In Part 1 (Cone stimulation vs. Afterimage persistence), test subjects stared at a red circle for various times and then I recorded how long the afterimages lasted. In Part 2, test subjects looked at a three-colored circle, then at a white page. I recorded where the colors appeared and timed how long they were there. In Part 3, test subjects stared at the same three-colored circle for a brief time, then at a white page. I recorded what afterimage appeared. My final results will be available on the day of the fair.

MBI104: Bale of Hay vs. Soil
My project’s purpose was to see if plants would grow better in hay or soil. Plants, hay, soil and a pot were gathered and separated into two equal average heights. I planted half into soil and half into hay. Both plant sets were placed in the same location, sunlight, and watered half gallon equally. All plants were measured periodically and record. Results show the plants growing on hay grew more than the plants in soil. Nonproductive or eaten plants were eliminated from my results. My hypothesis stated plants in hay grew better in soil. My results proved I was correct.

MBI105: Tooth Stain?
Tooth stains are irritating problems that are easy to avoid but a hassle to remove. In my experiment I will test liquids that are most frequently drunk to see which ones stain the teeth the most. I will also test whether rinsing your mouth with water after drinking the liquid will do any good to prevent staining. I will conclude which liquid stains the teeth the most and figure out how to stop staining but still drink that liquid. I hypothesize that water will have an positive effect on the staining.

MBI106: Stretch Those Muscles
This project was very useful and helpful because of the awareness it gives me and my fellow athletes about the importance of stretching and what it can do for you. I had the volunteers complete the 3 trials without any physical activity beforehand. Then again on another day completing my stretching routine beforehand. All of the subjects increased their records by the very minimum of 2 and raised them by the maximum of 6. I have learned that I should always stretch to reduce the risk of injury and help my muscles perform better in my sports games and competitions.

MBI107: Cluck! Cluck! An EGGsperiment
The purpose of this experiment is to see if the introduction of peanuts into a laying hen's diet will increase the size and mass of its eggs.

MBI108: Get The Dirt On Soil
In my experiment, I was trying to find out what type of soil helped grow bean plants the fastest, tallest, and caused the most blooms. We used 25 plants for each type of soil fertilized soil, compost soil, potting soil, and top soil. I thought that compost would be the best type of soil because it adds natural nutrients and adds a balanced amount of everything. In the end I found out that fertilized soil did the best with an average growth of 55.2 cm but compost came in second with an average of 45.32 cm.

MBI109: Super Sweet Beat

The purpose of this project is to determine whether artificial sweetener has an effect of the heart rate of daphnia magna. It is from this information that I formulated the following hypothesis. I believe that as the strength of dilution increases so will the heart rate. However believe that spring water will not increase the daphnia's heart rate at all since they live in spring or brackish water. Since Natural sugar is not as sweet as some of the other artificial sweeteners used in this project I believe it will increase the will not increase the heart rate as much as Stevia. Since Stevia it is also natural, has no calories but is 200 times sweeter than natural sugar. Splenda, which is an artificial sweetener, will affect the heart rate of the daphnia more than the previously mentioned sweeteners because it is 600 times as sweet as natural sugar. However, Aspartame will increase the heart rate the most because it is said to cause cancer and tumors, and it is very harmful for your body.To determine which sugar increases the heart rate the most I will be creating dilutions of 0% sugar 100% spring water, 1% sugar 99% spring water, and the same for 10%, and 25%, for each of the 4 different sugars. 1 daphnia will be placed in a well slide under a microscope in one of the dilutions and control, which is spring water. For the 4 different sugars, the daphnia will stay in the dilution for 5 minutes, and then I will count the heartbeat for 10 seconds. For the spring water, I will put the scud in the water and immediately count the heart beat for 10 seconds since the daphnia came in spring water, there will be change. After everything is recorded I will multiply the number by 6 to get the heart rate for 1 minute. The final information will then be recorded.

MBI110: Acid Rain and Salt Damage

In my project, I will test the effects on pea plant growth of a simulated acid rain and a simulated salty snow melt. I will create the acid rain by mixing vinegar and distilled water, and I will create the salty snow melt by mixing salt and distilled water. I will water the Alaska peas with each solution and compare the results using the height of the pea plants.

MBI111: What is the effect of heat on enzyme activity?

I chose this project because I wanted to see how enzymes worked. Pineapples have enzymes that will help digest protein, so eating fresh pineapple might help digest your food. The hypothesis I investigated was If the enzymes are the freshest possible from raw pineapple then the most protein will be digested because there will be more active enzymes. I tested pieces pineapple by heating them in water to various temperatures. Ten chunks of pineapple, ten different temperatures, and using ten different pieces of Jell-O to see how much was digested. The enzymes digested the Jell-O until it reached 167 degrees. The conclusion was that the pineapples digested Jell-O up to 167 degrees.

MBI112: How do fish react to red, blue and ultraviolet light?

The purpose of my experiments was to work out which receptors contribute to the VMR by trying to trigger a response using different colored lights. I built a light box with blue, red, UV and white LED lights inside. It was connected to a computer and put into an experimental incubator. A 96 well plate with a zebrafish in each well with buffer was placed into the incubator at 28°C on a platform above an infrared camera and below an infrared light, so that I could shoot a video of the fish swimming in the wells (figure 2). I was able to make video recordings of zebrafish swimming in 96-well plates using an infrared camera. I was able to analyze these videos with MATLAB (and help from my dad). I interpreted that all of the different colored lights contributed to the visual motor response for larval zebrafish. My experiments have shown new information about the types of light receptors that can control movement in fish.

MBI113: Nutergy

Imagine you are a cross country runner. You have so many miles to run and have to have quick nutrition to keep you body in top form. Enter the nut- packed with protein and good fats, the nut is an essential part of a runner's diet. Hence, my experiment. Which nut gives off the most energy? By creating a home made calorimeter I was able to find the answer to this question. I hypothosized that the cashew would be the nut with the most energy. My hypothesis was incorrect. Almonds produce the most energy.

MBI114: THE WATER WARS

The purpose of my experiment was to find out what water is best to grow plants with. I filled red cups almost full with topsoil. I then planted 3 lima bean seeds in each. Iplaced them by a window. I watered each with 1/4 cup of the appropriate water once a week. I also collected results every 1-5 days. I took photos and marked growth on a ruler about once a week. I used my data to collect my results. My data shows that Tonic Water will grow lima bean plants the most efficiently in 39 days

MBI115: What fruit do ladybugs prefer?

The project I did was what fruit do ladybugs prefer. The three fruits used were strawberries, blueberries, and raspberries. To do this experiment use a behavioral tray and put one piece of each of the cut fruit in each corner. I put six ladybugs into the center of the behavioral tray, put the lid on it, and set the timer for five minutes. I repeated for a total of ten trials. Based on the results, I have found out that ladybugs do not like fruit. They went to the control more often than they went to the fruit

MBI116: Does the Color of Wood Mulch Affect Plant Growth

Purpose: Determine if colored wood mulch affects the growth of radish plants.
Hypothesis: The color of mulch won't affect the growth of the radish plants.
Procedure:

1. Place 50g of topsoil in a container without mulch.(Control)
2. Place 1 radish seed in the container prepared in step1.
3. Water with 25ml of distilled water every 3 days.
4. Determine germination and growth every 3 days.
5. Determine the dry bio mass of the plant at the conclusion.
6. Repeat steps1-5 for 19 other plants.
7. Repeat steps1-6 mixing10g of undyed,red,black,or brown mulch in soil.

Conclusion: Results available on fair day.

MBI117: Short Term Effects of Coca Cola on Teeth

My experiment tested the theory that soda causes tooth decay. I used an eggshell as the substitute for a human tooth and submerged it in Coca-Cola. I used two eggshells- one to be submerged for 10 minutes and the other to be submerged for 24 hours. Results showed that both shells lost one gram between days eight and nine even though one eggshell was in for 240 hours and the other was in for a total of 240 hours. My hypothesis was incorrect- it is the carbonic acid created by combining water and carbon dioxide that causes tooth decay. Afrer 10 minutes soda loses it's carbonation and goes "flat". That is why both eggshells had the same mass- the eggshell that sat in Coca Cola for 23 hours and 50 minutes sat in flat soda

MBI118: The Effects of Drought on Beans

Ongoing drought conditions are having a negative impact on Southwestern states' crop production. Dry beans are an important crop these states and the U.S economy. Dry beans, such as the kidney bean, are often marketed as drought resistant. This experiment was intended to test if drought resistant bean plants' growth would be significantly affected by water deprivation, similar to the loss of water during drought. I hypothesize that the bean plants will only grow for one week after being left without water, but will survive over the course of the entire experiment. This project had two main groups, the water deprived plants (drought group), and the plants watered for the entire experiment (water group). I began my experiment by watering both groups of bean plants, the water group and the drought group, for fourteen days with ten milliliters of water per plant. The next fourteen days the water group of bean plants received ten milliliters per bean plant and the drought group of bean plants received no water. After fourteen days, I watered the water group and the drought group for another fourteen days; however, my results were inconclusive, as many plants had lost turgor pressure and then became brittle and broke. It was determined that the watered plants narrowly grew better than the drought plants, but the difference was not as much as I had thought it would be. Part of my hypothesis was correct as the water-deprived plants did survive the prolonged loss of water; however, part of my hypothesis was incorrect as the drought plants did grow past the first week. After further research, it was found that low water availability causes other physical limitations in plants, which were seen in the experiment. During moisture stress, stomata close to conserve water. This also closes the pathway for the exchange of water, carbon dioxide, and oxygen resulting in decreases in photosynthesis, and therefore, leaf and stem growth. This project's purpose was to help farmers and other agricultural officials determine whether this crop can be grown in areas of states prone to drought, and how long these plants can survive without water.

MBI119: What scent lures a ladybug?

My project is on What Scent Lures a Ladybug. I wanted to do this experiment because I would like to know how to keep ladybugs out of my house or how to get them into my house. I now know that ladybugs prefer grapes over cranberries which where my initial hypothesis. My hypothesis stated that the ladybugs would prefer cranberries, but they did not. I conclude that the ladybugs like the grapes and I now know what crop to grow if I want ladybugs.

MBI120: YUCK!! What Happened To My Apple?

My project was to determine which food wrapping would prevent the most spoilage. The purpose fo the project was to help others and myself to prevent spoilage when you put an apple in the refrigerator, only to find that when you take it out it is all brown. I wondered how anything could do worse than the sandwich bag we are already using now, but my results showed otherwise. I am really glad I got to perform this experiment not just for my own benefit but for others as well.

MBI121: Yes to Fertilizer or No

In my experiment I am going to test the effectiveness of homemade fertilizers on the growth of a fenugreek seed. I am going to test the speed and time of how long it takes for the plant to germinate and I am going to compare each plant group to each other. My conclusion should either be saying which fertilizer works better and the speed of the plant growth.

MBI122: Can Direct Reprogamming Transfer Cells into Another?

The purpose of this experiment is to see if direct reprogramming can transfer cells into another. To conduct this experiment I will use bioinformatics and statistics to discover which cell type will transcribe more efficiently and function correctly to the target cell. The experimental results were measured by how efficiently the lung and kidney cell type transcribed into the target heart cell type. The results of the experiment showed that a kidney cell would be more efficient and reliable than the usage of a lung cell. The results indicate that my hypothesis should be accepted because shown and stated in the results I compared which kidney factors were expressed higher along with the lung factors. Clearly a kidney cell was the overall superior choice for direct reprogramming.

MBI123: Hot Dog Mummies

My question for my project was, "Will salt preserve a boiled hotdog better than sugar or baking soda would in the course of one week?" My hypothesis was that salt will preserve the boiled hotdog better than sugar or baking soda. The first step in my project was to gather all of my materials which were hotdogs, baking soda, salt, sugar and containers. The next step was to boil hot dogs and then place the boiled hotdogs in three separate containers. I then covered them with salt, sugar or baking soda. After one week, I removed the hotdogs from the salt, sugar and baking soda and recorded my results. I repeated these steps for three separate trials. In conclusion, I found that my hypothesis was proven correct. Salt did preserve the boiled hotdogs better than sugar or baking soda.

MBI124: Colorful Cacti

The purpose of this experiment is to change the color of two bristle brush cacti using colored water. To conduct this experiment I will need to give each cactus 2.5mL of different colored water and repeat throughout the weeks of experimenting. The results were measured by how much change the color of the cacti had experienced. The results of my experiment show that cacti can be changed with colored water. The results indicate that my hypothesis should be accepted and rejected because only one cactus, cacti B, changed color.

MBI125: Preservation

The purpose for the experiment is because I am interested in preservatives. The procedure I used was to add my preservatives to the food and check on them every single day for three days in a row, until they become unhealthy for human and animal consumption. Every single day I would smell, feel, and look at them. My data is my notes that I have written about the food. Also, what I used to preserve the food and the food I was using. The Results were that Refrigeration is the best way to preserve your food. But salt is the healthiest.

MBI126: Does Plastic Mulch Color Affect Plant Gowth?

Purpose: Determine if different colors of plastic mulch affect the plant growth.
Hypothesis: Dark colored plastic mulches will cause the bean plants to grow faster than light colored plastic mulches.
Procedure:

1. Place 275.3mL of soil and a seed in 210different cups and place them in 7 different containers
2. Pour 3.7854L of distilled water in container holding cups.
3. Secure the plastic mulch being tested over the opening of the cups.
4. Place the cups under grow lights.
5. Determine the growth of the plants every 3days a month.
6. Determine dry bio mass at the conclusion

Conclusion: Final results will be available at fair

MBI127: Changing Eye Color through Emotion

Can eye color change if we are emotionally moved? I have found that people with light color eyes undergo changes of color with varying emotions.

MBI128: Does Yeast metabolize Natural or Synthetic Sweetners Better?

Purpose: Determine if yeast will metabolize natural or synthetic sweeteners better.
Hypothesis: Yeast will metabolize natural sweeteners better than synthetic sweeteners.
Experimental Procedure

1. Collect needed materials.
2. Create a 50ml solution of yeast and distilled water not containing a sweetener being tested in accordance with the directions printed on the dried yeast package.(Control)
3. Determine and record the amount of CO2 produced in 15min.
4. Repeat steps 2-3 for 29 more trails.
5. Repeat step 2-4 for each set of the natural and synthetic sweeteners being tested.

Results will be shown on the date of the fair.

MBI129: Hydro Vs. Soil

The purpose of my experiment is to see if hydroponically grown lettuce grows better than soil grown lettuce. I used my hydroponic kit and I planted seeds in 4 pots. During my experiment I made observations. Once my plants were tall I measured them. Two grow lights were used and the plants got watered as needed. My hydroponic group got water changed and added nutrients. On day 38, my hydroponic groups tallest was 6 cm tall. My soil groups tallest was 5 cm tall. My hydroponic group's average was 3.3 cm. My soil group's average was 3.6 cm.

MBI130: Can Plants Move and Groove?

The purpose of my project is to measure a plant's response to gravity using time-lapse photography. I will measure the response by using a digital camera, large box, 6 mature coleus plants in pots, and a dark blanket. The reason I would need those things is because the box and the cover would go over the plants making it completely dark. The reason I would need a camera is to take pictures of the plant as they move and respond to the change in gravity since there is no light present to overtake the response. I think the plants will move because of plants have a sleeping cycle called circadian response. If it's dark all the time the plant will think that its night and will be asleep most of the time. Also I think that plants move towards light and if there is no light it will start to close its leaves or petals and move towards the pull of gravity. The reason I am so interested in this project is because I actually have a house plant and wondered if it ever went to sleep or even moved but I have now.

MBI131: Hydroponic Fertilizer Comparison

Do hydroponic gardens need expensive fertilizer? Hydroponic gardens are becoming more popular. The most expensive element is the fertilizer. This experiment compares two different fertilizers, one designed especially for hydroponics, MaxiGro, and a typical plant food, Miracle Gro. Both work equally well, so it is concluded that expensive fertilizer is not needed. There is no statistical difference between the growth rates of both samples. The experiment kept all variables the same except for the fertilizer. Sweet basil was used in this experiment. Hydroponic gardens can be fun and inexpensive.

MBI132: How Much Light is Too Much Light?

LED lights are replacing conventional bulbs in many current applications due to their energy efficiency, and this is beginning to occur in the area of indoor plant growing. This experiment compared the effect of (4) different LED light exposure times on the growth of radish plants. An enclosed growing station was built to test the exposure times of 12, 15, 18, and 21 hrs/day of light. 45-Watt red/blue LED light panels were used, along with timers to automatically turn the lights on each day, over the 15-day monitoring period. Results from daily measurements showed that plant growth increased with exposure time.

MBI133: Fertilizing More Than Fields

My experiment tests the effect of different concentrations of phosphate and nitrate containing fertilizer runoff on algal growth in pond water. I hypothesized that the greater the amount of fertilizer runoff in our pond water, the more the algae will grow. The data showed that the algal growth was greatest in the pond water sample with a moderate amount of the fertilizer runoff solution. There was no algal growth in the control group samples, and there was only minimal growth in the sample with the highest concentrations.

MBI134: What Substance Inhibits Mold Growth Most Efficiently?

This researcher will be testing to see what substances inhibit mold growth most efficiently. This experiment will help people with the everyday problem of mold growth on porous surfaces. The hypothesis is that bleach will be most efficient because it oxidizes substances. The researcher will soak pieces of bread in several different liquid then allow them Letting them sit in plastic zip-lock bags and observing them daily. The number of days it takes before mold is visible on the bread will be recorded. Data is not complete, will be available on fair day.

MBI135: Does raising the temperature affect the ability of lipase to break down oil without bile?

The purpose of this experiment is to determine if raising the temperature affects the ability of lipase to hydrolyze oil without bile salts. To conduct this experiment, I created an enzymatic reaction and observed the results after twenty minutes. The experimental results were measured by an estimated percentage of oil breakdown. The results of the experiment showed that raising the temperature did affect the percentile, but forty degrees Celsius was optimum. The results indicate that the hypothesis should be rejected because eighty degrees Celsius was not the optimum temperature and was nearly inactive, though raising the temperature affected the percentage of oil breakdown.

MBI136: Pittsburgh's Plankton Population Ratios

I think that if I collect plankton from all of the rivers then the Ohio will have the biggest ratio of zooplankton to phytoplankton because it is the deepest of the three, and zooplankton like deep, cold waters. I also believe that the Allegheny will have the biggest ratio of phytoplankton to zooplankton because it is the shallowest of the three, and phytoplankton prefer shallow, cold water.

MBI137: Bioluminescence: Investigating Glow-in-the-Dark Dinoflagellates

For this project the researcher will use the species Pyrocystis Fusiformis to investigate how light affects the bioluminescence of this species. The purpose is use dinoflagellates more effectively in heavy metal tracings. The hypothesis is that the more light dinoflagellates are exposed to they will glow brighter and longer when exposed to mechanical stress. I will be exposing two test tubes to complete darkness 24 hours a day, two test tubes to 12 hours darkness and 12 hours light per day, and two test tubes alternating in 24 hours of darkness and light. Results will be available on fair day.

MBI138: Vitamin C Loss
Vitamin C is an important vitamin in our bodies. Vitamin C is an antioxidant, meaning it prevents destroys radicals. Free radicals are groups of atoms and electrons that can cause severe damage when reacted with DNA or cell membranes. This is important because it is a public health issue. Many people like to enjoy their vegetables cooked, boiled, or steamed. What they don't know is that when they eat it that way, they are eating less Vitamin C.

MBI139: Harmful Effects of Popular Drinks on Teeth
My experiment is to show the harmful effects of popular drinks that most people drink more than 2 times a week. Soda, sure does it taste good but man does it harm your teeth. After looking over some of the decay on some of the teeth that were put in these drinks (coke, root beer, Hi-C, sprite) you may reconsider how much you in take. There were a few mess ups on my part say root beer would have the most visible decay. The drink with the most decay is coke. Coke's tooth was completely demolished. It was brown all over and had a few little cracks. The drink that came in second was Hi-C. Hi-C was pounding that tooth like George Foreman. Hi-C's tooth had a lot of tiny cracks and the root of the tooth was blood red. Root beer came in third place with a big disappointment from me because I predicted that to demolish the tooth. Root beer's toothed was a little yellow but no much else. Finally, you guessed it, Sprite. It was pretty obvious that a white drink on a white tooth would show the least visible damages or cracks.

MBI140: Do people read faster from a book or from a computer screen?
Do people read faster from a book or from a computer screen? Subjects were timed with the same passage using both book and computer. After they finished reading I timed both of the times they read the pages. The results really surprised me. I expected people to read faster on paper because most people read from books than from a screen. This experiment was a fun, useful, and very important. It is important because from my experiment most people read faster on a screen and people would choose this method more often.

MBI141: Microwaving M & M's
This experiment was designed to test if microwave radiation is absorbed in different ways by different colors. I did this experiment in my kitchen with a microwave and M & M candies. My microwave doesn't have a carousel in the middle, which posed the problem of unequal amounts of microwave radiation. I solved the problem by putting the M & M's in a circle, all equidistant from the center, ensuring they all received equal amounts of microwave radiation.

MBI142: Investigating the health benefits of Himalayan sea salt
I investigated whether Himalayan sea salt will improve health and survival in Artemia. I hatched and grew Artemia in different salts including Sel Gris from France, Black Lava from Hawaii, Alaea from Hawaii, Himalayan sea salt from India, Kala Namak from India and normal sodium chloride. I controlled the temperature and pH. I compared and examined their growth and survival in different concentrations of sea salt. 1.75% was overall the best concentration for all salts but most Artemia died after 3 days. I found that Kala Namak was the best salt for hatching. However the Artemia grew faster in Himalayan sea salt. The salt that came from Hawaii killed all of the Artemia while the same salt from India was outstanding. I conclude the source of the salt, irrespective of its sodium concentration and salt type are critical for survival.

MBI143: Fair Weather Crickets
Can crickets predict the temperature by their chirps? I hypothesized from my research that when the temperature increased the chirps did too, and when the temperature decreased the chirps did also. Before I did the project, I put all the crickets in a cage with food and water. To begin the project, put one cricket in another cage and take it to three different rooms with temperatures of 60, 70 and 80 degrees Fahrenheit. Count the number of chirps in 14 seconds. After I got the data from the number of chirps, add 40 to arrive at the current temperature. Convert temperature to Celsius. Compare the data to actual temperature.

MBI144: Making an Artificial Pancreas
The purpose of this experiment was to find out if artificial pancreas' can be made, and to assemble a model of an artificial pancreas. The goal is to get the artificial pancreas to function and simulate insulin lowering high blood sugar. To conduct this experiment, I will assemble and use my pancreas model to function the lowering of high blood sugar. My results were measured by the amount of baking soda that was left in my bowl after the pump stopped running. The results showed that my artificial pancreas model worked at 100% accuracy. My hypothesis stated: If an artificial pancreas is built to produce insulin, then the artificial pancreas will be successful in producing insulin at least 90% of the function of a normally functioning pancreas.

MBI145: Environment in a Jar
My project was about observing a small scale environment. I grew four different plants in three different environments. One was a forest biome; another was a water biome, and finally a desert biome. My project went really good and there were no problems. My hypothesis was neutral. The water biome had successfully growing plants in it. The desert and forest plants died very slowly. The forest and water biomes did show signs of self-regulation, though. The lids on the jars popped up showing that the oxygen was trying to be released. In conclusion, my entire project went very smooth.

MBI146: The Reading Dog
The purpose of this experiment is to see if a dog can progress from learning a command verbally to learning a written command on colored papers. To conduct this experiment I will give oral commands, trying to get the dog to associate the word with the command on the colored sheet of paper. The experimental results were measured by comparing the reactions of the command written, and verbally. The results of the experiment show that the dog did respond not only to the command verbally, but she also responded to the written command on the sheet of colored paper. The results indicate that the hypothesis should be accepted because the dog did progress from learning a command verbally to learning a written command on colored paper.

MBI147: Do brine shrimp go to the top or the bottom of a tank based on light?
In the conducted experiment, brine shrimp were put in a graduated cylinder under an overhead lamp. This was conducted to see if brine shrimp would go towards the light with no predators around them. The brine shrimp did go towards the light. This is probably because there were no surface predators to worry about and because they are light seekers. What happened was what was predicted.

MBI148: Which type of worm will enrich the the most for better plant growth
Worm's casts release NPK, which enriches the soil and greatly benefits farmers. This experiment was conducted to find out which type of worm, the earthworm or red worm, will enrich plant grow the most. Soil containing no worms was tested first as a control. Three Rubbermaid boxes were filled with equal amounts of soil and 48 earthworms were put in 1 of the boxes, and 96 red worms were put in the other boxes and the control had no worms. The soil was tested once every two weeks for two months to find levels of NPK in the soil.

MBI149: Ginseng: Helpful or Harmful?
The purpose of this project is to determine whether Ginsneg will increase the heart rate of daphnia. Daphnia magna will be purchased from Carolina Biological. A .5 stock dilution was made with 2.0 grams of ginseng and added to 100mL of spring water and mixed. A pipette will be used to remove a single organism from the shipping container and placed on a well slide, with just enough spring water to keep it alive. The number of heart beats will be counted within a 10 second time period. This number will be multiplied by 6 to determine the number of beats per minute. The organism will them the removed from the well slide and placed in a 0%, 25%, 50%, 75%, and 100% dilution of ginseng for 10 minutes. The organism will be removed with a pipette and once again the heart beats will be counted within a period of 10 seconds. The number of beats will be multiplied by 6 to determine the heart rate for per minute. The organism will be removed and placed in a container.When the daphnia were place in the ginseg full strength they all died. the results supported my hypothesis.

MBI150: Eco-Friendly Herbicides
In my science experiment, I will be experimenting with organic store bought and homemade herbicides to find which are the most successful in eliminating Taraxacum Officinale (the dandelion) the most efficiently. The two store bought herbicides being used are Avengers Weed B Gone© and Eco Smart © while the home made solutions are my mixture of vinegar and salt, and lemon juice. After the dandelions have grown to a suitable height to be tested, I will execute four different tests, spraying one dandelion per herbicide per test, and leaving a control untouched.

MBI151: How Does Light Affect Spinach Plants?
For this project, the researcher is planting 36 seeds, allowing 12 to grow in 100% darkness. Another 12 in 7 hours of direct light and the last 12 will grow under constant direct light. After the plants mature, chromatography will be used to identify the amount of xanthophyll, chlorophyll a and b, and carotenoids to determine if the amount of light affects the amount of pigments in spinach? If spinach is grown under 24 hours of direct, constant light it will have the most pigments. Data collection is ongoing and results will be available on fair day.

MBI152: Does Soil Sweetness affect Worm Growth?
I am testing to see if adding sugar aspartame and saccharin to a worm's natural soil would cause a difference in growth and natural reproduction. This is important scientifically because a molecule as small as sugar could change our ecosystem dramatically.

MBI153: Is Organic Really "Better"?
Please visit student's exhibit on Fair Day for abstract.

MBI154: Does Dionized Water Promote Plant Growth?

Purpose: Determine if deionized water affects plant growth.
Hypothesis: As concentration of deionized water increases, plant growth will increase.
Procedure:

1. Construct testing apparatus.
2. Create 0%, 25%, 50%, 75%, and100% deionized water solution.
3. Place 100g of dry topsoil in a cup.
4. Repeat step3 for 19 more cups.
5. Place one seed in each cup.
6. Every 3days pour 25mL of 0% deionized water, into each cup prepared in step5.
7. Repeat #7 for remaining deionized water solutions.
8. Determine germination and growth for 30days.
9. Determine dry biomass of plants.

Results will be posted at fair.

MBI155: Pea Growth in Different Liquids

Pea plants do grow in water like other plants, but I wanted to know if they would grow in other liquids. In this experiment Gatorade, apple cider, iced tea lemonade, tap water and rain water were used to see if they would support pea germination and growth. Overall, Gatorade was slightly better than iced tea lemonade and apple cider encouraged no growth at all. Rain water and tap water led to the best growth. Their root and shoot lengths were similar.

MBI156: Music and Memorization

The purpose of this project was to see what type of sound is best for memorization. The participants were asked to memorize a string of ten numbers while a certain music was playing, then do an arbitrary distraction task. After three minutes they were asked to recite back what they remembered of the string of numbers. The amount of numbers correct was then recorded and turned into percentages. Classical music got the highest score, with Nature Sounds second, Pop without lyrics third and Silence fourth.

MBI157: Does Soil Type Affect Plant Growth?

The purpose of this experiment was to see of the soil you used affected the way plants grew. I predicted it would affect it and that the best soil would be Expert Gardener.

1. Gather the necessary materials
2. Fill the cups (Four for each type of soil) with the same amount of soil
3. Plant each seed
4. Place the pots under a grow light that is on for eight hours and off for sixteen each day.
5. Water the plants once daily (30mL each)
6. Measure the plants at the end of each week.
7. At the end of 55 days I took a final measurement.

MBI158: The Effect of Music on Plants

In two, three week trials, I investigated how music affects the growth and germination of the Pisum sativum. I hypothesized that plants will grow faster in a silent environment rather than in a musical environment because the sound waves created by the music will rock the plant. In each trial, I had three categories of music and sound, each with three plant pots that contained nine ounces of soil, ten seeds, and six drainage holes each. The sections were in different rooms, and “listened” to Classical, Rock, Jazz, Indian, Silent music styles and repeated pitches for ten hours per day.

MBI159: What kind of soil do sugar snap peas grow best: yard, wetland, or forest soil?

I tested sugar snap peas in three types of soil, Soil from My yard, Soil from the Forest, and from the wetlands. I wondered this question, does sugar snap peas grow in different types of soil. First I gathered the soil for my project, prepared it in plastic cups, then sow the sugar snap peas about 2.54 cm. into the soil. Every week I water my plants around 45 ml. of water. My Results and my conclusions will be available at the fair.

MBI160: Which brand of disinfecting wipes has less bacteria?

The purpose of this experiment was to see if wipes were clean right when you take them out of the container. For the experiment I took a disinfecting wipe and swiped it on general media in a petri dish. The only bacteria colony that grew was on trial three of the Lysol wipes.

MBI161: Does Caffeine Affect Plant Growth?

People ask if caffeine will stunt plants' growth and does caffeine affect plant growth. This project looks at how plants react to diet soda. My hypothesis is, if plants are watered with a caffeinated drink, then they will grow faster than those hydrated with a non-caffeinated drink because caffeine stimulates plant growth. My procedures are: plant plants in same size pot, write "C" for caffeine on five and "W" for water on five, wait a couple weeks for plants to grow, measure 10 ml of diet Pepsi and 10 ml of water, put each liquid on the plants, wait a couple of days when need water again to measure, do steps 4-7 over again every couple days. Results and conclusions will be stated at the science fair.

MBI162: Does Aspirin Affect the Growth and Development of Plants?

The purpose of this experiment is to figure out the best for plants to grow and to see if Aspirin affects it. I put 4 bean seeds in each of my pots and watched it grow. Pot 1 has no Aspirin, pot 2 has ½ of an Aspirin, and pot 3 has 2 ½ Aspirin. I watered with the dissolved Aspirin. My data was very little growth in pot 3, little growth in pot 2 and a lot of growth in pot 1. My conclusion was Aspirin has not helped my plants

MBI163: Importance of Studying Tree Rings

I am investigating tree rings and how the rings determine the age and health of the tree.

MBI300: Open Wide

Cavities stink, and drinks are a big contributor to them. So we thought: Which beverages contribute to tooth decay the most? We poured 150 mL of each beverage into different cups with each tooth. Wait two days and weigh the teeth. Repeat every two days.. Now, we see that orange juice decayed the tooth the most. Next were milk and coffee. Water stayed the same the whole time, like we thought, because it's pH is neutral. Then Coke, and Diet Coke. We conclude that they type of beverage you consume, is a factor to tooth decay.

MBI301: Ants Begone

Ants are a nuisance to people. We wanted to test ant repellents that are cheap and safe. We are going to be putting the ants in the middle of the bin placing them on vinegar, black pepper mixed with water, sugar water, and plain water, one item per trial. Then we are timing to see how long it takes for them to move off of the location. We will repeat each test 4 times. At this time the experiment is still on going.

MBI302: What exercise makes a dog exert itself the most?

The purpose of this experiment is to figure out what exercise makes a dog exert itself the most. To conduct this experiment, we will have a dog do each exercise and after each exercise we will measure the dog's heart rate. The experimental results were measured by counting the heart rate of the dog. The results of the experiment showed that jogging up and down the stairs is the best exercise for a dog. The results indicate that the hypothesis should be accepted because jogging up and down stairs would increase the heart rate the most.

MBI303: Into the Voice Box

In our project we tested if how tall you are and the length of your neck affect your vocal range. We did this by testing five boys and five girls vocal ranges and then measured their height and the length of their neck. Finally we saw if the measurements correlated in any way to their vocal range. We wanted to test this because both of us are interested in singing and we are fascinated by how every person is unique and different from everyone else.

Intermediate – Chemistry (MCH), 7th & 8th Grade

MCH100: Sweeter than Sugar?

The purpose of my project is to determine if yeast will reproduce if I use substitutes for sugar instead of real sugar. I will test this by adding yeast to a mixture of warm water and the sugar substitute and measuring the height of the bubbles created by the mixture. I think that the Truvia will produce the results closest to sugar because it is made by all natural leaves of the stevia plant. The stevia plant is 20 times sweeter than regular sugar and I think that it is healthier. I am interested in this project because I want to know how sugar is made and if sugar substitutes are better and healthier than regular sugar.

MCH101: CORROSIVE IONS

This experiment was to determine if the number of ioins in salts affected corrosion on iron. I chose this because I was curious about the effect on car frames during the winter. I used rock salt solution, calcium chloride solution, distilled water and nails in the experiment. I put the nails into the solutions for 21 days, drying and massing them every night. The results showed that the salt with the most ions (rock salt) caused the most corrosion and that rinsing periodically reduced corrosion.

MCH102: Colorful World

After researching how algae are formed and the history of paint, I decided to do my project on making paint. My experiment was to test which liquid makes the best paint. Paint requires a pigment plus a binder. I tested three different binders by mixing them with crushed up chalk (pigment). The liquids (binders) that I chose were water, glue and egg yolk. The water mixture was powdery and the egg yolk chipped. My conclusion to this project was that the glue mixed with the chalk made the best paint, as my hypothesis suggested.

MCH103: The Kastle-Meyer Blood Test

The purpose of this experiment is to test what substances react to the Kastle-Meyer blood test. To conduct this experiment, I will obtain positive control strips, cow blood, chicken blood, an egg, and a strawberry and test three sample swabs of each substance with the Kastle-Meyer test. The experimental results were measured by the color change of the Kastle-Meyer blood test. Prior to each trial, a positive control strip was tested to ensure that the phenolphthalein solution was not compromised. The results of the experiment showed cow blood and chicken blood created positive test results. The egg and strawberry created negative test results. The results indicate that the hypothesis should be accepted because the results complied with the hypothesis that states if you swab a sample of chicken blood, cow blood, egg, and strawberry then, the cow blood and chicken blood will create a positive test result when the Kastle-Meyer presumptive blood test is used.

MCH104: Purity's affect on water's ability to supercool

This experiment is to find out if the temperature of water affects the ability (the time it takes or if it does at all), to supercool. If purity effects ability to supercool, then the more pure water is, the faster it will supercool, because there is less stuff in the water. For my experiment, I poured a small amount of liquid into a clear plastic cup. I put the cup in a large bowl, put ice cubes around it, and then salt on the ice. I did this three times for each of the four different purities of water. I found that there was no real influence on water’s ability to supercool, because of the purity. My hypothesis was wrong because I had predicted that there would be a relationship between these two variables, but there was not.

MCH105: Fruit Battery Power

The procedure of this project is taking a citrus fruit and squeezing it to soften the fruit. Then, insert nails and remove the insulation of the bulb wires. Next, you take one of the exposed wires and wrap it with electrical tape. After, the second wire is attached to the nail, your bulb should light up. I did this because it was interesting how we can make electricity with a fruit. This experimentation is still going on and results are not yet found.

MCH106: Electrolytes and Temperature

In this experiment the purpose was too determine if the temperature affects the amount of electricity in certain drinks. Using the top brand names of sports drinks helped to see the effects. It was discovered that temperature plays a role and that when a liquid is heated it reacts differently.

MCH107: Does adding a solute to a solvent increase the solvent's boiling point?

My science fair experiment falls under the category of chemistry. I did my experiment with the purpose of figuring out how water scientifically boils and what factors can affect the boiling point of water. I wanted to find the answer to these questions; "Does adding a solute to a solvent (water) increase the solvent's boiling point?" and "If the answer to this first question is 'yes', then which solute (sugar, salt or baking soda) causes the greatest change in boiling point when added to water?".

MCH108: Let's Rust
In my project I tested different types of liquids to see which would make steel wool rust the most or fastest. My question is which liquids would make steel wool rust the most? My hypothesis is that lemon juice would work the best because it contains citric acid. When I did in my project was cut very fine steel wool into three, two centimeter pieces. Next, I measured out equal amounts of three different liquids and put them into labeled cups. Then I placed the steel wool into the labeled cups. The next day I took out the steel wool with tongs and let them sit for three days. Finally, I weighed the steel wool using grams. My hypothesis was wrong coke seemed to rust the best. IF I were to do this project again, I would try using different types of liquids to see if something rust faster than coke.

MCH109: Cold Pack Chemistry: Where does the heat go?
Coaches and parents are always using ice packs. In this project, I will be testing how cold packs work. I find this interesting because I always wanted to see what kind of chemicals are in ice packs. Also, I wanted to see how the ice packs cool without putting it in the freezer. First, I will have to label the Styrofoam cups. Then I will have to add 100 ml of distilled water in each cup. Then I will have to put my safety goggles and latex gloves on also I will have to shake the ice packs really gentle to get the chemicals and water mixed in. I have to shake it gently because I do not want the cold pack to get cold. The rest of my results and conclusion will be on my science fair project.`

MCH110: Fan-Plastic!
Which liquid creates the best plastic? I hypothesize that milk will create the best plastic. Required items to complete this project include: lemon juice, tomato juice, orange juice, milk, cups, a thermometer, cloth and vinegar. First pour 5.007 grams of vinegar into 4 cups. Each liquid is heated to 48.88 degrees Celsius and poured into cups. The mixture is then poured over a new cup with a cloth over it, so curd can be collected. In conclusion, the only substance which created curd was milk. If this was performed again, I would change the liquids used and temperature level.

MCH111: Ultimate Meltdown
For my project I decided to experiment with ice to determine which added material (sand, salt, pepper, or sugar) would affect the ice in a way that caused it to liquefy or melt the most within a three-minute time period. I chose to test this because I figured that if sugar, sand, or pepper was proven to melt ice more efficiently than salt, then it may be used as an alternative to spread on icy roads in the winter as opposed to salt. I hypothesized that the salt would melt the ice the most. After the experiment, I concluded that my hypothesis was correct.

MCH112: Electrolytes in Drinks
In this experiment, the hypothesis was that Gatorade will contain more electrolytes than other sports drinks. The materials used in this experiment were various types of drinks and a conductance measuring circuit (CMC). The procedures of the experiment were to assemble the CMC, test the solutions for electrolytes with CMC, record data, and analyze data. The electrolyte results were as follows, from highest to lowest: orange juice, Powerade, Gatorade, Infuse, tap water, and distilled water. In conclusion, my hypothesis was not supported. With this data I have collected, I will use orange juice to prepare for running competitions.

MCH113: The Effects Of Various Whitening Toothpastes on Tooth Stains
Whitening toothpastes are used to make teeth appear whiter. This experiment was chosen to find out which whitening toothpaste would perform the best. My hypothesis was that my homemade toothpaste that contains the mixture of hydrogen peroxide and baking soda would perform the best. 70 sterilized teeth were stained in cranberry juice for 7 days. The teeth were separated into 10 groups of 7. The whitening toothpastes used in this experiment were Arm and Hammer Enamel Care- Extra Whitening, Colgate Optic White, Aqua Fresh Extreme Clean Whitening, Crest 3D Whitening, Colgate Optic White Whitening, and Aim Whitening Gel. I also made 3 homemade toothpastes: baking soda ($NaHCO_3$) and distilled water, hydrogen peroxide (H_2O_2), and a mixture of hydrogen peroxide and baking soda. Water was the control group. I brushed each tooth for two weeks with the same exact technique – same number of strokes, same pressure, and same amount of toothpaste. After one week, I compared the teeth to the VITA shade guide chart and recorded the changes. I repeated all steps of the experiment for another week, with a total of 70 trials in all. The results were that the Colgate Optic White and hydrogen peroxide whitened the teeth the most at an average of 11 shades lightened for each. Colgate Optic White may have exhibited the greatest whitening effect because hydrogen peroxide was present in the toothpaste. After further research, it was found that there were also high amounts blue covarine in the toothpaste, along with hydrated silica, an abrasive. Colgate Optic White was the only toothpaste that I tested that contained the chemical blue covarine, which has been confirmed in studies, both in vitro and in vivo, to adhere to the surface of the tooth, changing the optical properties of the teeth so that they appear whiter. Since some whitening toothpastes contain abrasives that may harm the enamel if used too often, leading to demineralization of the teeth, this may be a major advancement in tooth whitening.

MCH114: Shimmer or Dimmer
The purpose of this project was to determine how three individual glow sticks reacted when submerged in cold, warm, and hot water. Each glow stick was each individually submerged underwater and studied at the first 5 minutes for the amount of brightness. After the first 5 minutes the glow sticks were observed every 15 minutes and ended at 60 minutes. The glow stick that was submerged in the hot water was the brightest for the first 15 minutes and was quickly reduced to a dimmer brightness compared to the glow sticks submerged in warm and cold water which remained a constant brightness.

MCH115: Acid or Base? Find your pH

My project is to determine whether a substance is an acid or base. To do this, I boiled cabbage juice and mixed it with household items. If the color turned light, it is an acid. If it turned dark, it's a base. This happens because cabbage juice contains anthocyanin. My hypothesis was that orange juice, lemon juice, tomato juice, and vinegar were acids, and eggs, laundry detergent, baking soda, bleach, soap, maple syrup, and milk were bases. The neutral would stay purple. I was partially correct. I was wrong in saying that maple syrup and milk are bases.

MCH116: Candles...Cozy or Cool?

This experiment was designed to test whether or not the temperature of a candle affects the rate at which it burns. In this experiment, two candles at different temperatures were observed and measured as they burned. The results agreed with the hypothesis and they show that the refrigerated candle burned at a slightly slower rate than the candle at room temperature. This happened because the wax of the cooler candle took a longer time to melt. No problems came up during the experiment, but if there would be repeated tests, there would be a larger temperature range between the candles.

MCH117: All About that Base

Type 1 Diabetes is something that puzzles many people. One of the main purposes of my project was to see how people with this common disease bodies work differently. Type 1 diabetes is most commonly known as juvenile diabetes because it is most commonly found in children. When someone has diabetes their bodies produce none, very little, or not enough insulin to lower glucose in the blood. Glucose is a hormone that is acidic while insulin is a hormone that is neutral. Together they work together to produce energy. Their acidity and neutralizing state help to balance each other. Patients with this disease most commonly use insulin therapy to balance each other. Patients with this disease most commonly use insulin therapy to balance glucose levels. Insulin therapy is the injection of insulin into the body. The amount of insulin needed is measured by a small prick of blood from your finger on a blood meter. The size of the injection of insulin is based off of the measurement of glucose on the blood meter, but it is quite a guessing game on the correct dosage. The invention of the artificial pancreas took away the guessing game. The artificial pancreas contains a small pin in your body that signals when insulin needs to be produced. This will lower the levels of glucose allowing the insulin and glucose to produce energy for the body. Type 1 diabetes affects many people around the world.

MCH118: Seeing is Believing

Purpose: Which contact solution cleans the best?
Procedure:

1. Gather five contact solutions.
2. Record ingredients of the contact solutions.
3. Obtain transparency film. Cut the transparency film into small squares.
4. Contaminate the film with three substances
    a. Crayon
    b. Lipstick
    c. Marker
5. Soak for 5 hours.
6. Record results
7. Determine which contact solution removed the most substance.

MCH119: Does the Amount of Ammonium Nitrate Affect the Temperature of Instant Cold-Packs?

The researcher will be testing if the amount of ammonium nitrate affects the length of time water stays below 0 degrees Celsius. The purpose of this experiment is to save consumers money. The hypothesis is that the amount of ammonium nitrate will affect the length of time the water is below 0 degrees Celsius. The researcher will mix the following amounts of ammonium nitrate in 100 mL of water: 10g, 20g, 30 g, 40 g, and 50 g. The researcher will record time in seconds that the water is below 0 degrees Celsius. Data will be available on fair day.

MCH120: The Effects of Antacids on the Neutralization of Gastric Juices

Antacids are commonly used non-prescription drugs that help with heartburn and acid indigestion. This experiment was conducted to show which antacid works the fastest and raises the pH the highest to neutralize stomach acid most effectively. Gelusil was believed to work the best due to its active ingredients. To test this hypothesis, 50 mL of hydrochloric acid was added into a beaker containing a magnetic stirrer, and heated to body temperature. The initial pH was recorded, and the antacid was added. The pH was measured every 20 seconds for 8 minutes and 20 seconds. Three trials were conducted for each of the 8 antacids and the control group (27 trials in all). Results were recorded using the average of the 3 trials per antacid. The data showed that Top Care Complete raised the pH the highest and the fastest. The reason may be that it contained 800 mg of calcium carbonate (CaCO3) and 165 mg of magnesium hydroxide (Mg(OH). It was the only antacid to have a high amount of calcium carbonate plus magnesium hydroxide. A cost analysis showed that Top Care Complete gives you more for your money.

MCH121: Autoxidation Effects of Temperature and Illumination on Certain Foods

The purpose of this experiment was to observe how temperatures, environments, and illumination effects food oxidization. Six different illumination and temperature locations were examined. The foods evaluated were gala apple slices, iceberg lettuce leafs and half-slices of Italian bread. The conditions were observed and recorded over a seven day period with three recordings per day. Observations were recorded on appearance of relative oxidation to the foods. Observations identified the higher temperature and illumination along with the food highest in sugar content oxidized the most rapidly. Unexpectedly, illumination played a more critical role in the oxidation process than expected.

MCH122: How Sweet Do You Eat?

There are a ton of foods that are tasty because of the sugar in them. But did you know that there are different types of sugar? One certain food could have three types of sugar in it. For my project, I found how much glucose was really in 5 different foods. I measured the concentration of sucrose and glucose and investigated how sucrose can turn into glucose with an enzyme called invertase.

MCH123: What Battery has the Best Performace?

The purpose of this project is to determine which batteries have the longest life and are the most economical for the consumer. I believe that Members Mark, a generic brand of battery and the control for this project, will provide the consumer with the longest lasting battery for the least amount of money. This will be followed by Energizer, which is a few pennies less than Rayovac and claims to last as long as Duracell and Energizer. Duracell will last as long as all the batteries tested but is the most costly for the consumer. I decided to take a picture every two seconds and kept track of the time using a stopwatch. I also needed to locate a memory card with 8 gigabyte of ram so the card would not be filled before testing was completed. I decided to take pictures of a nonmoving background such as the back of the package that the batteries came in or of a blank wall to ensure that nothing interfered with the testing.
Pictures were recorded every 2 seconds until the camera said to change the batteries. The pictures were then downloaded onto a computer and the number of pictures as well as the length of time the batteries lasted was recorded. The pictures were then deleted from the memory card, new batteries were inserted into the camera and the test was repeated 4 more times for each set of batteries for a total of 5 samples for each brand of battery. This was repeated for Duracell, Rayovac, Energizer, as well as Members Mark, which served as the control. The results were then averaged.Members mark, a generic brand of battery, Duracell, Rayovac, and Energizer batteries were tested to determine the average usable lifetime and number of photos taken. Members Mark, the control, turned out to be the most economical price per battery, costing 31 cents per battery. However you can only buy them at Sam's Club s in a package of 48 for $14, they are the cheapest per battery.
Duracell lasted the longest out of all of the battery brands tested but costs the most, which is 99 cents per battery.
Energizer cost 87 cents per battery but provided a shorted usable lifetime in minutes compared to Duracell and Members Mark.
Rayovac who claims that their battery will last as long as Energizer and Duracell but cost less ended up lasting a shorter amount of time than both Energizer and Duracell. Rayovac even costs more per battery than Energizer costing 89 cents per battery.
This information is especially useful to consumers, since it seems that the actual cost of the battery is not reflected in the performance. It is possible that the cost of advertising is being passed on to the consumer and we are not getting what we pay for.

MCH124: Ammonium Nitrate Cooling Water

For my project, I tested which amount of ammonium nitrate cools water the fastest. I chose this experiment because people often get hurt in sports, and this experiment shows the best amount of ammonium nitrate to put in a cold pack to help heal injuries. To conduct this experiment, I placed ten, twenty, thirty, forty, and fifty grams of ammonium nitrate into 100 mL of water. I recorded the time it took for the water to drop to five degrees Celsius. My results showed forty grams of ammonium nitrate was the most effective amount, followed closely by fifty grams.

MCH125: Road Wreckers

Potholes are the enemy of a car's tire. This experiment was meant to show whether different salt compounds used to melt ice will later affect the size of the pothole when the water refreezes. Four different salt water mixtures were placed in a freezer and the expansion was recorded. The experiment showed that calcium chloride causes water to expand the least. The other additional salt compounds caused the expansion to increase. Future work will be planned to determine if the results would differ in different pothole substitutes.

MCH126: What tooth whitening toothpaste whitens the best?

For my experiment, I tested which tooth whitening toothpaste whitens the best. I tested this experiment to see which brand would whiten the best, comparing the lower cost to higher cost brand. My main procedures were to soak raw eggs in coffee, let them dry after soaking, picking an area to test on, brushing the eggs with each brand for seven days, then coming to a conclusion. My conclusion was that Crest, the average cost brand, whitened the best.

MCH127: Which Stains do Not Wash Out
I became interested in this project because I have found that stains in clothing don't all wash out. I heard viewing the stains under a black light would determine whether the clothing is completely clean. So I decided to run a test in order to tell the difference in stains.I believe that the more acidic things such as pop or orange juice will show up greater under the UV light and confirm that not all stains will wash out fully. I will be using five different stains and testing which ones do not entirely come out. They will be washed at a regular cycle while nothing else is running. They will be washed in cold water and air dried. The stains will be tested on pieces of cotton cloth in a fixed place.

MCH128: Making Bio-Plastic Stronger
The purpose of this experiment was to test various materials which could possibly make starch based bio-plastic stronger. The four materials I tested were cotton, saw-dust, agar, and cheese. In my experiment the starch bio-plastic was prepared from starch, vinegar, water, and glycerin, and each of the four materials was mixed with starch. The experiment was performed three times for each material. The bio-plastic that was prepared was tested for strength and flexibility using the Tensile Strength Test. The bio-plastic which was strong and flexible was then used to make a product.

MCH129: Catching Criminals with Chromatography
I am studying the chromatography of different black ink pens. I will be testing them with alcohol and water and comparing their results to one another.

MCH130: Metals - How are they different?
Which metal is better with different tests and the test were weathering, corrosion test,and boiling water in a pot.

MCH131: Coke VS Pepsi and The Effects On Your Body
The purpose of my experiment is to compare two carbonated drinks, and see which is healthier for you. First I gathered my supplies, and set up the experiment. I laid out six jars, and put a half egg shell in each. Then I filled two with Pepsi two with water and two with coke. I secured each with a lid. After observing I saw that the eggs in coke floated, and the egg in Pepsi broke apart. Eggs in both yellowed, but the eggs in water remained the same. After I found that Pepsi is healthier for you.

MCH132: How fast do different liquids melt?
The purpose of this project is to see witch liquid will melt the fastest. I froze water, orange juice, milk, and coke. Then I put each ice cube on a paper plate and timed how fast it melted. My hypothesis was that the water would melt the fastest because there's no added sugar or solids. In conclusion the coke melted the fastest and the water melted the slowest. My hypothesis was not supported.

MCH133: What color diffuses into a rose the most?
My experiment is What color will diffuse through a carnation the most? The propose of this is to learn about diffusion. It is also fabulous that I was able to combined flowers and colors with it because these are my interests. I did this by cutting carnations up the middle and putting half into one color and the other half in the other color. Then I waited for 2 days to see results. The results were that green diffuses through a carnation the most, after green comes blue, then red, and finally yellow. This is because green has small particles and yellow has big particles.

MCH134: The Penny Drop
I will be testing how the liquid effects the rate of a penny dropping.

MCH135: Vitamin C Content in Bell Peppers
My project title is Vitamin C content in Bell Peppers. My hypothesis states that red peppers will have the most Vitamin C because they grow on the vine for a longer period of time. For the procedure, I blended the pepper and distilled water and counted the amount of added iodine drops it took to change the solution blue. My data showed that red peppers had the most Vitamin C, and green peppers had the least. Overall, eating red, orange, and yellow peppers would allow the body to take in a large Vitamin C amount, but by eating green peppers half of the Vitamin C would be lost.

MCH136: Natural preservatives:Which is Best?
Are there things around the house that can act as natural and healthy preservatives? The purpose of this project was to find out if there are things around the common household that can act as natural yet healthy preservatives. The apple slices were cut into fifteen equally sliced pieces and placed into quart sized plastic bags which contained different substances. The results showed that salt acted as the best preservative because it drew the water out of the apple, and the apple remained hard, was only a very light shade of brown, contained no visible mold, and remained around the same weight.

MCH137: Chromatography Dye Challenge
Column chromatography requires setting up a column in order to separate two chemicals in a mixture. I accomplished this by making my column a syringe, and dripping grape soda into the syringe to see which dye would come out first, red dye 40, or blue dye 1. My hypothesis was that red dye 40 would come out first because of its high polarity. My results concluded that red dye 40 was indeed more polar than blue dye 1. The results of this continuation will be available at the PRSEF Science Fair on March 27, 2015.

MCH138: UV-A and UV Beads
Ultraviolet rays, while helpful, can cause major problems for our planet and its inhabitants. In this experiment, several ultraviolet-protective coatings were sprayed on glasses to see how it would affect the change of color of ultraviolet-reactive beads inside the glasses. Ultraviolet exposure in the form of black light was shown on the beads. After the experimentation, it was determined that the sunscreen provided the best protection. This result shows that my hypothesis was incorrect, for I predicted that the boat and car enamels would protect stronger. In conclusion to this experiment, a surprisingly effective UV blocker was found.

MCH139: Natural casing Hot Dogs vs. Processed Casing Hot Dogs
In ancient Egypt, mummification was a serious religious ritual. They believed that preserving human remains was necessary so that the previous owner could enjoy the fruits of the afterlife. In this science fair project, you will learn about the science of mummification by mummifying two different types of hot dogs: a natural casing hot dog vs. one that is commercially made. Which will mummify faster?

MCH140: COOL!
My project tested what liquid will stay cool for the longest period of time, and if molarity has any effect on how a liquid's temperature changes.I did this project because a common problem is when someone takes a beverage somewhere only to find when they're thirsty that the drink is warm. I tested this by measuring several liquids' temperature across three hours. This concluded that molarity does not effect how a liquid's temperature changes and that all liquids heat at a constant rate. If I did this project again I would make sure their starting temperatures were more equal.

MCH141: Comparing Limonene Extraction Methods
Limonene is an effective compound to directly replace more toxic solvents. Extraction of limonene from citrus fruits can be accomplished using either methanol or dry ice. The latter method is less toxic and therefore more "environmentally friendly." Extraction methods for limonene will be conducted and results compared for efficiency.

MCH142: What Beverages Stain Your Teeth the Most?
Purpose: The purpose of this project is to determine if and to what degree Coffee, Green Tea, Red Wine, Red Bull, and Diet Pepsi stain your teeth.
Hypothesis: It is from this information that I formulated the following hypothesis. I believed that the Coffee would have stained the Unglazed Porcelain Tiles more than any beverage due to its naturally dark color. This will be followed in descending order by Diet Pepsi due to its naturally dark coloration. Red wine will stain less than the Diet Pepsi due to its reddish color. While Sugar free Red Bull, with its diluted yellow coloration, will stain the porcelain tiles slightly more than green tea, with its pale yellow-green color. Distilled water, which will serve as the control, will not experience any staining due to an absence of coloration.
Procedure: Each unglazed porcelain tile will be massed prior to experimentation. 10 Styrofoam cups will be labeled for identification. A digital photograph will be taken of the porcelain plates before experimentation. 150 ML of black coffee will be added to the cups prior to inserting the porcelain plates. The same procedure will be repeated for Red Wine, Distilled Water, Green Tea, and Red Bull Sugar Free. The porcelain plates will be removed and allowed to air dry prior to massing. A digital image will be taken of the plates. This image will be used to construct a scale to assign a numerical value to aid visual observations. The plates will be returned to the liquid and the same procedure will be repeated for 3 weeks. Results will be averaged and recorded.
Results: The Results of this project were Red Wine, Diet Pepsi, Coffee, Green Tea, Sugar free Red Bull, and Distilled water

Conclusion: In summary, 60 empty Styrofoam cups were labeled 1-10 and filled with 150 mL of coffee, green tea, red wine, sugar free red bull, diet Pepsi, and distilled water which served as the control. Unglazed porcelain tiles were massed and placed into the cups I then let the tiles soak in the beverages for one week. After one week the tiles were removed dried, photographed, and massed before being placed back in the various liquids. This process was repeated for two more weeks. It appears that the 51% concentration of concord grapes used to produce the red wine had a greater impact on the staining of the unglazed porcelain tiles than either the coffee or the diet Pepsi. This may be due to the combination of sugar concentration and dark coloration in the red wine. While Diet Pepsi is only slightly lighter in coloration than coffee it does not contain sugar but does contain aspartame which is a very sweet substance used as an artificial sweetener. It is a derivative of aspartic acid and phenylalanine.Coffee, the darkest colored beverage used in the experiment, contains no sugars that enabled it to stick to the unglazed porcelain tiles. However, green tea contained no sugar or aspartame but was a dark green color and therefore it did not erode the tiles as much as the red wine, diet Pepsi or coffee. The aspartame content in the Sugar free Red Bull enabled it to erode the tiles more than the coffee and green tea. However it's light yellow color did not enable it to stain the tiles like the darker beverages. Distilled water did not erode the tiles at all due to its absence of color, sugar and acids.

MCH143: Does the Color of the Crayon Affect How Fast it Will Melt?

Various colors of crayons will be evaluated to see if color impacts the time it takes to melt.

MCH144: How Too Cool?

Please visit student's exhibit on Fair Day for abstract.

MCH145: At Wicks End

When you spend lots of money on candles you probably want to know what makes it last long. I took three tea light, votives, and 2 inch pillar candles with ½, ¼ and 1/8 inch wicks and I lit them and covered them with a jar. I timed how long it took for all of the oxygen to be consumed. I did this three times and recorded the results. My hypothesis said the tea light candle and the 1/8 inch wick would consume all the oxygen the fastest, but 2 inch pillar and the 1/8 inch wick burned out faster.

MCH146: Edible Energy

The purpose of my experiment is to see if fruits and vegetables are a plausible source of electricity. I tested this by electrically wiring five potatoes, five lemons, and five oranges together. To generate electricity from the lemon, potato, and orange I had to use a zinc plated(galvanized) nail and a copper rod. Electricity is generated when the nail's zinc chemically reacts with the acid in the common fruit or vegetable. Then, the electrons travel from the nail to the penny causing an electric current known as voltage. The experimental results could have been measured by a light bulb, but I chose to use a volt meter to more accurately measure my results. To gather more electricity, I used a circuit to wire all five fruits together. The correct way to make a series of potential batteries is to have many electrical sources and wire the negative end to the positive end and so on with as many potential batteries that are needed. The positive and negative at the opposite ends of the circuit should have nothing attached. The cathode(-) and anode(+) of the voltage meter should be touched to these ends in order to read the voltage of the circuit. The results indicate that my hypothesis should be rejected.

MCH147: Shaking 4 Suds

The purpose of my project was to determine the hardness of water types. I filled three containers with 250ml of 3 different types of water. The types of water I used were natural spring water, treated tap water, and distilled water. I added 3ml of dish soap to each container and shook them from side to side for 15 seconds each and then measured the height of the height of bubbles to the initial water level. I concluded that distilled water was the hardest and that treated tap water was the softest.

MCH148: Saturated Fats Levels in Different Cooking Oils

This investigation will determine if an Iodine test and a melting point test provide an equal ranking of the saturated fat proportion of peanut, olive, canola and coconut oils. The iodine test is convenient to carry out and could be an integral part of an educational program for selecting healthier foods. The melting point test is a gold standard, but is not portable for demonstrations. I found that it was practical to invert the melting point test into a freezing point test, since the oils were already liquid at room temperature. The results I present at PRSEF will show a week relationship between the tests: freezing point/melting point data were found to have greater reliability.

MCH149: Temperature, Lipase,Oil, and Bile

People whose gallbladder is removed cannot store bile. I wanted to see if they can digest hot, oily foods as well as someone who has not. I believe there will be less available bile for someone who has their gallbladder removed. For this experiment, I put 1mL of lipase in a test tube and three droplets of oil, and heated it in water until it reached fro 30 to 80 degrees Celsius. After 20 minutes I visually rated each using a rough rating system. In conclusion, as the temperature rose, the less affect the lipase had on the oil.

MCH150: Shedding Light On Which Battery Lasts The Longest

With this experiment, I could find out which battery lasted the longest, or which battery was the best price for its battery life. I bought seven different types of batteries. I labeled and lined up the flashlights and with help, turned them all on at the same time. I monitored the flashlights throughout the day and recorded when each light went out. The Duracell alkaline battery lasted the longest, however, the Sunbeam non-alkaline battery was the best price for how long the battery lasted. My hypothesis was correct that alkaline batteries lasted far longer than the non-alkaline batteries.

MCH151: Don't Be A CryBaby

My research questions relates to the irritation and watering of the eyes while chopping an onion. I execute many different trials trying to prevent the tears and discomfort. In the project I try to find out what chemical is released from the onion whenever it is broken that causes the eyes to tear. I believe that wearing goggles will work well to prevent tears because they will block the onion's chemicals from going into the eyes.

MCH152: What's The Point?

Last year for my Science Fair project, I wanted to see what would happen if you added substances to ice. This year I wanted to see the freezing point of the substances. When you add calcium chloride to water the freezing point is -6 degrees Fahrenheit. When you add table salt to water the freezing point is 17 degrees Fahrenheit. When you add sand to water the freezing point is 28 degrees Fahrenheit. When you just freeze water the freezing point is 32 degrees Fahrenheit.

When the temperature of pure water drops to 32 degrees Fahrenheit, ice begins to form. This temperature is referred to as the freezing point. In order for water to freeze, the molecules must line up in an “orderly fashion”. When substances such as calcium chloride, table salt, and sand are added, it prevents the water from reaching this “orderly state” as easily.

In order to see the freezing point of the substances I added one teaspoon to ¾ cup of water. After I mixed all of the substances into the water I put them in the freezer at 2 degrees Fahrenheit. I then put a thermometer in each cup with a substance added to it. I kept checking the temperature on the thermometer until I noticed that the temperature was staying at a steady pace. That is when I knew that was the freezing point of the substance. As I did my research, I found that when you add substances to water, it effects the time it takes to freeze. It will take longer for water to freeze depending on the chemical makeup of each added substance. I found that the freezing point of calcium chloride is -6 degrees Fahrenheit, the melting point of table salt is 17 degrees Fahrenheit, the freezing point of sand is 28 degrees Fahrenheit, and the freezing point of water is 32 degrees Fahrenheit.

MCH153: C + or -

Vitamin C (ascorbic acid) is essential for your body, but heat decreases the amount of vitamin C. I wanted to figure out what juice had the most Vitamin C. I also wanted to find out how boiling affects the Vitamin C levels. I tested four different juices using ascorbic acid strips and compared the Vitamin C levels. I then boiled each of the juices to determine the levels in each stage of temperature. Orange juice had the most Vitamin C and boiling it for even a short time decreased the amount of Vitamin C, proving my hypothesis.

MCH154: Nailed It!!!

The purpose of this experiment was to see if an iron nail would Rust more in water, apple juice, grape juice, or orange juice. To conduct this experiment, I put four nails into four different cups. The first nail was in a cup of grape juice. The second nail was put in a cup filled with apple juice, the third nail was put in a cup filled with orange juice. Finally, the fourth nail was put in a cup filled with water, which is my control. Experimental results were measured by seeing which liquid rusted the iron nail the most by recording the location, color, and the amount of rust on the nail as well as the nail's weight. The results indicate that the hypothesis should be rejected. My hypothesis stated that the orange juice would rust the iron nail the most, but instead it turned out the water rusted the nail the most.

MCH155: Which brand of paint last the longest?

In my experiment, which paint brand lasts the longest, I was testing the durability of the two leading paint brands. I had come up with my idea during my look for paints in my new room. When testing was complete the result ended as the paint brand Behr as the most durable.

MCH156: Fun in the Sun: The Effects of Sunscreen and Comparison of SPF's

This experiment was to test the Sun Protection Factor (SPF) of six sunscreens and compare sunscreen and sunblock. The SPF of each sunscreen and sunblock was tested using UV changing beads. As the protection decreased, the beads would start to change color. This process was timed and compared to see which gave the most protection the longest. The sunscreens were also compared to the sunblock to see which gave better protection. It was found that an SPF of 50 or higher lasts the longest and that sunscreen lotions protected more than sprays and sunblock.

MCH157: Gelatin + Cornstarch = ?
For my science fair project I tested if adding cornstarch to gelatin changed the compression strength, elongation, flexibility, or setting time. My hypothesis was that if I added cornstarch then the gelatin would be more flexible, less elongatable, the compression strength stronger and the setting time slower. In my results I found out that if I added cornstarch to gelatin then the compression strength got stronger, the gelatin becomes more flexible and elongatable, and made the gelatin set faster. All in all, I proved part of my hypothesis correct.

MCH158: The Bacterial Content of Milk
This experiment completed determined milks bacteria content. This is important because the more bacteria in milk, the chances of becoming sick increase. Drinking raw milk increases illness, kidney failure, and possibly death. This took eight hours to conduct. You need test tubes, to fill with the raw and pasteurized milk, and methylene blue. Also you need jars, and heating element. If the milk quickly turns white, it has a lot of bacteria. The objective was to see which milk has more bacteria and which has less. This experiment has proven that drinking pasteurized milk is safer than raw milk.

MCH159: How can I make a vegan cake rise?
My older sister is allergic to dairy, so in my family we always enjoy vegan baked goods. The best vegan recipe is for chocolate cake; I have made it so many times I have memorized the recipe. I wanted to find out if there is a way to make this cake rise higher while keeping true to vegan ingredients. I am going to substitute the baking soda of the original recipe with baking powder and yeast to see which most effectively makes the cake rise.

MCH160: Ultimate Bubble Solution
Bubbles are a fun and enjoyable part of little kid life. However, bubbles tend to have a short life span and pop very easily, and on most anything. The experimenter tried adding glycerin to bubbles to see if it would last longer and pop less often. Four different solutions were made, each with different amounts of glycerin. The solution with the most glycerin had the bubbles that lasted the longest.

MCH161: What's Poppin'?
Chemicals are cool and eruptions are cool too so why not have them both? All you need is Mentos and soda. I wanted to do this project because I wanted to find out why Mentos placed in soda cause an eruption. To do that, I dropped Mentos into different kinds of soda and recorded the information. I measured how high the eruption went and how long it lasted. After I tested this on different sodas I found that the soda with more combination causes more of an eruption.

MCH162: What Cleans Pennies?
My experiment was basically leaving brand new pennies in lemon juice and water for about one day to see what effect this would have on the pennies. While I was watching the pennies in the water mixture they did not seem to change much during the hours and by the end they had gotten much shinier and looked better than an average penny. This experiment will help the world with preserving special jewelry that is worth money and is made of copper. It can also help people if they have some rare coins that are worth a lot and made of copper. My hypothesis was not correct on this experiment.

MCH163: Thermodynamics of Salted Ice versus Unsalted Ice
The purpose of this thermodynamics study is to determine whether salted ice cools pop faster than regular ice. The study hypothesized that if salt is added to regular ice then the temperature of pop would cool faster than unsalted ice. Two cans of pop were placed in coolers of unsalted and salted ice. The temperatures of the pop were measured at ten and twenty-minute intervals. It was concluded the salted ice cooled the pop faster and fifteen degrees colder than regular ice. On a summer day, salting the ice in your cooler can get you a cold drink of pop faster.

MCH164: Electrolytes in Different Drinks
This researcher will test the differences between sports drink and energy drinks for electrical current. It will help anyone who participates in athletic competitions if there are more electrolytes in the energy drink. The hypothesis is that monster will conduct more electricity because of the nutrition label. The researcher will use a multi-meter and power a light bulb with the drinks to show which has more electrolytes. Data is not complete. Results will be presented at the fair.

MCH165: Crayon On The Wall
Have you ever been faced with the dilemma of removing crayon from a wall? The goal of this experiment was to aid those faced with this situation. The problem studied was which cleaner will best remove crayon from painted drywall. In any cleaning product, the molecules can either be classified by polar or non-polar. The answer lies in the polarity of the chemical make-up of the substances. The experimenter hypothesized that Mr. Clean Magic Eraser, WD-40, Formula 409 and Goof Off would each remove at least some crayon and that distilled water would remove none. After conducting 30 trials, the results demonstrated that Magic Eraser was clearly the superior product to tackle crayon marks.

MCH166: How do Preservatives Affect Fast Food?
For my experiment I got an order of fries from four different fast food restaurants, and some homemade fries, and put them in mason jars for three weeks to see how long it took to grow mold. The purpose of doing this is to study the preservatives that fast food restaurants put in their food. Mcdonald's, and chick-fil-a puts a preservative called TBHQ in their fries that makes them last for a long amount of time, but TBHQ can also be poisonous if not used correctly. My experiment grew odd, and suspicious when after three weeks no mold whatsoever had grown on mcdonalds, or chick-fil-a fries.

MCH167: Rainbow Fire
This project shows how chemicals burn in different colors and what chemicals caused the color of the fire to change their colors. This project also showed how the chemicals can affect the burning of wood. This project is not very useful in everyday life but it can help show why chemicals should not be near any flammable products. I think that if the chemicals in the colored fire affect the burning than the normal fire will have a faster burning ability because the chemicals will slower its burning ability.

MCH168: Medicated Waters
Which medication in water will have the greatest affect on the survivability of daphnia? Based on research, I hypothesize the medication, Tylenol, will affect the daphnia most. In this experiment, I am determining which medication will affect the survivability of daphnia most. First, I used three different medications and spring water. Next, I put one daphnia from each medication under a microscope and counted the heartbeats. After that, I recorded how many were produced. After doing the trials, I came to the conclusion the allergy relief caused the greatest affect. So based on this, my hypothesis was not supported.

MCH169: Burst My Bubble
The purpose of this experiment was to test if adding different household objects to bubble solution would affect the bubbles. To conduct this experiment I simply added each of the variables to the solution and blew the bubbles. I compared how long they lasted and how hard they were to pop to normal bubbles. The paint and corn syrup bubbles were the hardest to pop, and the paint bubbles lasted the longest. My hypothesis, the paint bubbles would last the longest and be the hardest to pop, was half correct.

MCH170: Drinks For Your Teeth
My purpose was to see what liquids would dissolve the eggshell faster. YOU WILL FILL THE GLASSES WITH YOUR LIQUIDS. THEN YOU WILL PLACE THE EGGS INTO THE LIQUIDS. NEXT YOU WILL WAIT A WEEK CHECKING THE EGGS AT THE SAME TIME EVERY DAY. THIS WILL SHOW YOU WHAT LIQUID WILL DISSOLVE THE EGGSHELLS THE FASTEST. OUT OF ALL MY LIQUIDS THE VINEGAR DID THE BEST AT DISSOLVING THE EGGSHELL. THE EGG BECAME JELLY LIKE. OUT OF FIVE THE VINEGAR HAD A FIVE IN A SOFTNESS RATING.

MCH171: Choose a Perfect Color and Perfect Health
My project is to find the brand of food coloring that produces a product with the least amount of chemicals, and most color in each drop. I will be researching health hazardous chemicals in common food dyes, and then finding which company of food coloring has the least amount of those chemicals in their products. My rationale for this project is that the main problem with using food coloring these days is that each drop you put into your food contains a large amount of chemicals that are not good for your body.

MCH172: Drinking Our Curds and Whey
Cow's milk contains more casein protein than human milk and forms large curds in the stomach, making it hard for some children to digest. Ultra-pasteurization alters the chemical makeup of milk by denaturing the proteins, but without loss of nutritional content compared to pasteurized milk. This may also affect the side of curds formed. I extracted and compared the curd size from pasteurized organic, nonorganic and ultra-pasteurized organic milk. Ultra-pasteurized milk had a smaller curd size than pasteurized milk. For children with milk related stomach problems, ultra-pasteurized milk may be easier to digest because of the smaller curd size.

MCH173: Oil Spill Cleanup
Oil spills are devastating events that are capable of destroying entire ecosystems. One way to clean them up is to use sorbents, or insoluble materials used to recover liquids. This experiment was intended to find out which sorbent recovers the most amount of oil and the least amount of water, so that the most efficient option can be used to clean up an oil spill. Polypropylene cloth was hypothesized to be the most effective because of its oleophilic (oil attracting) and hydrophobic (water repellent) properties. A glass measuring cup, a stopwatch, a micro-screen filter, dish soap (to wash the filter after each use), water, vegetable oil, and cotton, hay, polypropylene cloth, and glass wool sorbents were used to find out which sorbent is the most effective. A sorbent was placed in the filter and allowed to soak in a mixture of 750 ml of water and 250 ml of oil for thirty seconds. It was then allowed to drain excess oil and water over the mixture for thirty seconds. The amounts of oil and water remaining in the cup and retained by the sorbent were recorded and the averages of these amounts were found. This experiment was performed five time per sorbent for all four sorbents (20 trials in all). Polypropylene cloth retained the least amount of water and the most amount of oil, therefore, making it the most effective sorbent.

MCH174: Marker Magic
The purpose of my experiment was to find out what ink colors were made up of. I started by cutting up paper towels into 16 two inch pieces. I then labeled them and drew a line on them. When they were dry, I finally got to start dipping the pieces in water, and hanging them to dry. I recorded how long the spread was, and what colors emerged. In the end I found out washables do in fact spread more when hit with water, then permanent markers will.

MCH175: The Effect of Sports Drinks On Teeth
Recent studies have shown that acidic beverages such as sport drinks and energy drinks contain added acids that can cause demineralization, leading to tooth decay. Research showed that the most common acids used in such drinks are citric and ascorbic. This experiment was conducted to see which drink would cause the most tooth decay. Thirty-five sterilized teeth were obtained from an oral surgeon. Before the experiment was started the mass of each tooth was taken using an electronic balance and the pH of each drink was taken with a pH meter. The drinks used in this experiment were Gatorade, PowerAde, Vitamin Water, Vitamin Water Zero, Pur Aqua Infuse, and Vita Coco Sports. The teeth were soaked in 6 different acidic drinks and the control group, water, for a one-month period (5 trials for each sports or energy drink, and 5 trials for the control group - 35 trials in all). Every 3 days, each tooth was taken out and dried, the mass of each tooth was taken, and the pH of each drink was measured. Each set of data was then averaged for each group. The percentage of loss in mass per tooth was calculated, as well as the average percent in mass lost for a month period for each group. My research found all of the sports and energy drinks caused tooth decay, and that Gatorade, which contained citric acid and caramel coloring (which contains acids) caused the greatest amount of tooth decay in this experiment. Further research showed that tooth decay begins when hydrogen ions in the acids combine with hydroxyl ions in the hydroxyapatite crystalline structure of the tooth. This results in the removal of the mineral ions from the enamel, which is demineralization. This weakens the enamel of the tooth, and a cavity is formed. This experiment showed that small amounts of acids that remain in the mouth when sipping these beverages could continuously dissolve the minerals in tooth enamel.

MCH176: How Fast Does Ice Melt
Please visit student's exhibit on Fair Day for abstract.

MCH177: Ghastly Gloves: Comparing Ways to Remove Contaminated Gloves
When treating diseases, doctors use many protective gears such as a robe, suits, and gloves. But the problem is how to take the equipment off without harming yourself. My experiment will compare two different ways of taking off gloves, the self-named, Inside Out Bag and the Equalism technique. This work also includes analysis of training effectiveness.

MCH178: Which Way To Go with Your H20?
Water is vital to all living things, which raises the question: Which drinking water is the safest for human consumption? I hypothesized that Evian spring water would be the safest. To test this hypothesis, I performed 150 tests over the course of three trials. I tested for pH, total alkalinity, total water hardness, total dissolved solids, and total dissolved metals. This was done by pouring 200 mL of water into each designated bag and following the exact instructions for each test. All data was recorded and averaged using 3 equations: Equation #1: The average of each contaminant per each water sample / the average of each contaminant for all water samples. Equation #2: The average of each contaminant for all water samples / the average of each contaminant per each water sample. Equation #3 (Equation #1 + Equation #2 / 5). It was determined that Poland Springs was the best individual brand of water and the best overall water type was purified.

MCH179: Generating Fuel From Biomass
The project purpose is threefold: first, confirm that biomass can be used to produce methane gas; second, test biomass types to see which produces the most gas; and third, build a functional prototype. I filled separate bottles with a solution of water and: 1) manure, 2) compost 3) a 50/50 mixture and 4) water only (control). To capture gas, I secured balloons onto each bottlecap. My hypothesis was generally correct - each biomass type generated methane (the 50/50 solution produced the most). Further, my prototype (“iPoo”) demonstrates and promotes biogas generation.

MCH180: The Clear Choice When Choosing Allergy Relief
Factors impacting the rate of dissolution for allergy medication will be evaluated.

MCH181: Your Teeth: Better than Whiter?
Four different toothpastes, two normal and two whitening, will be used in this experiment to compare the toothpastes’ ability to protect against the erosion of a soft drink. Boiled eggshells will simulate teeth; they will be soaked in Coca-Cola, then brushed with different toothpastes. The hardness of the eggshell and its color will be recorded and analyzed to evaluate the protection provided by the tooth paste.

MCH182: Saving Christmas
The purpose of this project will be to evaluate the effectiveness of various solution to keep needles from dropping off cut pine trees (Christmas trees).

MCH183: Round and Round It Goes
To determine if varying the amount of malonic acid will control the oscillating reaction of the Briggs-Rauscher reaction. Create 4 solutions and use fewer scoops of malonic acid in solution B.

MCH184: Captivating Crystals
In my project, "Captivating Crystals" I investigated which environment would grow the largest and purest crystals. I grew the crystals in varying environments with different temperatures; at room temperature, in a refrigerator, and in an ice bath. I predicted the crystals would grow best at room temperature, the warmest environment of three. The crystals grew for a total of 4-5 hours in all three trials, and were made of a saturated solution consisting of borax and water. In conclusion, my hypothesis was incorrect. The crystals that grew in the refrigerator had the largest individual size and grew the most amount of crystals on the string.

MCH185: Up Up And Away
I did this experiment so that I could see which substance created the most fizz. I used sugar, baking soda and salt each combined with white distilled vinegar. My conclusion is that vinegar combined with baking soda was the best because it created the most gas to blow up the balloon. It was so strong the balloons could not hold on to the test tube. The sugar and salt had no reaction- there was little or no fizz in the test tube.

MCH186: Glow With The Flow
A glowstick! I did this project to find out which temperature allows glowsticks to light up the longest. In an emergency these light sticks can be used. They are easy to carry around and are waterproof. Sometimes I'd want my glowsticks to be brighter or last longer. This experiment lets me test which was best I put glowsticks in a cup that was 50 ° Fahrenheit, 75° Fahrenheit, 100° Fahrenheit, or 125° Fahrenheit. It showed that the ones in colder temperature lasted longer, but the hotter temperature was brighter.

MCH187: Does Tea, Coffee and Coke stain your Teeth?
In this project I was looking to see if coke coffee and tea stain your teeth. I studied the different types of teeth staining and also the different ways you can prevent teeth staining. I found out that they all do stain your teeth in.

MCH188: Gallium and Aluminum
My experiment was Gallium vs Aluminum. I wanted to see if applying Gallium would corrode an aluminum soda can faster. I melted Gallium and applied it to an aluminum soda can with a syringe. I observed the results and my hypothesis was correct- gallium will help aluminum break down faster. This experiment will help aid the recycling industry who is looking for a way to recycle aluminum faster

MCH300: Catching Fire
The purpose of this experiment is to see how fabric softeners affect flammability. To conduct this experiment we compered the times it took the fabric to burn with the different fabric softeners. The experimental results were measured by recording the times it took them to burn. The results of this experiment show that fabric softeners do affect a fabrics flammability. The results of our experiment led us to agree with our hypothesis because Downy did make the fabric take the longest to burn

MCH301: GLUES OF THE AGES
In this experiment, we will be testing to see if there were any glues were used in ancient times that work better and cheaper than glues used today. One of the most popular glues today is Elmer's. In this experiment we will be testing three glues that have not been used for a long time. After doing this experiment, we have concluded that Rice glue is a very easy to make and reliable glue. It may be even as good as Elmer's glue. This means that some people are wasting there money on something they can easily make for themselves.

Intermediate – Computer Science & Math (MCM), 7th & 8th Grade

MCM100: The Optimal Batting Lineup
With this experiment, I aimed to debunk the traditional theory behind organizing a baseball batting lineup. I tested three different structures of lineups: the traditional one, one that staggered good hitters and poor hitters, and one that ranked batters by a statistic called OPS. I hypothesized that the third of these would be the most effective at scoring runs. I tested this by simulating 100 games. The results for each batter stayed the same across all of the structures, but the different orders changed the outcome of each game. I concluded that the OPS lineup was indeed the best.

MCM101: Wi-Fi Roadblock
I was changing the different types of materials to see which one disrupted the Wi-Fi signal the most. I placed the materials in front of the router and recorded the signal. I kept everything the same all except for the disrupting materials which were changed each trial.

MCM102: Can you hear the Difference?
The purpose of my experiment was to see whether people can hear the difference between CD-quality music and MP3s compressed to various bitrates. The results of this experiment will be useful for people with lots of high-quality music looking to fit more music in a smaller space. My testable question is: How low can MP3 bitrate go before people notice a difference when compared to CD-quality audio? I hypothesized that MP3 compression at lower bitrates (64 kbps) will sound worse compared to CD-quality audio, while MP3 compression at higher bitrates (128 kbps) will sound about the same as CD-quality audio. To test this I extracted 3 different 10-second audio clips – samples of rock, classical, and jazz music – and compressed them to 3 different levels. I recruited 1,203 people on Amazon Mechanical Turk to listen to a clip at 2 different bitrates and fill out a short survey. The results of the survey show that 31.2% of people correctly identified the difference between a 64-kbps audio clip and a CD-quality audio clip, while only 27.53% correctly identified the difference between a 128- kbps audio clip and a CD-quality audio audio clip. However, most people were unable to identify difference between CD-quality audio and MP3 compressed audio at any of the bitrates I tested.

MCM103: The Computer Sank my Battleship!
The purpose of my project is to develop a computer program in C that will evaluate three different guessing patterns in the game of Battleship for the purpose of guessing the position of an opponent's ships. In order to evaluate each strategy, the computer will engage in 100 simulated games against each 10 ship layouts submitted by human players. Success will be evaluated based on the number of turns required to locate all five ships. Ultimately, the goal is to improve the success rate of the computer against a human opponent as compared to a control strategy of intelligent random guessing.

MCM104: Controlling the Console
With the growing problem of video game addiction rampant across society, it has become imperative to mitigate the amount of time individuals spend playing these games. This project involves the creation of a system that has the capacity to regulate excessive video game usage, and can easily be installed into a smart phone and video game console. The idea is for the system to alter the gaming console in such a way to reduce the amount of time the user spends playing on the console. The device will fit the user in the form of alerts and interruptions throughout their gaming experience. See project board for final result.

MCM105: A Touchy Subject
A new type of touch screen was engineered using LED lights. This newly engineered product has countless applications in booming technology field.

MCM106: Creating a Self-Diagnosis iOS App
As healthcare is inefficient and expensive for many people in the world, I set out to determine whether an app to diagnose injuries and calculate injury risk is feasible. After completing tutorials on Xcode, I created the app, and sent out a form to all scholastic athletes, asking if they would participate in the study. I tested it on nine athletes at my school who fit all the requirements necessary. Due to an extremely positive response from app users who all diagnosed injuries accurately, I concluded that an iOS App that can diagnose injuries and calculate injury risk is feasible.

MCM107: Google Glass: Rethink
Google Glass can change the way we see technology. Unfortunately regular people don't have access to it because of the cost and the flawed design. The Google Glass Rethink Project aims at fixing the problems of Google Glass. The project goal is to produce a prototype that can lower cost and weight of Google Glass significantly. The Google Glass rethink project's initial prototype is still in development, but sufficient modeling, testing, and proof of concept work has been done to say that the initial prototype can reduce the cost of Google Glass by 94% and weight by 65%. Project will be completed by February 22nd.

MCM108: Automating Records of Cell Interactions in Organ Research
My project advances the feasibility of programming algorithms to quickly and accurately classify the interactions between Tcells and Dendritic cells in transplant organ tissue in laboratory experiments. Automating this task with MATLAB programming and demonstrating increases in speed and accuracy will lead to an increase in knowledge and ultimately insure the acceptance of thousands more organ transplants.

MCM109: What's Your Ispeed?
Is it possible to determine the speed of a car passing by using an iPad? An oscilloscope app on an iPad was used to record sounds of three cars passing by at a known speed. Sound spectrograms from the app were examined to observe the shift in sound frequency. That change in the frequency was analyzed using the Doppler Equation to calculate the car's speed. The differences between the calculated and actual speed were small indicating that speed can be determined with this app. If perfected, police could use this app as a cheaper alternative to other speed measuring equipment.

MCM110: Which Material Blocks the Wifi Signal?
The purpose of this experiment was to see what materials block wi-fi. I set up five different computers in an arc a set distance away from the router. I then ran the application that tests the Dbm, after putting the material in question over the router. Foil had teh largest effect, as it decreased the Dbm the most. This is likely because foil is the densest. Paper had the least effect as it is the least dense.

MCM111: The Helix Hard Drive
Information technology is advancing faster than ever before. This has introduced the problem of data storage. Archiving the increasing amounts of data that keep the digital infrastructure afloat is becoming increasingly challenging. Therefore, we must turn to a radically different storage medium- DNA. My goal is to store binary data in a DNA sequence form and then program a computer so that it can receive DNA data from a sequencer and read it as a traditional computer file. I will create a code to translate ATGC sequence of DNA into binary code and extract the binary code from the file I wish to store on DNA. I will demonstrate the accuracy of my code by having the computer read DNA from a sequencer and display it as the original file.

MCM112: Programming NANORGs in a Virtual World
The year is 2030 and I am a software engineer. The world is in an energy crisis, and we have run ut of fossil fuels. My goal is to program robotic nano-organisms (NANORGs) to extract energy from industrial sludge. The procedure will compare programming NANORGs to use either 45 degree angle turns or 90 degree angle turns.

MCM113: Which Is The Best Search Engine?
In my science fair project, "What is the Best Search Engine?", I wanted to learn which engine will help me accomplish my homework faster with the most results. This will help anyone to complete tasks that can, and will, be useful to get an answer revealed sooner. I investigated which out of the 3 top-rated search engines will give you the most results. After I finished the trials, ninety six one hundred eleven results said Google.com was the way to go. And in the end this project will help people invest time to advance technologies.

MCM114: Medicine Reminder App
The rationale for my project is to help forgetful patients remember to take their medications. When I create an app that will allow patients to get reminders to take their medicine this will help improve their health. My research will impact society because 32 million Americans use three or more medicines daily. The engineering goal for my project is to help patients take medications prescribed on time so that their conditions don't weaken they improve or stay the same. The expected outcome for my project is that I will create a successful app and it will help many people. Working toward my goal will allow me to experience all phases of engineering design, including pilot testing the app with people who can provide feedback.

MCM115: Simple Computer-Based Assessment of Music Performance
The goal of my project is to provide instant feedback to a student while they are playing the music. This will help the student understand the music characteristics and will eventually improve their music skills. Music performance was simulated and assessed by using cross-correlation of time-shifted-segmented music data and the reference music data. Using the proposed method, the similarity and time accuracy of the played music could be estimated. However, the calculation time of cross-correlation was not fast enough for the instant feedback, so we will develop and test other simpler methods. In addition, we will apply the proposed method to the real music performance assessment; the reference music will be played by a professional musician and recorded, and the same music will be played by the student, which will be automatically compared to the reference by computer.

MCM116: Cube Fever
What is the fastest way to solve a Rubik's Cube? From my research I have found three different ways to solve a 3X3 Rubik's Cube. They considered different algorithms for different situations. I predicted that the third method which I labeled method C would be the fastest. For my project I tested each method three times and timed them to see which algorithms are the quickest. Method B had the fastest times with an average of 26.8 minutes. Method C had an average of 34.4 minutes. Method A was the slowest with an average of 40.9 minutes.

MCM117: Adaptive Smart Game

It is an adaptive game that can be played on a smart device. This will use algorithms that allow user to play at their own pace based on their skill level.

MCM118: How Video Games Affect the Body

My project is about how video games can affect the body. I chose this project because my brothers play a lot of video games and my parents always say, playing video games is not good for you, so I decided to find out. So I researched about my project, things like heart rate, blood pressure, and other necessities for my project. Once I researched all my information I began my project. Then I worked it all out. In the end I found out that video games did change and everything increased. So in the end, I guess my parents were right, video games really aren't good for you.

MCM119: Where's my Wi-Fi?

I am testing how Wi-Fi travels through different materials. I will be collecting information on the time it takes for the Wi-Fi signal to travel from one device to another.

MCM120: Relationship Between Parents' SES and Childrens' Grades

Socioeconomic statuses vary throughout our school district, and so do academic performances. It has been an age long question as to how SES affects our common day lives. My hypothesis is that parents with a moderate SES will provide a learning friendly environment that promotes academic success for their children. I used Google Docs to survey parents confidentially for their job title and childrens' grades. I used Duncan's Socioeconomic Index to derive SES from job titles. I used the program R to find relationships between SES and grades. I also built a math model that will predict grades based on SES.

MCM121: Most Effective Means of Wireless Transfer of Electricity

my experiment was to see which device would transfer electricity wirelessly most effectively. Using various types of wireless transfer devices I conducted several trials to ascertain my results. my hypothesis was proven correct.

Intermediate – Consumer Science (MCS), 7th & 8th Grade

MCS100: Can a solar oven cook food?

My problem was to figure out if food will successfully cook in a solar oven. There are a bunch of people who professionally make solar ovens. Most of these people live in hot climates here in the US and across the world. When I did my experiment, I was actually expecting it to not work well, because of the weather, but luckily I got a few sunny days. Even though it was colder outside, the sun's rays still heated some of the food. Overall my experiment was fun to do, and I would recommend it to fellow classmates.

MCS101: Drop the Nugo

Childhood obesity is a growing problem in the U.S. The purpose of my study is to see if easy to understand information on nutritional content helps children make healthier lunch choices. I post a sign in my school lunch line with information on sugar and calorie content of Nugo bars. I hypothesize that the sign lowers sales of Nugo bars and sales of overall sweets. My results confirm the hypothesis that Nugo sales decrease but does not confirm the hypothesis that overall sweet sales decrease. Total sales of treats and desserts increase when the Nugo sign is posted.

MCS102: To Rust, or not to Rust?

Rusting is a problem for anybody. From metal lawn chairs, to car bumpers, rust seems to be everywhere without the right protection. This work intends to prove which rust-inhibitor would work best. Five containers are set out. Each container is filled with 4 different liquids, such as rain water, tap water, distilled water, and home-made saltwater. One is left empty. Seven nails painted with 7 different paints are placed in the water and kept there for 2 weeks. The results showed that Valspar worked the best.

MCS103: The Battery Battle

Some challenges R/C hobby enthusiasts' face when we meet is run-time of our batteries. Nickel Metal Hydride (Nimh) batteries come standard with an R/C purchase, but the enthusiast find that lithium polymer (lipo) batteries fit their needs with increased run-time and a large increase in speed. Which battery will be the best overall choice and investment? I found that the 3 cell Lipo is the best for run time and speed, but very hard to control. The 2 cell is the best overall battery for a boost in run time and overall speed.

MCS104: The Reliability of Lead Testing

Lead is a highly toxic element that is continually being exposed in many common household items. In recent news, many manufacturers have been blamed for the high and dangerous amount of lead content in their products. Lead was found in baby toys and items in the Pittsburgh area, as reported by WTAE News, Nov. 2014. Concerned parents have felt the need to test their own products for lead content with at home lead test kits, but the Consumer Product Safety Commission feels that these at- home lead test kits may be unreliable. Which at home lead test kit will be the most reliable for testing the presence of lead in products? It was the experimenter's hypothesis that the Pro-Lab Lead Surface Test Kit will produce the most reliable results. 10 newly bought items (toys, baby pacifier, etc.) were tested with 3 different at home lead testing kits (Lead Check Test Kit, Pro-Lab Lead Surface Test Kit, and Lead Inspector Test Kit), each test's procedure was followed according to package directions. To determine the reliability of each lead test kit, five of the items were tested with an Atomic Absorption Spectroscopy test. It was determined that the Lead Check Test Kit is the most reliable test kit Both the Lead Check and Pro-Lab brands used sodium rhodizonate, which compared to a sodium sulfide test by used Lead Inspector, produced better results. But since the Pro-Lab brand required the addition of water, so even though it has the same this may have diluted the chemical, causing less accuracy.

MCS105: Which Homemade Fire Starters Burn the Longest?

The purpose of my project is that campers need a dependable product to light a fire using waterproof, cost effective, readily available, and less harmful fire starters. Several types of homemade fire starters can be assembled safely using recycled household materials.I hypothesize that the homemade fire starter made of soy wax,sawdust, and a cardboard egg carton cup will burn the longest.

1. Under adult supervision, gather materials and set up for experimentation in the kitchen
2. Weigh and measure materials
3. With adult supervision and wearing rubber gloves, submerge four recycled wine corks into 500mL of isopropyl alcohol and store in a tightly sealed glass jar overnight
4. Assemble four cotton ball fire starters by coating three cotton balls in 3 g of petroleum jelly
5. Under adult supervision, melt 8g of unscented soy wax in a metal pot
6. Measure and cut four 15cm square pieces of wax paper using a metric ruler and scissor
7. Assemble four lint fire starters by stuffing 3g of dryer lint into 4cm wide sections of toilet paper tubes and wrapping each in precut wax paper squares
8. Place a wine cork fire starter into the heavy metal pot with adult supervision
9. Light the wine fire starter with a butane lighter with adult supervision
10. Use a stopwatch to time how long the wine cork fire starter burns
11. Repeat steps 9 through 11 three more times with adult supervision

12. Assemble four egg carton cup fire starters by adding 2 g of sawdust and have an adult pour 2 g of unscented soy wax into individual recycled cardboard egg carton cups
13. Place a cotton ball fire starter into the heavy metal pot
14. Light the cotton ball fire starter with a butane lighter with adult supervision
15. Use a stopwatch to time how long the cotton ball fire starter burns
16. Repeat steps 13 through15 three more times with adult supervision

Results to be discussed at PRSEF

MCS106: Exposure Disclosure: How much Radiation does your Cell Phone Leak?

The purpose of this experiment is to investigate whether different brands of cell phones vary in radiation levels when using call mode, text mode, or game mode. To conduct this experiment, I measured the temperature and the maximum radiation reading of each cell phone while it was placed in the jig. The results were determined by recording the maximum radiation levels that each cell phone emitted in the three different modes. The results of the experiment revealed that the IPhone 5s had the highest average radiation level for all modes of operation. My hypothesis should be accepted because I predicted that the IPhone 5s would emit the most radiation in all modes of operation and the experimental data and results agreed with this conclusion.

MCS107: The Acid Test

Project : The Acid TestI wanted to know how much acid is in different brands of sour candy. I dissolved a dozen different sour candies in water, and then tested their pH levels using an electronic meter. All the candies came in somewhere within the 2-3 range on the scale. Battery acid has a pH of 1. Although the candies may not be as corrosive as battery acid, they are still very bad for your teeth. Tooth enamel begins to wear down at a pH level of 4.0. Candy with a pH of even 3.0 has 10 times the acid needed for enamel loss

MCS108: Do More Expensive Flea Collars Repel or Kill Insects Better Than Less Expensive Ones?

Purpose: Determine if more expensive flea collars inhibit insects better.
Hypothesis: The ability of flea collars to inhibit insects will increase as their price decreases.
Procedure:

1. Cut the flea collars being tested into equal sized segments
2. Place a segment of one of the flea collar being tested into the testing apparatus
3. Place 30 drosophila in the testing apparatus
4. Determine the number of drosophila repelled by the flea collar after 5,10,15, and 20minutes
5. Clean testing apparatus and repeat steps 4-5 for the control (no flea collar) and the remaining flea collars

Conclusion: Final results will be available at the fair.

MCS109: The Effects of Temperature on Different Brands of Batteries

Purpose: Determine if more expensive brands of batteries produce more voltage than less expensive batteries at different temperatures.
Hypothesis: As the temperature decreases more expensive batteries will produce a greater voltage than less expensive batteries.
Procedure:

1. Create 8groups of 10Energizer and Rayovac alkaline batteries
2. Place 1of the groups of Energizer and Rayovac batteries in an oven for 1hr. at 93.3°C.
3. Determine voltage produced by each battery at testing temperature.
4. Place the remaining groups of batteries in a heating/cooling device for 1hr. at the desired temperatures(23°C(control),2.8°C,-17.8°C)being tested.
5. Repeat step3 for the batteries at the temperatures being tested.

Conclusion: Final results will be available at fair

MCS110: Insulation Education

Have you ever wondered why the temperature in your house stays so much warmer than the temperature outside? There's a lot more to it than the hot air that comes out of your vents! In my project, I tested how insulation works. I chose Styrofoam, Spray Foam, and Fiberglass to test. I placed jars filled with hot water into coffee cans, and surrounded the jars with insulation. Every 5 minutes I checked the temperature of the water. I did this for 20 minutes each trial. In conclusion, my hypothesis was correct. Fiberglass holds the most heat.

MCS111: Color's effect on melting point

The purpose of my experiment is to see if color effects how fast things melt. People all over the world will care about my experiment because it will tell them what color to wear on a hot day, it will tell them what object will melt very quickly and much more. The testable question is does color effect objects melting rate. My hypothesis is if I melt many different color M&Ms then the black M&M will melt first because dark colors absorb heat. For my experiment first I boiled a pot of water. Next I put a plate on top of the pot. Then I put the M&Ms on top of the plate. Next I recorded when they melt. Last I repeated this three times. For my experiment it had no relationship, for example one time the gold M&M lasted for 900s and then the next experiment it lasted for 180s then last one lasted 172s. Also the black and white, completely opposite colors melted at the same time at 150s. For my experiment my hypothesis was wrong, I assumed that color did effect melting point but I was wrong from my experiment I learned that color does not affect how fast things melt because colors absorb light faster not heat.

MCS112: Does the Price of a Pellet and BB Fired From an Air Rifle Affect Its Accuracy, Precision, and Ability to Penetrate a Target?

PURPOSE: Do more expensive air-riffle pellets penetrate deeper than less expensive ones.
HYPOTHESIS: As the price of air-rifle pellets increases the depth they penetrate will increase.
PROCEDURE:
Step1:Select 30pellets of each brand which are within .03g of each other.
Step2:Level, plumb and securely mount a phonebook 15.24m away.
Step3:Load a pellet being tested and pump the lever of the rifle once.
Step4:Level, plumb and securely mount the rifle in the holder and fire.
Step5:Repeat Steps1-4for the remaining 29pellets and record the depth each penetrates the phonebook.
Step7:Repeat Steps1-5using new phone books for each pellet brand being tested.
CONCLUSION: Final results available at fair.

MCS113: The Antacid "Ph"actor

Antacids work to neutralize stomach acids, however what happens when they outdate? This project was intended to see whether expiration dates affect the pH level of antacid tablets. Six antacid tablets, three expired and three unexpired were dissolved in water and tested with pH paper. The types of antacids were Tums, Mylanta, and Equate. It was determined within the duration of the experiment that the newer the antacids, the higher the pH would be. This means that newer antacids would do a better job to prevent heartburn and neutralize stomach acids.

MCS114: Let There Be Light

My project "Let There Be Light" was to find out if candle color affects how fat and/or slow the candlestick burns. I used five different colored candlesticks- blue, white, yellow, red, and green. I put the candlesticks in their holders and burned them for two hours straight. Then, I took them out of their holders and measured them in centimeters with a tape measure. (Measuring in centimeters showed the difference in height better than measuring in inches.) When I lined the candles up next to each other, I realized that there was a bigger difference in the height than I thought there would be. My hypothesis was correct. The white candle burned the fastest and the green candle burned the slowest.

MCS115: The Durability of Paint

The purpose of this investigation is to find the most durable paint brand under various weathering conditions. My hypothesis was that the Sherwin Williams Flat paint would be the most durable brand because I spoke to a professional painter, and that was the paint brand she'd used her entire life and it was very durable. To test this hypothesis, I cut 24 blocks of wood into 15 x 15 cm squares and painted 6 different types of paint: 3 different paint brands in two finishes of each - flat and satin. I placed these boards at each of 3 weathering stations (rain, sun and extreme cold). I rotated each group every 12 hours for 60 days. A 100 block transparent grid (the same size as the block) was placed over each block of wood to determine amount of chipping. My results showed that the most durable paint was Behr Flat with only 15.8% average chipping. Therefore, my hypothesis was incorrect. Behr is a very durable paint brand and is recommended. With further research, I found that paint contains the natural pigment titanium dioxide. This would cause the paint to resist moisture, heat, and snow. The more titanium dioxide present in the paint, the more durable it would be.

MCS116: What athletic beverage contains the most electrolytes?

As an athlete, a common recurring dilemma is finding the "perfect" drink to properly rehydrate and replenish myself after I play a sport. My project tests 9 different sports drinks (Coconut Water, Gatorade, Chocolate Milk, Vitamin Water, V8, PerfectWater, Orange Juice, Distilled Water, Pickle Juice, Pineapple Juice) to find which of them contains the most restoring electrolytes. Electrolytes are minerals in your bodily fluids that carry an electric charge and have a major effect on your pH levels and the amount of water in your body. In this project, I pour each drink into a cup, and set up a copper sheet and a zinc sheet on each side of the plastic cup, while wiring a multimeter to each sheet. Using the multimeter, I record the direct current and the voltage of each beverage. I then divide the direct current reading by the voltage reading, and ultimately get the conductance of each drink. I repeat this process 10 times with each beverage. I will have my final numbers and conclusions posted at the fair.

MCS117: Does Antibacterial soap make a difference?

The purpose of this experiment was to determine if antibacterial hand soap is more affective at killing bacteria than non-antibacterial. Through testing hand using bread, the result was antibacterial hand soaps work better at killing bacteria. On average, the zone of death was fifty millimeters for antibacterial but only twenty-one millimeters for non-antibacterial hand soaps. More mold appeared on the bread that were touched without hand washing. The bread touched with normal soap appeared to have more mold on the bread than the antibacterial soap. As soon as mold was present, I disposed of the bread properly.

MCS118: What Keeps Guacamole Fresh?

Test and find out what ingredients keep guacamole fresh for at least four hours. Common solutions include lime, green tomato, avocado seed, and olive oil. The researcher will report results of her test and make the corresponding recommendations.

MCS119: Dry Skin . . . A Big No No!

Did you ever wonder how much moisture is in lotion? Well I did! I hypothesized that there would be more moisture in Vaseline because it is a water barrier and holds in water. What I had to do was get a mason jar and put water in it then get a piece of filter paper with the lotion on one side and lay it on top. Then I had to flip the jar over and wait a half hour to go baack and see how much water was left over. I found out that my hypothesis was proven right.

MCS120: Don't Lose Your Marbles

My purpose is that I always wondered what type of paper towel was the strongest: Bounty, Brawny, and Sparkle. My procedure is that the clips on the box will hold up the paper towels and when the paper towels tear the box will catch the marbles. My data was interesting. Brawny paper towels were the strongest with 81 marbles and it took the longest to tear, Bounty came in second with 45 marbles and it took the second longest to tear, and Sparkle came in third with 31 marbles and it took the shortest time to tear.

MCS121: Are Mpre Expensive Nail Polishes More Durable Than Less Expensive Ones?

Purpose: Determine if more expensive nail polishes are more durable than less expensive polishes.
Hypothesis: Price increase equals increased durability
Experimental Procedure

1. Make testing apparatus.
2. Place unpainted nail on apparatus.
3. Determine mass of nail with polish before placing on apparatus.
4. Place fingernail from step 3 in apparatus.
5. Drag fingernail attached to apparatus across sandpaper
6. Determine and record change in mass of fingernail
7. Check nail with microscope, determine/record number of scratches on polished nail.
8. Repeat steps 3 – 8 for 29 more nails, and for each polish being tested

Conclusion: Available at fair.

MCS122: Eating Nails for Breakfast

Breakfast is the most important part of the day. It's essential why you need healthy nutritious food. My experiment was to determine which breakfast cereals had the highest iron content. To isolate the iron I put it in a plastic bag and crushed it with a rolling pin. Then I poured teh cereal in water and stirred it for five minutes. I put it in a coffe filter and examined the results. After conductin three trials of Golden Grahams, Cheerios and Real Medleys cereal. My hypothesis is that the cereal with the highest daily iron allowance will have the most iron. My hypothesis was proven correct

MCS123: Milks Rate of Spoilage

Inaccurate spoilage dates are an issue environmentally and economically. Using this as a guide can cause for premature disposal of milk that isn't spoiled. My experiment deals with the rate of spoilage of milk and if PH measurements are the best way to test milk spoilage. I used different types of milk and put each under different temperatures to simulate compromised storage conditions. Then I monitored and recorded the PH of the milk over two weeks' time.

MCS124: electric vs manual

The purpose of this experiment is to see which type of toothbrush, electric or manual, removes stains better. To conduct this experiment, I will compare the two types of toothbrushes by brushing egg shell stained with coffee. The experimental result were measured by how much stain was removed from the egg shells. The results of the experiment show that the electric toothbrush removed more stain than the manual toothbrush. The result indicates that I accept my hypothesis.

MCS125: Do Candles Burn As Well As They Cost?

I was curious to see if the cost of a candle affected how it burned. I chose three candles with varying prices, burned them for a few hours in each trial and recorded how they far down they burned. I found out that the more costly the candle, the better it burned. My hypothesis was proven correct.

MCS126: Turn That Down!

Each year nearly one million people are exposed to noises, loud enough to cause hearing damage and even hearing loss. In this experiment, I explored the effectiveness of earplugs for reducing machine-generated noise in my experiment. Seven different pairs of earplugs, 3 brands of foam earplugs and 4 brands of rubber earplugs were tested using a simulated head, a decibel meter, and a lawn mower engine noise file. First, for the control group, I played the machine-generated noise through the headphones and recorded the decibel level. Then I inserted the earplugs in the ears of the simulated head, played the machine-generated noise through the headphones, and recorded the decibel level for each of the earplug samples. All steps were then repeated for 3 trials of each earplug and the control group, for 24 trials in all. The testing room was well insulated from any outside noise, and the noise was played at the same decibel level for each test. The E-A-R Ultra Fit pair performed the best with an average attenuation of 15.0 decibels. However, the Howard Leight quiet rubber earplugs were the least effective with an average attenuation of 11.1 db. In conclusion, the E-A-R Ultra Fit performed the best because of their particular shape, not because of the material they were made out of. The Ultra Fit has three curved flanges that created a better seal than the other earplugs that were tested in this experiment.

MCS127: Can you make Dye from Natural Materials?

Purpose: I want to find out if the natural dyes like blueberries and turmicroot have better results when two different fabrics are dyed.
Hypothesis: My hypothesis was If I use natural materials to make dye then it will work very well.
Questions: I had a couple questions I needed answered so I will list a few of them for you. What should I use to boil the natural materials? What should I use to make the dyes? and What would be the best way to drain the water/dye out to make sure it was the right consistency?
Rationale: The reason I conducted this experiment is that some of the chemicals in real dye can be harmful to humans. I want to find a natural, healthier way to dye materials.

MCS128: Electrolyte Concentration and Conductance

The human body depends on a proper electrolyte balance. Athletes are especially dependent because they lose electrolytes through sweat. The problem studied in this experiment was which drink: sports drink, energy drink, orange juice or 2% milk (chocolate or white) contains the most electrolytes? The experimenter's hypothesis is that orange juice would contain the most electrolytes. To measure electrolyte concentration, an open circuit was made with copper wire, a nine-volt battery, a non-conductive spacer, and a multimeter. Twelve beverages were tested three times each for 36 trials in all. Results were converted to conductance measured in amps, which is proportional to the electrolyte concentration. On average, 2% chocolate milk contained the most electrolytes with an average conductance of 59.6 amps.

MCS129: The Effect of Various Whitening Toothpastes on Stained Teeth

Whitening toothpastes are used to make teeth appear whiter. This experiment was chosen to find out what whitening toothpaste will perform the best. My hypothesis was that my homemade toothpaste with the mixture of hydrogen peroxide and baking soda would perform the best. 70 sterilized teeth were stained in Cranberry - Raspberry Juice for 10 days. The teeth were separated into 10 groups of 7. The whitening toothpastes used in this experiment were Arm and Hammer Enamel Care- Extra Whitening, Colgate Optic White, Aqua Fresh Extreme Clean Whitening, Crest 3D Whitening, CVS Whitening Toothpaste, and Rembrandt. I also made 3 homemade toothpastes: baking soda ($NaHCO_3$) and distilled water, hydrogen peroxide, and the mixture of hydrogen peroxide and baking soda. Water was the control in this experiment. I brushed each tooth for one week in the same exact way – same number of strokes, same pressure, and same amount of toothpaste for 1 week. After one week I compared the teeth to the VITA chart and recorded the changes. I repeated all steps of the experiment for another week, with a total of 70 trials per week in all. The results were that the CVS Toothpaste whitened the teeth the most at an average of 10.1 shades lightened. It may have exhibited the greatest whitening effect because hydrogen peroxide was 6th on the ingredients list, which indicated that it contained more H_2O_2 than any other brand of toothpaste tested. After further research, it was determined that dicalcium phosphate ($CaHPO_4$), which was 2nd on the ingredients list, also contributed to the whitening of the teeth in the CVS group. Dicalcium phosphate efficiently whitens teeth when mixed with hydrated silica ($SiO_2 \cdot nH_2O$). These substances were not contained together in any other brand tested.

MCS130: Tough As Nails

Nail up keep for women is very expensive. My experiment consisted of comparing various polish brands in different environments to determine their performance and overall durability. Testing included taking fake nails attached to dowels, and simulating daily use over a five-day period with three different brands (Sally Hansen, OPI, and Wet & Wild). The testing criteria measured soaking the nails in a soil and water mixture. Then, soaking the nails in dish washing liquid and hand washing solution to replicate everyday daily choirs. OPI outperformed the other brands and contradicted my hypothesis.

MCS131: How Strong Is It- Homemade Paper
I tested the strengths of three homemade papers, each made with a different paper, using newsprint, copier paper, and brown paper bags. I tested their strength by clamping a strip of paper between small pieces of wood, then hanging a bucket below it, and filling the bucket with water, and turning off the water when the paper broke. The paper made with newsprint was the strongest, and the paper made with brown paper bags was the weakest. I had thought that the newsprint would be the weakest, and that the brown paper bags would be the strongest.

MCS132: Humpty Dumpty Fell and Turned into Paper
The purpose of this experiment is to determine whether a kitchen waste material, eggshells, can be used to produce paper. It was inspired by one of the market's featured eco-friendly products, stone-paper, manufactured from calcium carbonate and polyethylene. In this experiment, white glue and finely-grounded eggshells were used to model a simplified paper-making process. The produced papers were tested for qualities such as smoothness, neatness, and the ability to be written on. The results displayed that a three-layer production method was preferable over a one-layer method, and that eggshells can potentially be used to produce paper in the future.

MCS133: Pop It Up
My experiment was to see which brand of popcorn popped the most kernels. I wanted to conduct this experiment because I like popcorn and when I microwave it I do not like to have kernels left. I conducted several experiments snd my hypothesis was correct- the more expensive popcorn was the one with lest kernels left over

MCS134: The Science Of Addiction - Additives in Snack Foods
Please visit student's exhibit on Fair Day for abstract.

MCS164: The Effect of Dimples on the Filght of a Golf Ball
A smooth golf ball hit by a professional golfer would travel only about half as far as a golf ball with dimples does. Most golf balls have between 300 and 500 dimples, which have an average depth of about 0.025 centimeters. This experiment was conducted to find out which golf ball travels the farthest, also what was the dimple pattern and how many dimples were on that ball. It was the experimenter's hypothesis that the Titleist Velocity brand will travel the farthest and have the best results because it is more expensive and rated higher by professional golfers. To obtain an answer to the problem stated, 3 tests were conducted; a straight, slice right, and hook left. Three different brands of golf balls were tested: Titleist Velocity, Polara Ultimate Straight and Slazenger Raw. Ten golf balls of each brand were hit 10 times in exactly the same manner straight into the simulator. Next, the three brands of golf balls were tested with the same swing 3 times right, then 3 times left, with a total of 48 trials in all. The Titleist performed the best in 2 out of 3 categories. This experiment could help you in your golf game, as it shows which ball suits your swing best.

MCS300: Which Drinks Rot Your Teeth Faster?
The purpose of this investigation is to study the effects of different liquids on teeth.Many young children are getting cavities before they even get their adult teeth. Parents, dentists and pediatricians should know which type of drink is safe for their young children to drink without damaging their teeth. We predict that coca cola will do the worst and apple juice will do the best. If we submerge a tooth in coca cola, milk, lemonade and apple juice, then the tooth in the coca cola will have the highest percentage of erosion and decay.

MCS301: Protecting your iPhone
In our experiment, we want to learn what the best way to protect your phone from freezing temperature is. Sometimes, leaving phones in extreme temperatures can damage them. So, to put it to the test, we'll be putting an iPhone in the freezer, while its wrapped in various warm materials (insulated lunchbox, cotton, stuffing, and a glove.) We will also be putting two thermometers, one to measure the phone's temperature and the other to measure the freezer's temperature, in along with it. As of now, we haven't performed out experiment, so we do not yet have our data.

MCS302: Capturing the Quality
The purpose of our research project was to investigate and compare the quality of pictures that were taken with three different types of cameras - a Polaroid camera, a 35mm Kodak camera and a digital camera - to ensure that consumers are buying cameras that produce a quality image. We predicted that images taken with a digital camera would produce the highest quality photographs. Using a color coding chart, our results showed that pictures taken with the digital camera did indeed produce the highest quality image compared to the Polaroid and the Kodak 35mm.

MCS303: Which Disinfectant Cuts it?
Germs are everywhere! In our science project, we plan on finding out which disinfectant works best. We have chosen five different disinfectants along with our control, water. The disinfectants we chose to use are Dawn, Ajax, and Lysol soap, 409, Orange Glo, and Spray 9. We are going to use those disinfectants to see which can kill the most bacteria from meat rubbed on a cutting board. Our main objective is to figure out do all of the disinfectants work, and if yes, which ones work the best? We'll find out in the hands-on experiment, 'Which Disinfectant Cuts It?'

MCS304: Wild Water

Wild Water was a project to see which water filter could filter dirty creek water the best. First, we went to a local creek called Chartiers Creek to gather our water samples. Next, we went to Home Depot to purchase some materials that you would find in the woods. Then we made the filters. We made three filters to test. The first filter was the Tipi filter. Then, we made the Homemade filter. Finally, we made the Plastic Bottle filter. The last thing we did was we went to Home Depot to purchase some water testers and tested the water.

Intermediate – Earth/Space/Environment (MES), 7th & 8th Grade

MES100: Escaping the Unknown

This experiment is to find out which trajectory of an object towards a black hole is most likely to escape it. My hypothesis is that the greater the angle at which the object approaches the black hole, the more likely it will escape. I will be modeling a black hole with stretchy fabric, a wood frame, and a weight. I will stretch the fabric over the frame and weigh down the fabric's center to create a dent, like a black hole makes in spacetime. I will fire a ball bearing with a spring mechanism. Final results will be posted.

MES101: What Types of Hair Absorb Oil Best?

Purpose: Determine which type of hair absorbs oil best.
Hypothesis: Hollow core hair will absorb oil better than solid core hair.
Procedure:

1. Create 15 hair test samples each containing 100g of the hair being tested.
2. Determine the mass of each.
3. Mix 100mL of oil into 400mL of distilled water and place one of them in the mixture.
4. After 15min, remove it and determine the mL of oil absorbed.
5. Dry it and determine its mass.
6. Repeat steps 1-5 for the 14remaining hair test samples.
7. Repeat steps 1-6 for the other types of hair being tested.

Conclusion: Final results available at fair.

MES102: Fuel of the Future

The main purpose of this experiment is to find a better, and safer fuel source. Hopefully it will cost less, and be better for the economy. It will also take fewer time to make this product useful to our needs and wants. The procedures in this experiment is simple. You first must extract the oils from the algae by pressing it with a piston like machine. Hexane is another way to remove the oils which can remove almost 95%. Time is not much of a concern because it can take up to a day or two depending on the advanced technology used. This can help us severely as a country, especially if we want to sell the product, in a low time space. Using websites that I have already viewed, and tested, everything seems to fall into place and everything should be a breeze. That is how and why I chosen to do this project

MES103: Green Thumb

Is it more beneficial to grow your plants in a greenhouse or simply planting them in the soil in the garden? In my hypothesis, I stated that growing your plants in the greenhouse would be more beneficial than simply planting them in the soil in the garden. I did this project because I wanted to see which would be more beneficial, planting in the greenhouse or not. I built the greenhouse, planted plants inside and out. Watered and measured each week for four weeks. Upon completion I found that planting them in a greenhouse is more beneficial than outside.

MES104: Ozone where we live

I did this project because I wanted to know more about ozone and where the most ozone was. I think ozone has an impact on how we live because if there was no ozone layer, many would have skin cancer and many would die. Now that there is a treaty no to use ozone-depletion-substances the ozone hole is not getting bigger. I looked up ozone and learned that even if we have good ozone in the atmosphere, there is also bad ozone that is created at ground level.

MES105: Which Sorbent Absorbs The Most Oil

The purpose for doing my project was to find out which sorbent would absorb the most oil on water. This is important because with the oil spills that occur in the ocean we need to protect our marine life. With my project I wanted to figure out the best way to remove oil from water. I used various sorbents and concluded that oil dry sand and hair are the best sorbents to clean up an oil spill. My project could have been more effective if I was able to use ocean water during my tests.

MES106: Catching stardust

The purpose of this experiment is to see how distance affects the amount of "stardust" that a satellite collects after an impact. to conduct this experiment I will use different lengths of the satellites to see how much "stardust" it will collect after an impact. The experimental results were measured by how much "stardust" was collected after an impact. The results of the experiment showed that the closer the "satellite" was to the impact the more stardust it will collect. The results indicate that my hypothesis should be accepted because my hypothesis states that the closer satellite is to the impact will collect the more stardust. Which is true because the closest "satellite" to the "stardust"collected the most.

MES107: Flower Power
My project is Flower Power. In this project I used capillary action in flowers, and I was using four different dyes with white carnations. I was trying to figure out which color would show the most in the carnation. After performing the experiment, I noticed that there were big changes in each of the carnations. I initially hypothesized that the blue color would show up the best; however, it was the yellow color dye that showed up the best. Next time, I would use four different flowers, one color dye, and observe which flower absorbs the most dye.

MES108: Is Solar Power the Energy of the Future?
Our supply of fossil fuel is running out. The energy needs of the world could, in principle, be fulfilled by one single source - the sun, although there are challenges in making this a reality. The solar systems available in the market are very expensive and not efficient as regular electricity. The objective of this project is to build a low cost, efficient solar powered charger for my phone. I am evaluating the efficiency of the system by calculating the time in which it takes to charge my phone using the solar powered system versus the regular outlet charger.

MES109: Ice Ice Baby
Rock salt prices are going up and quantities of salt are dropping. My goal was to see if there was a cheaper, possibly faster, way to melt ice during the cold, icy winter. I froze containers of ice in a temperature of sixteen degrees Fahrenheit, and poured two ounces each of rock salt, calcium, urea, cat litter, vinegar, and rubbing alcohol in separate measurured containers. The calcium and rubbing alcohol were the only things that work, but calcium was the most effective. This means I reject my hypothesis of cat litter melting ice the best.

MES110: Which Eco-Friendly Insulation Works Best?
Using shredded denim, or sheep wool, or shredded newspaper as insulation in a model home, which will allow the temperature to stay warm the longest?

MES111: Algal Bloom
Algae is an inconvenience to the ecosystem. This project was intended to learn how much fertilizers affect algae growth. Four different cases, with different amounts of fertilizer, were set up in sunlight and their mass increase was recorded (over thirteen days) in grams to the nearest tenth. It was determined that the fourth case, the one with the most fertilizer added, grew the most over the thirteen days. As expected, the one with no fertilizer did not grow at all. Further testing could find out what amount of fertilizer that no longer aids algae in its growth.

MES112: Natural Deterrents Against Ants
Ants will be exposed to the aroma of a variety of natural substances (nutmeg, hot sauce, peppermint) to determine if any will successfully deter ants from moving toward a food source.

MES113: Styrofoam: Alternative Disposal
The purpose of my project is to try to find an alternative disposal process to reduce the amount of styrofoam and to make a recyclable material from it. Was not exactly sure how it worked so I had to do my research. I found that Acetone separates the air from the polystyrene to create a more dense plastic like material but it never mixes with the polystyrene. I found that this could be used to make backs of school chairs etcetera. In conclusion I think this is an environment saving chemical reaction that is far better than any other option.

MES114: Which Colors Affect Solar Panels?
The purpose for this experiment is to determine if a solar panel can be more efficient with a particular color or frequency of light using plastic sheets in various colors. Connected to the solar panel is a solar windmill that will be used to measure RPM of the motor connected to the solar panel using a stroboscope. The hypothesis is that red would have the highest RPM because the light waves would be slower which will allow the solar panel to collect more energy. Results will be available on fair day.

MES115: Cleaning the Oceans
Oil spills are dangerous to the environment and can cost a fortune to clean up. Why have people clean up oil spills for months when you can let technology clean it up half as fast? One solution to cleaning up oil spills could possibly nanotechnology. In my experiment, I will mix water and oil to represent the oil spill. Then, I will add in ferrofluid to magnetize the oil. Finally, I'll put the neodymium magnet in a plastic bag and pass it through the oil. Nanotechnology may be the solution to cleaning up oil spills up faster.

MES116: What Is The Best Environment for Decomposition?
This report will describe each step I took to conduct my science project. First, I got some information about decomposition to develop a hypothesis. My project is about comparing environments for the rate of decomposition. I tested the decomposition of food. I chose food scraps that were common in most kitchens and added them to grass clippings. These environments were monitored over a period of time by taking pictures and recording temperatures. Comparisons of the pictures were made.

MES117: The Effects of Herbicide Contaminated Soil Beneath Power Lines on the Heart Rate of Daphnia magna

Purpose: Determine if chemicals sprayed beneath power lines are environmentally safe.
Hypothesis: Toxicity of soil beneath power lines will decrease as you move further away.
Procedure

1. Mix 100g of soil collected from outside test area with 100mL of water and filter and collect filtrate. (Control)
2. Place one Daphnia magna on concave microscope slide containing filtrate and allow it to acclimate for 1min.
3. Using a microscope set at lowest light and magnification setting determine daphnia's heart rate for 1min.
4. Repeat Steps 2-3 using 29 more Daphnia.
5. Repeat Steps 1-4 using soil samples collected from beneath power line.

Conclusion: Available at fair

MES118: The Effect of Environmental Pollutants on the Hatching Rate of Artemia

The purpose of my project is to determine whether the hatching rate of brine shrimpis affected by household products such as bleach, ammonia, and laundry detergent. I believe that the higher the pH of each solution the more effect it will have on the hatching rate of artemia. Once the eggs arrived i was ready to begin I used a one percent solution by using one gram of lab grade sodium chloride and the added to 100 mL of perchased spring water. I put 25 eggs in a petri dish and made 131 petri dishes to test with. Then I made the solutions using 1mL of the pollutant for every 1000mL of spring water I used. Then plated them with 20mL of each solution then waited 48 hours and counted the hatched brine shrimp with a pipet.Then recorded it in a data book. The results were that bleach was the most effectiv folowed by laundry detergent,ammonia, then the sodium chloride solution which served as the control. In conclusion the eggs were placed in different pollutants for 48 hours and were counted. The data of how many eggs hatched was then recorded.

MES119: See Weed Later!

Have you ever wondered if weed killer affects the plants growth? I did. I hypothesized that the weed killer would kill the plant and it would not grow tall and it would die off. In my project I bought two plants and set them up on a flat surface. I sprayed the plants each day but each plant had a different number of sprays. One plant had three sprays while the other had six sprays. I would come back every day and measure them before spraying them with the number they started with. After I finished my project I found that the less sprays killed the plants more and the more sprays kills the plants less. the plant with the six sprays was not affected as much as the one with three sprays.

MES120: How Magnets Affect Plant Growth

This project shows how magnetic field affects the growth of plants. I studied what different magnetic strength do to the growth and dry masses of plants. While phototropism, gravitropism, and tigmotropism have been thoroughly studied, the impact of GMF on plant growth and development is not well understood. This study shows how magnetic field can alter plant growth.
Hypothesis: I hypothesize that magnetic field has effects on plant growth. If plants grow in an environment with magnetic field, they will grow differently than if they grow without magnetic field. Magnetic field will significantly increase the plant growth
Results: There were three experimental conditions, as shown in Figure : (1) no magnet, (2) low magnetic field, and (3) high magnet field. The plants that had no magnetic field surrounding them were found to have slower growth i.e less shoot height as well as smaller leaf sizes and less biomass. The growth i.e shoot height, biomass and leaf sizes increased as the strength of magnetism increased.

MES121: Cleaning Oil Spill from Feathered Birds

The goal of my study is to find the most reliable and effective way to clean oil off birds who have been trapped in waterways contaminated with petroleum oil spills. My hypothesis is that different procedures will be less effective or more effective on how clean the bird is and how safe it is for the bird. Also I believe that the texture of the feathers on a bird will determine the best way to clean it. My findings will reduce thousands of incidences of birds dying or suffering permanent injury from human caused damage to their habitat.

MES122: Get out of my light!

This experiment was conducted to see if different environmental and animal substances have an impact on the amount of energy a solar panel can collect and if solar panels then return to baseline energy collection capability after cleaning. To conduct this experiment, I used environmental and animal substances as my independent variables. The amount of energy collected and the energy collection capability after cleaning with water are my dependent variables. The clean solar panel was my control. The experimental results were measured by observing readings on a multimeter, which were in milliAmps (mA). The results of the experiment show that all of the substances: leaves, ice, bird droppings, and rain, had an effect on a solar panel's energy collection capacity. The different substances had differing amounts of % change from baseline. The energy collection capability was decreased when the substances obscured a portion of the solar panel. When the solar panel was cleaned, it's the energy collection capability returned to baseline.

I agree with my hypothesis because my experiment and data show that when a substance obscures a part of the solar panel, the amount of energy collected was reduced, depending on the substance. When the panel with the substance was cleaned, baseline energy collection capability was returned.

MES123: Wiser with Water: Does real-time feedback modify behavior?

Purpose: Water is an important resource, and its usage has increased dramatically. Technological advancements have allowed people to become more aware of their own self-behavior by providing real-time feedback. The purpose of this experiment is to evaluate whether a novel innovation, using a phone-based application, will decrease water utilization. Accordingly, this study will evaluate the hypothesis that subjects will conserve water when they are given real-time data about the consequences of their behavior.
Procedure: In order to do this experiment, an iPhone-based application is created to provide real-time feedback to a user regarding their showering time, gallons of water used, cost of water and heating, and carbon footprint related to showering. For phase 1, participants will time their shower using a regular timer. For phase 2, participants will use the iPhone application during their shower which will show them the consequences of their water use. For phase 3, participants are given data about the average water usage of all other participants, and they will measure shower times again with this knowledge as well as with the use of the iPhone application.
Data: The mean and standard deviation of shower times for each phase will be calculated. The means between each pair of phases will be compared using a Student's t-test.
Conclusions: This study will help evaluate if people will conserve water if they are aware of how much they are utilizing. This study may be the foundation for larger studies evaluating practical initiatives to modify behavior to help conserve resources.

MES124: Hydroponics Growth Rate Garden

The purpose of my experiment is to determine if plants can be grown in water instead of soil. The plants are placed in water and fertilizer is added. The lighting is controlled as to the intensity and angle. I record the growth rate of the plans to determine if they are growing at the same rate as the control plants. My experiment will prove that plants can be grown without soil and that they may grow faster than in soil. My experiment will help to determine how much sunlight is needed to make the plants grow in a hydroponic garden.

MES125: Eco-Friendly Oil Spill Clean-Up

The purpose of this project is to evaluate the practicality and efficiency of using human hair to clean oil spills on water.

MES127: The Masyaf

The purpose of this experiment was to determine if the design of an aircraft I designed would be more efficient than a standard US army jet. I started by researching experimental engines and the most efficient turbines and jet engines to date. I decided on using the VASIMR which is an experimental engine design by NASA that uses the hydrogen isotopes deuterium and tritium as a fuel source, not unlike a nuclear fusion reactor. From then I decided on using the strongest and lightest alloy to make the frame and body of the aircraft, which is a mixture of titanium and carbon. So far, I can say that the engine and the weight of the Masyaf in comparison to a standard army jet make it more efficient. I still am drawing my conclusions.

MES128: The Effect of BPA in Plastic on the Heart Rate of Daphnia magna

Purpose: To determine if the amount of BPA affects heart rate of Daphnia.
Hypothesis: As concentration of BPA increases, heart rate will increase.
Procedure:

1. Obtain materials.
2. Remove one liter of water from glass container, and put into polycarbonate container.
3. Set on heat source until water boils.
4. Remove 200 mL and place in glass vial.
5. After ten minutes, repeat step 4.
6. Repeat step 5 until all the water is separated.
7. Expose first removed water sample to daphnia1 for one minute.
8. Count and record heart rate of daphnia1 for fifteen seconds.
9. Repeat steps 7&8 for remaining water samples and daphnia.

Conclusion:Results available at fair.

MES129: Air Pollution Solution

Clean air is a concern for people all around the world. I evaluated how clean the air is by carrying a portable air monitor around for 3 days. I analyzed the data to determine the pollution concentrations for different activities such as eating in the cafeteria and riding the school bus. I also calculated my pollution exposure which is the amount of pollution I inhaled. My hypothesis was partially proven because the bus had the highest particle concentration, but I received the largest pollution exposure at school because it had high concentrations and I spent one-third of my time there.

MES130: Will it tilt in sand, clay, or silt?

The purpose of this experiment was to test whether the bearing capacity is greater in sand, silt, or clay. To conduct this experiment I will apply weight to the different soils and record the results. The experimental results were measured by which soil could support the most weight without descending too far into the soil. The results of the experiment show that the clay soil could support the most weight only descending 6.5 centimeters into the soil. The sand soil was able to hold all the weight applied only descending 9.4 centimeters into the soil. The silt soil could only hold a fraction of the weight until it reached the bottom of the bin. The results indicate that my hypothesis should be accepted because the results show that the clay soil was able to support the most weight and not be forced deep into the soil.

MES131: Which Water Filters Really Work?

I chose this experiment because I kept my audience in mind. I assumed that if you took the time to read my project then you must like science, and you are my audience. This helped me because I knew that you wouldn't want to sit here and read about something random and off-topic. So after I reviewed about what options I had, I chose this report. This experiment seemed like the most interesting one I could complete rather easily. There are other experiments I would like to do, but for now I am still following up on this one.

MES132: Can CO2 KO our oceans?

My project is testing the questions: Does the CO2 level effect ocean water? To solve this question, I followed this procedure; fill eight carafes with 1 Liter of sea water. Fill the carafes for 35 seconds with CO2. Take samples of regular sea water without added CO2. Close lid so that the gas can't escape. After Day 1, Day 2, Day 4, and Week 1, open both carafes for each day. Test pH level of the water using pH strips. I found that the longer the CO2 purged with the salt water, the more acidic and polluted the water became.

MES133: Stressed Out

I GOT 28 RUBBER BANDS AND HUNG THEM OUTSIDE AND 2 INSIDE. THE ELASTIC INSIDE WERE THE CONTROL GROUP, WHILE THE ELASTIC OUTSIDE WAS THE EXPERIMENTAL GROUP. I CHOSE THIS EXPERIMENT BECAUSE I FOUND IT VERY INTERESTING. I LEFT THE ELASTICS OUTSIDE FOR 14 DAYS. EVERY DAY MORE SIGNS OF DETERIORATION OCCURRED.THE MORE THE ELASTICS WERE EXPOSED TO OUTSIDE ELEMENTS THE MORE SIGNS OF DTERIORATION OCCURRED. AFTER THE EXPERIMENT, THE EXPERIMENTAL GROUP LOOKED A DECADE OLD. TEH CONTROL GROUP LOOKED NEW THE WHOLE EXPERIMENT. THE DEPENDENT VARIBLE (WEATHERING) CHANGED EVERY DAY, I PROVED MY HYPOTHESIS.

MES134: Rev Up Your Tsunami Science

Tsunamis are a threat to cities anywhere near the ocean. The information gathered in this experiment will help citizens know where tsunamis are likely to form, and how much time they have to evacuate. A block of wood was dropped into a tank of water, the water height being different each test. The wood formed a wave, and the waves' distance was timed from how long it took for it to get from one end of the tank to the other. Though a tsunami is smaller in deeper water, they travel faster than they do in shallow water.

MES135: The Effect of Long Term Space Travel on Bone Mass

The purpose of this project is to determine if gravity has an effect on bone mass loss during long term space travel. The hypothesis is that artificial gravity in the form of a centrifuge will slow the mass loss of chicken bones. Chicken bones will be spun in a centrifuge two times daily for five days a week for a total of 4 weeks. The mass of the bones will be found everyday as quantitative data. Results of experiment will be available on fair day.

MES136: Which will best disinfect water: sunlight, UV lamp light, deciduous bark, or coniferous bark?

The purpose of this experiment is to determine an effective way to disinfect creek water using sunlight, ultraviolet lamp light, deciduous bark, and coniferous bark. To conduct this experiment, I tested all four variables for six hours each. Each variable had three trials in test tubes. The experimental results were measured by counting the bacteria colonies in all fifteen petri dishes. The results of the experiment show that deciduous bark disinfected the creek water the best. The results indicate that the hypothesis should be rejected. I hypothesized that ultraviolet lamp light would kill the most bacteria in the creek water. The deciduous bark killed the most bacteria, and the ultraviolet lamp light caused over one-thousand bacteria colonies to grow.

MES137: Are the Fertilizers Used On Golf Courses Safe and Environmentally Friendly?

Purpose: Determine if chemicals used on golf courses are environmentally friendly.
Hypothesis: The chemicals sprayed on golf courses will increase the heart rate of Daphnia.
Procedure:

1. Place a Daphnia on a slide containing water from the Daphnia culture (Control)
2. Allow the Daphnia to acclimate to the solution for1min.
3. Using a microscope determine the heart rate of the Daphnia
4. Repeat steps 1-3 using 29 more Daphnia
5. Collect 50g of grass from hole 1
6. Grind the grass and 25 ml of water in a blender and filter
7. Place a Daphnia on a slide containing the filtrate and repeat steps 1-4
8. Repeat steps 1-7 using grass from holes 2,3,4,5 and 6

Conclusion:Results available at fair.

MES300: Can We Slow Glacier Melting?

Please visit student's exhibit on Fair Day for abstract.

MES300: Can We Slow Glacier Melting?

Please visit student's exhibit on Fair Day for abstract.

MES301: Does Bacteria Have You Parched?

This project was a huge learning experience. We started out not knowing what would happen. Through the different water sources and processes we proved ourselves wrong and right. At the beginning we had a whole different hypothesis what would happen than what really did. The water we expected to have the most bacteria was one of the least. Also our process was wrong. When we thought boiling would be the best method when actually chlorine was the best process. Only one drop and it would kill all the bacteria! We thought the most interesting thing was the incubator and vacuum.

MES301: Does Bacteria Have You Parched?

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Intermediate – Engineering/Robotics (MER), 7th & 8th Grade

MER100: Lift Off
The purpose of my project was to determine if I could design a better helicopter rotor. I will build my rotors out of wood. I will then experiment using a motor in a wooden contraption. I will then analyze the data. Results will be available at the fair.

MER100: Eco-Mow
A standard gas powered lawnmower was modified with solar panels in order to be solar powered. This engineering project has immediate applications in commercial manufacturing.

MER101: A Helping Hand
A new model of a prosthetic hand was engineered and tested. The hand was constructed with wood and rubber wires. This working hand could be used as a prototype for future prosthetics.

MER102: Coupling ePaper and Solar Cells
Electronic Paper Displays are used in E-Readers and many other devices. But they are typically controlled using Active Matrix displays. The objective of this experiment is to couple the mini solar cells to the electronic paper display and demonstrate that the display can be controlled using external light. This will enable some novel applications of this technology, such as using the lasers to control the display.

MER103: Sustainable Robot
The purpose of my project is to determine if you can make a robot sustainable by using recycled items. To build my robot, I will use items such as aluminum cans, aluminum foil and plastic bottles. I will reshape these items to work as part of my robot's body. I will be able to determine the success of my robot by measuring the distance and speed that it moves. I feel that it is important to use recycled materials because it will cut down on pollution instead of making debris in the world.

MER104: The Influence of Aerodynamics On Automobile Fuel Efficiency
The purpose of my project is to determine how aerodynamics influences automobile fuel efficiency. I will do this by testing different spoiler designs attached to a gravity-forced test car. My hypothesis is that the spoiler design which has the greatest amount of downforce will increase car traction, improve car speed, and thus be the most fuel efficient.
Procedure:
1. Assemble the test car.
2. Design and build the spoilers based on Bernoulli's theorem.
3. Assemble the test track.
4. Test four spoilers and the control for distance traveled and speed.
5. Record data.

Results to be discussed at PRSEF

MER105: Windmill Blades
This experiment was used to determine what basic shape of windmill blades was the most efficient. I carefully cut the blades from a sheet of thin foam and then set them up on a 4 bladed windmill. Then I set up a fan and counted the RPM of the different blades and recorded the data. Once I compared the different blade's RPMs I concluded that my hypothesis had been incorrect. The trapezoidal wings had been the least efficient, placing in third. The rectangular wings made a close second but the wings shaped like right triangles where the best over all.

MER106: Soil Types Affect on Buildings
Please visit student's exhibit on Fair Day for abstract.

MER107: Effect of Surroundings on Wi-Fi Strength
The Internet is highly popular, but it cannot work the way it does without another developing technology, Wi-Fi. Wi-Fi enables people to connect to the Internet wirelessly. In some cases Wi-Fi can periodically lose a meaningful amount of strength, often frustrating the user. If certain materials are near the Wi-Fi router, then the router's Wi-Fi strength will be affected because the material will alter or obstruct the radio waves traveling to and from the router. I will evaluate slabs of cardboard, glass, steel, cotton, plastic, aluminum foil and wall plaster placed near a Wi-Fi Router and measure resulting Wi-Fi strength.

MER108: Efficient Dam Structire
This project looks at which part of a dam should be more structurally sound. My hypothesis was the middle part of the dam needs the most support. To conduct the experiment, first fill the gallon jug with water. Second, put three holes in the jug. Immediately, put a piece of duct tape on the three holes. Fourth, over the bathtub, rip the duct tape and start 3 stopwatches. Correspond each stopwatch with each hole. Then, when one hole stops flowing, stop the corresponding stopwatch. Do this with all the holes. Record the times for each hole. Do the experiment multiple times.

MER109: Robotic Hand Workout
I have created a model robotic hand and will use it to pick up objects that are different shapes and sizes. I will time how long it takes to pick up each object.

MER110: How Plane's Wings affect its Flight
My research is useful in the field of aerodynamics. The objective of my research is to find the most efficient wing based on the position of where the wing is on the plane. My second objective, for this experiment is to apply Bernoulli's principal to show how it works. Experiment will be performed by designing wings, and attaching it onto the foam rocket at various positions, which serves as plane's body. This will be launched with AirZone crossbow. Time taken, distance travelled, volume and weight of the plane will be measured. The results and conclusions will be shown on poster.

MER111: Can My Bot Track light Like A Moth
Please visit student's exhibit on Fair Day for abstract.

MER112: Non-Newtonian Fluid Armor
My project is about non-Newtonian fluids and which ones might have applications in fluid filled body armor. Hopefully this might help create a safer armor for our military and police. I have conducted three different experiments with ten trials for each fluid to find which is the best fluid for liquid filled armor's and I believe that red potato starch is the best out of the trials.

MER113: Is the future bright for LEDs?
Lighting alternatives are emerging as environmentally conscious options are sought by consumers. This study investigates if LED lighting is comparable or better than its alternatives (incandescent and fluorescent lighting) and if investment in LEDs for the home makes economic sense. Comparable samples of each type of light were obtained in accordance with manufacturers' recommendations. A light meter will measure the brightness of each type of light over varying distances from the source. Data collected will determine the quality difference between the three different types. The manufacturers' rated power consumption and pricing will be used to conduct the economic analysis.

MER114: Investagating Angles
Ever interested in which angle launches a projectile the furtherest? Well this project was intended to answer that question. In this project a total of six angles were tested, fives times each, the angles 130 degrees, 140 degrees, 150 degrees, 160 degrees, 170 degrees and 180 degrees. A protractor was used to get an exact angle of the catapult's arm, using the inside of the arm to measure. The results were that the angle 150 degrees launched the projectile the furthest. The conclusion of this project is that the best angle for launching a projectile the furthest is 150 degrees.

MER115: The Lotus Effect
My project, The Lotus Effect, demonstrates the properties of hydrophobic (water-fearing) coatings. I found that wax coatings proved a more reliable coating than chemical coatings, though the latter has more application in the real world.

MER116: Hello...Sunshine
Solar power is a renewable source of energy. I wanted to test if solar power is reliable enough to charge a cell phone that is completely dead. I'm timing the time it takes for a wall charger in an outlet to charge a phone and comparing that time to the time of the solar charger. To charge the solar panel, I'm placing the solar panel in direct sunlight for an hour and then plugging the phone into the solar panel. This allows the solar panel time to collect energy. Final results will be available at PRSEF.

MER117: Don't Burn Breakfast

Rationale- I want to know the best possible way to protect astronauts, using ablative shielding, upon re-entry of the atmosphere.
Hypothesis- My hypothesis is the wood will work the least to protect the egg and that steel wool will work the best.
Question- What is the best way to protect an astronaut upon re-entry?
Expected outcomes- My expected outcomes were, that steel wool will be the best. The drywall will be next, followed by the tile, and lastly wood.
Procedure-

1. I drilled a hole in a wood block.
2. Next, I put a golf tee in the hole and put an egg on it.
3. I set it on a table, this egg would be my control.
4. I faced the blow torch toward the egg, and turned it on.
5. I turned off the torch, broke the egg, and recorded my results.
6. Next, I changed the egg and golf tee.
7. I put wood in front of the egg and proceeded with steps 4-6.
8. I proceeded with steps 4-6 each time replacing the material between the egg and torch, with Ceramic Tile, Steel Wool, and Drywall.
9. I recorded my results and analyzed them.

Risk + Safety- I wore safety glasses, heat retardant leather gloves, heat retardant jacket, and my hair was in a bun.
Bibliography-

- Space History – Tony Osman pg. 118
- Space Chronicles- Neil DEgrasse Tyson pg. 64
- How Spacecraft's Fly- Graham Swinera pg. 37
- http://www.nasa.gov/centers/ames/research/msl_heatshield.html
- http://www.ae.utexas.edu/news/features/investigating-heat-shield-physics

MER118: Car Shape and Wind Resistance

The purpose of this research project is to find out which car body shape has the least wind resistance. I wanted the experiment to show that the more the shape of a car became more wedge shaped, the lower the wind resistance reading would be.

MER119: Nonometal Coated Hockey Stick

Hockey sticks are really expensive to buy and, if they get cracked, must be replaced. Companies are looking for a way to design a stick that is more durable. Moreover, flexibility is essential in hockey so that the player can have a good shot and handle the puck better. There is a new type of hockey stick that is made of a composite material and the bottom part of the stick is coated with a nanomaterial. This nanomaterial is designed to make the stick more durable while keeping the stick's ability to flex. This new stick raises the following question: is it breakable in a game situation? And how much force is needed to break this stick? I hypothesized that it would not be breakable during a game situation because the players won't be able to apply enough force in order to break it. My experiment used a pendulum test to determine whether it can be broken during a game situation. In this test, we swung a stick made out of composite and wood to determine if it can break the nano-coated stick. Our results indicate that it is difficult to break it in a game situation because of the many factors that have to be maximized: angle, mass, acceleration, and time. Given these results, our hypothesis was shown to be correct.

MER120: Holoscreen

My project is a holographic screen, it was invented in 1947 and a was glorified by the movie Star Wars. I set out on a belief that using water vapor, I could make a floating screen to project light. My process for my build is gather materials, build my planned structure, and test to see if it works.

MER121: Colorblind can see Rainbow

Many colorblind people of the world have the trouble of recognizing or even seeing colors. In order to improve their lifestyle I developed a device that can read colors and tell the user what color it is. It first takes input from what the infrared sensor reads, then it sends what it reads to the breadboard then the microcontroller processes the information to send to the speaker. The speaker then, depending on what color is displayed, tells the user what color it is through a recorded sound.

MER122: The Cup Filler

My purpose is to make it easier for people to get their cup filled and my question is “How to get the Cup Filler to work.” My best educated guess is that the Cup Filler won’t be able to hold more than ½ of a small cup (like a small plastic cup or a dental cup). I also think I would have to put it to full power to get it to press the button on the drink dispenser.
Procedure:

1. Build the Cup Filler using the Mindstorms EV3 kit and the Discovery book
2. Then remove the touch sensor and put it in the designated spot
3. Add the extra technic pieces in their designated spots
4. Download the Mindstorms EV3 software onto a computer
5. Make the “My Blocks” using the instructions in the Discovery book
6. Start programming the Cup Filler
7. Plug the Cup Filler into the computer with the wire that came in the kit
8. Download the program onto the Cup Filler
9. Begin testing it to see if any changes need to be made
10. Change anything that has to be changed and then the Cup Filler is working and done

Results to be discussed at PRSEF

MER123: The Parachute Project

The purpose of this project is to determine if the size of a parachute affects the speed at which a parachute falls.
Hypothesis- I predicted that the larger the parachute, the slower its speed.
Procedure:

1. Cut 4 squares from plastic tablecloth that increase by 8 sq. cm and poke 2 holes in the corners.
2. Tie a 16 cm string into each corner of each parachute and tie the ends of them together.
3. After measuring the drop, Test each parachute and the control with the figurine five times.
4. Take the distance of your drop (in meters) and divide it by your average time for each parachute to get each parachute's speed.Conclusion- I showed that my hypothesis was correct.

MER124: Shake It Up - Earthquakes

Earthquakes are natural disasters that happen on earth. My experiment was to simulate different types of building structures during a 30 second earthquake. I wanted to know whether wooden, masonry, or steel structures would withstand the longest. To test this I made three of each structure and I made a seismic wave machine. After testing I discovered steel and masonry structures withstood the longest, proving that my hypothesis was partially correct.

MER125: "Did I Attend a Rock Concert, or Eat a Ham Sandwich?" Are Our Ears Safe?

The purpose of my project is to test the sound level in the cafeteria to see if it is dangerous, or too loud for the students ears. If it is dangerous then something can be done to help the students. If something is done to help the students then they will not have to risk damaging their ears while eating lunch in the cafeteria. My hypothesis is that the sound level/decibel will be harmful to a student’s ears. I believe this because any sound of 85 decibels, or higher, can eventually lead to ear damage, if not immediately. 85 decibels is close to the sound level of city traffic, and the cafeteria could be the same sound level as city traffic, if not louder. Also, whether it is an elementary school, middle school, or high school, the students are in the same environment everyday for many years. This long of a time with 85 decibel noise everyday could eventually lead to ear damage. A motorcycle is about 100 decibels and a rock concert is about 115 dB (decibels). A school cafeteria could be comparable to either of those. I will go to each cafeteria and/or each grade’s lunch period on different days and test the decibel level of the room. I will test each lunch everyday for one week. Once I am done testing, I will analyze the data and compare it to a decibel level chart to see if the sound level is harmful. Doing this will help me determine if the cafeteria is harmful to a person's ears. The final results will be at my exhibit.

MER126: Modern Periscope!

A new and different type of periscope was engineered and tested for effectiveness. This periscope could have many applications in engineering, transportation, and the military.

MER127: Concrete Thinking

Concrete is relied on everyday to be strong and not break. That is why it matters how the concrete is cured. First, some uncured concrete cylinders were placed in water and some not in water. On days three, seven, and fourteen, three cylinders from each group were taken and put under pressure until they broke. My hypothesis was that the water-cured concrete would cure to withstand the most pressure. This was correct because the water-cured cylinders were the strongest overall after fourteen days. This is good for engineers who build bridges because they cure the concrete underwater when building bridges.

MER128: Stethophone Advancements: Machine Learning Approach to Analysis of Heart Conditions

Last year, I created a device that allows high fidelity recording of a person's breath sounds and heart beats. These recorded sounds can be transmitted to a doctor for subsequent diagnosis. To further automate diagnosis, I developed automated classification methods that differentiate heart murmurs from control heart sounds. My current most accurate method results in 100% precision and 81% sensitivity on a set of 195 heart sound recordings. Accurate, automated classification of heart defects would allow remote diagnosis and benefit groups including the military and people in developing countries as well as facilitate longitudinal monitoring of cardiovascular symptoms.

MER129: Awesome Aerodynamics

Project was done to compare the aerodynamics of several popular cars.

MER130: Which produces more energy: Wind or Hydropower?

The nonrenewable resources are being depleted quickly so people have to find an alternative source of energy. Wind Power and Hydropower are top candidates for this cause, but which power produces more energy? This project measures the watts the Wind Turbine and Hydro Turbine produce within two sets of six trials. My hypothesis was that Hydropower will produce most energy because it can use unlimited amounts of water to produce energy and Wind Power can only produce energy at a certain speed of wind. My results and conclusions will be displayed on the day of the Science Fair.

MER131: Ethnic Influence on Sprinter Performance

Please visit student's exhibit on Fair Day for abstract.

MER132: HOW DOES CORD LENGTH AFFECT THE EFFICIENCY

I tested chord lengths and their efficiency by connecting them to a DC motor and recorded the volts produced. My results could benefit kids who are trying to build model helicopters, aviators, or anyone who wants to learn about propeller design for a hobby. My hypothesis was that the longest chord length of a propeller will produce the most volts. I was incorrect. My problem could be that the wind source I used wasn't powerful enough. If I had to retest, I could use other materials of the propellers or I could vary the twist angle.

MER133: Effect of Temperature on Motor Oil Viscosity

The purpose of this experiment was to see if synthetic and conventional motor oils have different viscosities at different temperatures. Three different brands of each oil type were tested at three temperatures, timing the rate a marble traveled through the oil a specific distance. This rate was then used in this equation to determine the viscosity, vc= [2(d) g*r2] / 9ve. vc=viscosity, d=liquid density minus marble density, g=9.8 m/s2 (the acceleration due to gravity), r= radius of marble, ve= velocity. Results showed that the Pennzoil Synthetic did the best under cool conditions and the Valvoline did the best when heated.

MER134: Wind Power vs Steam Power

I created two boats, a sailboat and a steamboat. I did this project particularly because I was interested to see if the steamboat would actually work. First, I made two boats, Next I raced both of them. Finally, I got the results. The results wer that the steamboat never moved and the sailboat won the race. The steamboat didn't work because the candles burned through the cigar tube. My hyposthesis was that the steamboat would never move and I was correct. Even though the experiment was difficult it was still a lot of fun to do.

MER135: Let It Fly

Have you ever wondered about how a paper airplane flies? Well no is your chance to find out! The purpose of this experiment was to determine why a certain type of plane travels better than others. I started to conduct the experiment by building three different styles of planes and then throwing each one three times to meaure the distnaces that they flew. I then compared the data to detemine the results. A glider plane flew the best compared to the others. I concluded that planes can "float" in the air travel the farthest

MER136: Take Off (was MPH101) MER137: Beam Bridge Vs. Suspension Bridge(was MPH152)

MER300: The Dizzy Robot

The purpose of this experiment is to test which shape a zippy robot will follow with the most accuracy. To conduct this experiment we will need to draw three different shapes on poster board and then place the robot on top. The results of the experiment led to the circle having the best accuracy. The results of this experiment led our hypothesis to be correct. For we said that the circle would have the best accuracy.

MER301: The I.O.-1 (Indoor-Outdoor Soccer Shoe)

For our project, we designed a shoe that can help soccer players everywhere save money. In this sport, players must buy two pairs of shoes; cleats for game time and comfortable shoes for after the game so their cleats don't get damaged. We cut off two soles of each of these shoes and attached metal clips to both the body and each of these soles. Because we've played soccer all our lives, this was an entertaining project for us. Once the soles could clip together, we tested the product and collected results on their durability. The shoes ended up successful.

MER302: Fuel Efficiency

The purpose of us doing this experiment is to cut down on the waste of fuel and air pollution. Many cars, trucks, and vans with a V6 engine or above have terrible gas mileage. Our purpose of doing this experiment is to persuade SUV, and van companies to create more aerodynamic car hulls. We will compare and contrast different types of cars. We will analyze which type of car has a un-aerodynamic hull and their gas mileage. We will also be trying out different engines, such as hemi engines. Hemi engines are engines that use eight cylinders when put to full force (e.g. When a truck hauls a boat it will use all eight cylinders, but when it is cruising down the highway it will only use 4 cylinders to save gas mileage). After we do that, we will test two different toy cars. One will be a sleek aerodynamic car, the other will a box like car that is very un-aerodynamic. We will record the time of the amount traveled by the same amount of force given. Then we will analyze the data recorded.

MER303: Perpetual Motion?

Our research question is, can we build a vehicle that will sustain its own energy through perpetual motion? For our hypothesis we predicted that if we successfully build our vehicle, then it will sustain its own energy. Our purpose is to create a vehicle, without the use of gasoline, which will sustain its own energy thus limiting the amount of pollution in the environment. In summary, the data that we collected proved, that our hypothesis is incorrect. Therefore we can conclude that our vehicle did not sustain its own energy through perpetual motion.

MER304: Falling with Style

Parachutes are an important part of todays culture from skydiving to toys. We conducted an experiment to see which material works best as a parachute. We are testing wax paper, plastic, silk, and canvas. We cut the same size circle from each material, placed the same amount of weight on each and dropped them from the same height and timed their descent. Our experiment is still ongoing, but our hypothesis is that canvas will be the best, followed by silk, plastic, then wax paper.

MER305: Trebuchet Trials

Our project consists of a medieval siege machine that we built. We are testing how different components will affect the distance reached by the projectile. The components we are testing are arm length and counterweight mass. The projectile we are launching is a standard baseball. We will use a combination of 2 arms lengths and 2 counterweights. The final results we achieved were that the combination of the shorter arm length and the heavier counterweight launched the baseball the farthest distance out of the other combinations.

MER306: On Solid Ground

Millions of people all over the world are affected by earthquakes. According to FEMA, during an earthquake buildings can collapse, break apart, or be rendered inoperable. One of the largest contributors to the damage is settling. We began to wonder whether the material which the structures are built on affects the amount of settling. If that was true, what is the most effective material to build on to minimize potential damage? We hypothesized that packed soil would be the material that allowed for the least damage, and sand would be the worst.

MER307: Bridges

The purpose of this experiment is to discover which material will hold more weight when tested; popsicle sticks or metal hangers. After we had build our bridges, we tested them by placing dumbbells on them. The metal bridge held 90 pounds, and the wooden bridge held 30 pounds. This proved our hypothesis to be correct. We were surprised to see that both bridges held so much weight. Although at first we had some trouble designing an effective bridge, but then once we had our design everything went smoothly.

MER308: It's All in the Angles

After finishing our research and experiment on launching rockets to find an ideal angle for flight, we came to a very unusual conclusion. The purpose for our experiment was simply shooting rockets to find out what was the best angle for flight. We shot rockets on a vacant lot at four different angles and measured their distance. The farthest angles were the 45 degree and the 60 degree angles. In our hypothesis, we stated that the 45 degree angle would go the farthest, but in the results the 60 degree angle went the farthest in our experiment.

Intermediate – Medicine/Health/Microbiology (MMH), 7th & 8th Grade

MMH100: W.A.E.A.H.E.
E.coli is the second most common infection that leads to patients being hospitalized. This experiment helps people adjust their diets to prevent E.coli. To conduct this experiment, agar plates needed E.coli to be pipetted onto them and have four holes poked into them. Three microliters of the control and clove, nutmeg, garlic, and echinacea extracts are placed into those holes. Then, the plates are placed into an incubator for forty-eight hours with their zone of inhibition being measured after every twenty-four hours. Clove was the most effective, with echinacea next having little effectiveness. The others weren't effective.

MMH101: Is sensitivity to cold temperatures heightened on your dominant side?
My project tests whether your dominant side is more sensitive to cold temperatures than your non-dominant side. Your dominant side tends to be stronger than your non-dominant side and more coordinated. I will have 20 subjects put their hands in a bowl filled with ice water as long as possible. I will record them with a stopwatch. The hand that they remove first from the bowl is more sensitive to the cold temperature of the water. After 10 trials with each subject I will analyze my data. My final data will be available at the fair.

MMH102: Knowing Which Cleaners Work Best
The purpose of this experiment is to discover which cleaning solution works best. Spread E coli on 6 agar plates. Poke 4 holes into the agar using a a sterile straw. Put cleaning product into each hole using a micropipette. Store agar plates in an incubator at 37 degrees Celsius for 24 hours. measure zone of inhibition at 24 and 48 hours. For a control, use sterile water instead of cleaning product. Both the control and Clorox did not inhibit E coli bacteria. Vinegar's zone of inhibition decreased significantly after 24 hours. The results of this experiment rejected the hypothesis because Lysol best inhibited E coli bacteria instead of Clorox.

MMH103: Which sanitizer cleans hands best?
My question was what brand of sanitizer kills the most bacteria on your hands? I wanted to test this because when flu season comes, people want to use the quickest, most effective, and affordable cleaning device without having to run to the nearest sink to wash your hands with soap all the time. So I decided to take 4 different brands of hand sanitizer and test them on people's¬¬¬¬ hands by applying a liquid that makes germs visible to the naked eye. Then observed how much of the original germs were left on the test subjects hands. I took the most popular hand sanitizer brands that were available to me. In the end I saw that there was a tie for the most effective product, which was Germ X and Top Care. The cheapest hand sanitizer was Top Care so I think that the winner of this test is Top Care since it is both one of the most effective hand sanitizers as well as the cheapest at a going rate of 99 cents per bottle.

MMH104: The Effectiveness of Interventions to Improve Hand Hygiene
Many individuals are infected yearly with bacteria from poor hand hygiene. My experiment will help determine the best way to minimize bacteria on hands. To test that, I used three cleaning agents: soap, hand sanitizer, and wipes. I did three trials and recruited twelve participants, three as controls. I used glo germ and UV light to see the bacteria on their hands, and calculated the number of bacteria before and after cleaning using one of the three agents. The results supported my hypothesis that compared to hand sanitizer and wipes, soap and water is most effective in improving hand hygiene.

MMH105: Does the Distance of bacteria from UV light affect its growth
E. coli is an illness caused by uncooked meat or vegetables that are not properly washed. 25 agar plates were swabbed with bacteria and placed in the sanitizing goggle case for 15 minutes at different distances from the UV light source. After 15 minutes, the places were placed in an incubator for 24 and 48 hours and measured using a colony counter after each set of 24 hours. The data collected showed bacterial growth as the plate distances grew. The plates with the closest distance to the UV source had less growth than the plates further from the source.

MMH107: Plaque Tastic
People have always wondered which toothpaste takes off the most plaque. I have tested 7 toothpastes; Colgate Total, Colgate, Sensodyne, Colgate Optic White, Crest Scope, Crest Pro Health, and Aqua Fresh. My hypothesis was that Colgate Total would take off the most plaque. In order to see if my hypothesis was correct, I had to test each of the toothpastes. To test each of the toothpastes, I had to apply disclosing solution on the subjects' mouth. Then each subject had to rinse with water for 30 seconds. After rinsing, each subject brushed their teeth with the toothpaste that they were assigned. Once they were finished brushing, I reapplied the disclosing solution. The last step was to do a final rinse. My hypothesis was correct, Colgate total proved to take off the most plaque.

MMH108: Corrosiveness of Soda on Tooth Enamel
Soda is a very popular drink, and almost everyone drinks it. I wanted to know what soda does to the enamel on our teeth. Does it deteriorate it or does it help make it stronger? To begin my experiment, I gathered up a bunch of rusty pennies. The penny itself represented the tooth, and the rust on top of it represents the enamel. I then placed each penny into a small container each containing a different type of soda. I used Coke, Pepsi, Sprite, Mountain Dew, and Fanta. I then recorded what happened to the rust every week. Experimentation continuing.

MMH109: Spices: Making Food Tastier AND Safer?
The purpose of this project is to determine whether or not certain spices will inhibit bacteria. I believe that all the spices will inhibit the bacteria; however some will be more effective than others. Sterile petri dishes containing nutrient agar are divided into four quadrants using a sharpie marker, and swabbed with bacteria in an up and down and side to side motion. Sterile discs were soaked in a liquid spice for two minutes and let to drip for two minutes they were placed on the petri dish, inverted, taped, and placed in an incubator for 48 hours. results will be presented on my board.

MMH110: How does turmeric affect Daphnia magna?
How dose turmeric effect daphnia. I will be making turmeric solution and I will use it on Daphnia magna. There will be the levels that get less strong with less turmeric. I will test ten daphnia for each level. I will see how daphnia body's and heart rate. I will put the daphnia by its self the put turmeric juice will be put with it. I did the project because I know not most people know about daphnia and turmeric and this was very intriguing. Currently I am still working on my project I will be finished.

MMH111: Which Multipurrpose Contact Solution Inhibits The Most Bacteria?
There are many contact lens users in the world. My experiment helps people to know which multipurpose contact lens solution works the best to prevent eye diseases. In order to do that, I used contact lens solution from Opti-Free, up+up and Bausch and Lomb in order to see which of the top brands works the best. Using the bacteria I got from my eyes, I tested to see which of the solutions had the largest zone of inhibition. After the experiment, my hypothesis was rejected, which stated that Opti-Free would be the most effective. However, up+up was the most effective.

MMH112: Rub-a-dub-dub
The purpose of this experiment is to see what part of the hand is missed the most while washing your hands. To conduct this experiment I will use GloGerm and have my participants wash their hands. The experimental results were measured by comparing my participants' hands to see the amount of residue GloGerm on their hands. The results showed that the palm of the hand was missed the most then the back of the hand, nail area, and between the fingers. The results indicate that the hypothesis should be rejected. Therefore I accept a new hypothesis, which states if human participants wash their hands without any instruction, then the palm of their hand will have the most GloGerm persisting.

MMH113: Flu Shot Philosophy
Doctors recommend senior citizens and babies to get the flu shot, but what about the individuals between the ages of 14-40 years old. This is the age range that the medical community has done little research on the effectiveness of the flu shot. In my experiment I am surveying citizens between the ages of 14-40 years old from the Pittsburgh area. They are asked basic flu questions which help decide the effectiveness of the flu shot on the body. Once I received enough surveys (300-400 surveys), I will proceed to analyze the data, and draw a conclusion. In the end, I believe my research and experiment will show that this age group should get the flu shot because they are as vulnerable to the flu as the elderly and infants.

MMH114: Which Decomposing Fruit Produces the Most Biogas?
The purpose of this experiment is to see which decomposing fruit produces the most biogas. To conduct this experiment I will place the fruit skins in water bottles sealed with balloons on top. The experimental results were measured by measuring the size of the balloons. The results of the experiment show that the orange peel produced the most biogas. The results show that my hypothesis should be accepted because my hypothesis states that the orange peel will produce the most biogas.

MMH115: Cell Phone Radiation and the Effect on Cells
My science fair project for PJAS 2015 is 'Cell Phone Radiation and the Effect on Yeast'. I chose to do this project because I enjoy science that involves humans, and I think it's important to understand the ramifications of technology and its benefits and disadvantages to our health. The problem for my project is, 'How does yeast react to cell phone radiation?' I subjected one sample of yeast (experimental group) to cell phone radiation for thirty minutes, and one sample to no cell phone radiation (control group) for the same duration of time. Once I finished my experiment, I found out that the experimental group had a more powerful outcome than control group. The experimental group had increased yeast growth by 6.48%. From the research I have done and the experiment, it is concluded that the radiation can cause your cells to multiply rapidly and potentially form into brain tumors. My hope from this research project is for further development that can be made in cell phones that emit less dangerous radiation.

MMH116: Spicing Up Medicine

Different household kitchen spices were tested in their ability to inhibit growth of common bacteria found on the skin. Standard and safe agar plating techniques were utilized.

MMH117: Can popular beverages have reduced Brix content with the addition of an edible enzyme?

The purpose of this experiment is to determine if invertase(in liquid form) can reduce the sugar content in drinks so that common beverages can have lowered sugar content and no aspartame for diabetic people.This enzyme is used in the production of candy however, I have found that it is capable of reducing sugar content in beverages. To conduct this experiment, I tested common beverages before and after invertase was added. The experimental results were measured by the Brix measurement or sugar content test. The experimental results have proven that invertase is an effective method in reducing Brix content. So, now you can add this enzyme to most beverages and it will reduce sugar content. The results indicate that I should be accepting my hypothesis which stated that Brix levels in drinks would be reduced by the addition of invertase.

MMH118: Do Different Genres of Music Affect Your Heart Rate?

The purpose of this experiment was to determinate whether different types of music affect the heart. I predicted that the music would increase the heart beat and that Pop and Hip-Hop/Rap music would increase the heart beat the most.

Procedure:

1. Find your subject's resting heart rate by using two fingers on their hand below their wrist, to the right and feeling how many times it pulses.
2. Measure how many times their heart beats in 60 seconds.
3. Record the information on the spreadsheet for each subject.
4. Put the headphones on the subject and play a song from the first genre.
5. After the song is completed, measure their heart rate again.
6. Allow their heart rate to go back down before testing again
7. Repeat steps 3 and 4 for each of the 4 songs from the 4 genres of music.
8. Do this until you have tested each category at least 3 times.
9. Record the information on a spreadsheet
10. Determine whether their heart rate increased or not.

MMH119: Does a cheer base get injured more than a flyer in a stunt?

My project tests competitive cheerleaders and which level of their stunts gets injured more: bases or flyers. I have been a cheerleader and tumbler since I was 3 years old, and I will be using my own teams and 33 other cheerleaders as subjects in this project. I will create a survey to pass out to the 33 cheerleaders, 22 bases and 11 flyers. They will fill out the survey, which will include questions about their past injuries while cheering. After, I will analyze the answers. My final results will be posted at the science fair.

MMH120: Automated Image Analysis Software to Grade Bladder Cancer

Pathologists apply the manual technique of cytology to assist in finding high grade cancer, but low grade bladder cancer is often missed. Cytology can also be impacted by the pathologist's experience, disrupting the diagnosis of the cancer. Using automated image analysis opens the possibility of accurate diagnosis and earlier detection of low grade cancer. I will use brightfield whole slide imaging to automate the cytology process. My experimental design will compare the results of automation to the diagnosis made by a pathologist.

MMH121: Does the Type of Honey Affect the Ability of Bacteria to Proliferate?

Purpose: Determine which type of honey inhibits bacteria best.

Hypothesis: The ability of different types of honey to inhibit bacteria will occur in this order: Orange Blossom(best),wildflower, infused lavender,cotton,and black sage(worst)

Procedure:

1. Inoculate 50mL of Luria broth with 1mL of S.epidermidis(Control).
2. Remove 10mL of solution and determine %transmittance using a spec20.
3. Repeat step 2 at 24,48,and 72hrs.
4. At 72hrs. prepare a 10-10 serial dilution and inoculate a Petri dish with 1mL.
5. Repeat steps 3-4 using 3 more dishes.
6. Incubate for 48hrs. at 37°C.
7. Determine number of colonies present.
8. Repeat steps 1-7 for remaining honeys tested.

Conclusion: Results available at fair.

MMH122: How do dynamic and static stretches affect hamstring flexibility?

In this experiment, I have gathered information by testing two different types of stretches to help stretch your hamstrings. The two stretches were dynamic stretches which was a stretch while moving your leg up and down, and static where you hold your leg in the air for a certain amount of time. After the experiment, I have concluded that the two stretches were pretty even, but one stretch did prevail. Dynamic stretches were proven in my experiment to have a greater impact on the flexibility of the hamstring than static stretches. Again, the stretches were neck and neck, but dynamic did have the top spot.

MMH123: Scrambling Safely in the Microwave....Not an Eggxact Science

Purpose. worried if I could get sick if my eggs wern't cooked all the way through.Hypothesis. That at 90 Seconds all bacteria would be killed regardless of the eggs appearance.Procedure. Purchased a fresh dozen for each microwave, Sterilized each microwave, used a sterile q tip to stir eggs, and sterile guaze to culture the eggs.Results lower times produced more bacteria then higher times.Conclusion. The Hypothesis was supported.

MMH124: Antimicrobial Activity of Clove Extract/Oil on Oral Bacteria

Clove (Syzygium aromaticum) is used as flavor enhancer in a wide variety of foods, and beverages. Cloves are also used in Ayurveda and Chinese medicine to relieve dental pain and are known to possess antimicrobial activity. The purpose of my project is to investigate if clove extract has antimicrobial activity on oral bacteria. I am testing it on my own oral bacteria cultured on nutrient-agar plates. I will obtain oral bacteria using clean sterile cotton swab and culture on nutrient agar plates in the presence of different in volumes clove extract. I am expecting clove extract will inhibit bacterial growth.

MMH125: Cleaning Agents on Killing Bacteria

The reason I chose to do this experiment was I wanted to see which all purpose cleaners actually kill the most bacteria. There are so many claims displayed on the bottle, and with this experiment I was testing to see if they were actually true. I also wanted to see how well organic and eco friendly cleaners work, as they don't use any harsh chemicals. My hypothesis was that if the amount of bacteria killed was related to the all purpose cleaner its treated with, then the Clorox with Bleach would kill the most bacteria as the bleach kills the bacteria in a very unique way. As for my procedure, first and foremost I had to disinfect my workspace with a 10% bleach solution. Once that was out of the way, for each cleaner I used forceps to place a few disks into beakers filled with each cleaner. Then I set them aside and place the forceps into distilled water. After this, I took a micropipette fitted with a micropipette tip and got exactly 100 ml of non pathogenic E Coli bacteria. I would then spray it into a petri dish and dispose of it, as I did after every use. Then I used a sterile spreader to spread the bacteria all over the dish, and again, after every use I disposed of the spreader. Then I take the pair of forceps out of distilled water and put it over the flame of a candle, to sterilize it. Following that I grab a disk from the cleaner, wipe it against the inside of the beaker to squeeze out any excess, then carefully place it onto the petri dish. I repeat this for every cleaner, and the control. In the end, I found that Clorox with Bleach killed the most bacteria, as it's average area of inhibition was 7.5 cm2. My hypothesis was correct, Clorox did kill the most bacteria. It seems that the harshest chemicals, in the end, do work the best. I have to say I was disappointed in the environmental cleaners, I wanted to believe that they cleaned well, but the only thing they had going for them was the fact that they smell nice.

MMH126: Beneficial Microbes in Yogurt

In the stomach, there are thousands of kinds of bacteria. These different strains of bacteria can be good or bad for you. On an average, you should have a ratio of 80 to 90 percent good bacteria, and 10 to 20 percent bad bacteria. If these bacteria get unequalled, harmful yeasts such as candida can overtake the stomach, and cause serious symptoms such as white tongue, skin and nail infections, digestive issues, weariness, and mood swings (anxiety, depression, frustration). Eating strong, probiotic rich foods, such as yogurt, can cure this. There are pills for probiotics, but these have less microorganisms than natural yogurt, and very expensive. The less probiotics in a pill, the less effective it is, compared to natural ways of attaining good microorganisms. With these organisms, you can maintain good health. People who have eaten a lot of yogurt or other foods that have been grown using live cultures, such as cheese, kefir, and of course yogurts, have been known for maintaining good health. They do not show signs of bad health, and they do not have the symptoms of people with unbalanced systems, such as mentioned above, white tongue, skin and nail infections, digestive issues, mood swings, and depression. As multiple studies have proven, the use of supplementing yogurts into your daily diet can help cure many diseases that have to do with the unbalanced ratio of good bacteria and bacteria (80 percent good bacteria to 20 percent bad bacteria). My idea is to find the type of yogurt with the most bacteria in it, so that we can ultimately conclude that it is the best yogurt to include as a part of our diet. I will do this by taking the yogurts, and plating them so that I can count the number of colonies on the plates. The more colonies, the more effective the yogurt is.

MMH127: Handheld Backlit Devices and Myopia

The title of my project is “Do Hand-Held Backlit Devices Cause Adolescents to Develop Myopia?”. The purpose of this project is to see if using a hand-held backlit device causes adolescents to develop myopia (nearsightedness). The results of this project may encourage parents to limit their child’s amount of time using their device, to prevent developing nearsightedness at an early age. There are many speculations about the causes of myopia ranging from genetics to the use of small, lighted screens, (backlit hand-held devices such as smartphones and tablets). In my project I plan to answer the question “Does using a backlit hand-held device cause adolescents to develop myopia?” I distributed surveys to my test subjects that ask questions about age, gender, using a backlit handheld device, and wearing corrective lenses for the eyes such as glasses or contacts. I distributed surveys to adolescents (ages 9-15) and the parents of the adolescents. The parents fill out the survey according to information based on when they were 9-15 years old. I will analyze the data to see if there is a correlation between usage of a device and adolescents needing to wear corrective lenses. The results of my project will be available at the fair.

MMH128: Which Hand Sanitizer Works Best Against Bacteris?

Hand sanitizers are found in offices, homes, schools, and many more locations. The most commonly used brand is Purell. The experiment performed test if Purell, along with other brand such as Dial, Germ-x, and Cleanwell All Natural, work as effectively as their guarantee of killing 99.99% percent of all bacteria. Each hand sanitizer was paced in an agar plate swabbed with bacteria to see its effectiveness after twenty four then fourth eight hours of being in contact with the bacteria. Out of the trials performed Cleanwell All Natural did the best with an average zone of inhibition of 10 millimeters.

Intermediate – Physics (MPH), 7th & 8th Grade

MPH100: Can Hockey Stick Flexibility Affect the Speed of a Shot?
My experiment is "can Hockey Stick Flexibility Affect the Speed of a Shot"? I had five different hockey sticks, all with different levels of flexibility. I had 20 pucks;10 for the two different shots taken. I recorded all of the times of each shot for each stick. I gave each stick a rank depending on their times that I recorded. The Easton Aluminum 2000 ended up having the fastest time. My hyposthesis was that flex would affect the shot and I was partially correct. I did the project because I was curious to see if choosing a stick with a certain flexibility would help a player shoot better

MPH101: Take Off - MOVED TO MER136
The purpose of my experiment is to engineer an airplane propeller that causes minimum. I will construct my propeller using composite materials. I will layer the fiberglass and epoxy resin inside of a mold. After the propeller is dry, I will release it from its mold. Attaching my propeller to the motor, I will turn on the motor. I will place a decibel meter to measure the amount of sound produced. I will then analyze the data produced by each propeller. Results will be available at the fair.

MPH102: How to Build a Simple Electric Motor?
Making an electric motor will show how electric energy is converted to mechanical energy. Doing this experiment will help us understand how electric motors can deliver useful work. To conduct this experiment I will be attaching a needle, with a spun thread of coil it its holes, on each end of a battery with electrical tape. Then I will put a magnet on the center of the battery. Since my experiment is still in continuation, I hypothesized my results. I predict that motor will power the coil to spin to generate mechanical energy. After my experiment, I will take notes on what had happened.

MPH103: Which Battery Brand Last The Longest?
There are three battery brands that I have used for this experiment which are Duracell, Rayovac, and Energizer. During my testing I noticed that the batteries do not even equal 1.5 volts at all and the closest battery I got was .1 volt off but that batteries life was shorter than any other. Surprisingly though the least voltage battery brand won the overall measurements.

MPH104: RUMP: Rebound Under Multiple Pressures
Rump: Rebound Under Multiple Pressures
In this project, I wanted to see if we could develop a predictive model by filling a ball with different pressures, and plotting the rebound heights. My hypothesis was that the line would not be linear and you wouldn't be able to use it to predict the outcome. We used a camera to watch the bounce in slow motion and found the most accurate height possible. We used similar triangles to compute the actual height of the bounce. We then put those points into a scatter plot and found a trend line. The results will be displayed on exhibit day.

MPH105: Accelerated Gravity
In my experiment, I wanted to find out if an object's mass affects its acceleration. my hypothesis was the ball with more mass will have a faster acceleration because it is heavy and the more mass an object has the more gravitational pull it has. For my experiment i used six different balls and rolled them from three different heights and three different angles. My data shows that there is no trend showing acceleration with increased mass. My hypothesis was proven incorrect because the mass of the object didn't have an effect on it's acceleration.

MPH106: Does Temperature Affect Surface Tension
Surface tension lets small, light weight bugs walk across the top of water. Some bugs struggle with this in different climates. This project was intended to learn if the temperature of water affected it’s surface tension. Three different temperatures of water were tested and the strength of their surface tension was recorded. When the temperature gets hotter the molecules speed up and move around, not making a strong bond. But, when the temperature gets colder the molecules of the water slow down and stay in one place.The results were that the cold water had the strongest surface tension.

MPH107: The Bat Test
I am comparing a wooden bat to a metal bat to see which bat hits a baseball and softball the furthest distance.

MPH108: Three Throwing Balls
To find out what ball rotates the least. Used for training to generate more spin when ball is thrown as a curve ball. Label 3 balls with X using a Sharpie. Mark of 13.8 Meters from pitcher to catcher. Set up video camera and put on all catcher gear. Pitch each ball 10 times while video taping. Watch video and document the number of spins for each type of ball. Analyze data.

MPH109: Demonstrating Basic Physics with a Magnetic Accelerator
The purpose of this project is to demonstrate how magnetism and the principle of conservation of energy combine to accelerate objects to increasingly high speeds. The project uses wooden rulers, neodymium magnets, glue, and steel balls to construct at least three different versions of a magnetic linear accelerator. The hypothesis of a direct mathematical relationship between the number of magnets used in an accelerator and the measured speed of the steel ball projectile is tested by measuring the speed of the projectiles, comparing the results, and graphing them. Research on this project is ongoing, and results will be available at the science fair.

MPH110: Adhesion
My question is which surface will tape adhere to better? My hypothesis was proven correct, because smooth surfaces have a higher surface energy making it easier for tape to adhere. I punched holes in each side of a cup. Used 45.72 cm of string, thread through the holes making a hanger loop for the cup to hang. Used 10.16 cm. of Scotch Tape, hung the cup from rough wood. Started adding pennies until the tape failed. I did this procedure on other surfaces - metal and plastic. This procedure was also done with other tapes - 3M Blue Masking Tape and Black Electrical Tape on all the same surfaces mentioned before.

MPH111: [Deleted]

MPH112: Dark vs Light
I wanted to see which color of clothing would absorb the most heat in the summertime. I chose cloth and placed it over a lamp to heat it. I recorded the results.

MPH113: Bouncing Off The Walls With Energy
Have you ever wondered why when you bounce a basketball it does not reach the height that you dropped it from? WHen you bounce a ball the ball loses momentum by transfering energy elsewhere. To dribble a basketball a person must constantly replace the transfered energy by pushing down on the ball. Where does theenergy that gets transferred elsewhere go? From physics we know that the energy does not just simplydisappear. The energy just changes its form. One form may be from energy to heat. This may be the case when you dribble a basetball, hence the reason for my experiment.

MPH114: [Deleted]

MPH115: Solar Powered Desalination
Because fresh water is in demand, particularly in areas of drought, using some of the Earth's most abundant resources: salt water and sunlight, to produce potable water through the use of desalination devices would greatly influence the health of people around the world. I built three desalination devices: one had a black bottom, one a white bottom and one a clear bottom. The devices were filled with 500 mL of salt water and left in the sun for nine hours. The amount of fresh water condensed in each collection cup was measured. The results showed that the black-bottomed device collected the most desalinated water. This supports my hypothesis that the desalination device with a black bottom would produce more fresh water because the black surface generates more heat from the sun creating greater condensation.

MPH116: PIANO VIBRATIONS
My experiment is about finding the best possible quality of sound on a piano and how much pressure you have to apply to the note the achieve it. I will put pressure on the same key for different amounts of time and see which one the judges like best. After asking 4 people to rate the quality of the sound, I will collect the data. Then, after finding the averages, I will know what the best quality of sound is and how much pressure I need to put on that note to achieve it.

MPH117: The Best Rocket Launching Water
Fuels for small rockets are becoming more and more expensive every year. My experiment shows that there are other ways to launch small rockets in this world. To test this I got three types of water, carbonated water, tap water, and bottled water then poured a specific amount of water in the rocket and put air in the rocket using a bicycle air pump. the water that launched my rocket highest was the carbonated water. Therefore, saying that my hypothesis was correct. The carbonated water is the best rocket launching water.

MPH118: Energy Efficient Windows
The premise of this experiment is to find which color of filter would be best to put on windows for energy efficiency. The four colors were red, yellow, blue, and white/frosted. Each of these colors of filters were placed on the glass of a shadow box, each with a solar panel inside of them. The electrical energy produced from the solar panels were tested with a multimeter and recorded. After all the trials, it was concluded that the yellow filter reflected the solar energy best, while the blue filter absorbed it best.

MPH119: [Deleted]

MPH120: How the Body's Position Affects Pitching Power

My science fair project dealt with baseball pitching power and how the body's position affects the speed. I used three volunteers to pitch. Each were recorded onto the chart. All threw faster when they used a stride for their pitching style. My hypothesis turned out to be right. I said that if a bigger stride is used then more ball power will be created. All the research I did about this particular project and baseball its self has made me learn more about baseball and physics. In conclusion, it was a very successful and enjoyable type of project.

MPH121: Embed that Sound

My project will find an optimum material for sound transmission and for thermal insulation. My hypothesis is that fiberglass fabric with high air permeability would be an optimal performer.

MPH122: Charge!

The purpose of this experiment is to see which area in your house is the best and worst place to store unpackaged batteries. The procedures include taking voltage, making observations, and placing saran wrap down. The data and conclusions will be shown at the science fair.

MPH123: Egg Ball

For my project I tested to see if an egg white can seal a hole in a ball. To do that I inject the egg white into the ball with a syringe. I then let the egg white dry out over the hole, and added air to the ball. I then measured how much air was in each ball over a six day time period. This experiment confirmed my hypothesis that the egg would seal the whole allowing it to hold air again.

MPH124: Power From The Sea

Seawater covers 72% of Earth’s surface. 97% of that is salt water. If salt water can be used to power our homes and factories, it can produce energy with less harm to the environment than coal mining or oil and natural gas extraction. This experiment was intended to find out the best electrode combination to produce electricity from saltwater, as measured in volts. To test this, a battery was created with a 20% salt solution and 2 electrodes, with 10 different electrodes, forming 17 combinations. Volts were measured with a multimeter. Three trials of 3 tests each were conducted with carbon as the constant electrode. The entire experiment was then repeated with magnesium as the constant electrode. The results show that the electrode combination of magnesium and carbon produced the most electricity.

MPH125: Magnetic Momentum

The purpose of this physics experiment was to study the motion of magnetically propelled spheres on a constructed momentum track. This magnetic propulsion could be used in transportation and military applications.

MPH126: Water vs Water

The purpose of this experiment is to see if waters of different densities will float on top of each other. To conduct this experiment I put two water filled water bottles on top of each other. I dyed the water so I would be able to know when they are mixing.

MPH127: Does Mass Affect the Velocity of an Object as It Travels Through an Inverted Vertical Loop?

PURPOSE:Determine the effect of mass on the amount of energy a sphere possesses traveling through a vertical inverted loop.
HYPOTHESIS:As the mass of a sphere increases the amount of energy it possesses will decrease as it travels through a vertical inverted loop.
PROCEDURE:

1. Place one of the spheres of different mass being tested at the starting line of the testing apparatus and release it.
2. Determine the length of time required for it to cross the finish line.
3. Repeat steps1-2 for 29more test runs.
4. 4.Repeat steps1-3 for the remaining spheres of different masses being tested.

CONCLUSION:Final results available at the fair.

MPH128: Under Pressure

My experiment is about finding the best air pressure to get a basketball to bounce to an average height male's waist (6 foot 1 inches). The recommended air pressure range by the NBA is 7.5-8.5 pounds per square inch (psi). My prediction was that 8 psi would be the best, but that was proven incorrect. By looking at the results, I found that 7 psi would produce the desired results. I was trying to find what psi would bounce closest to 1.30m because that's the average height of a male's waist and 7 psi was the closest at 1.30m.

MPH129: Foot Angle and Breaststroke Proficiency

In my project, I looked to see whether a swimmer's foot angle affects their breaststroke speed. To find this, I had swimmers swim two different strokes, breaststroke and freestyle (crawl) and then recorded the speeds and foot angles, and then analyzed them using tables and a box plot. Overall, the data did not support my hypothesis, but I was not able to have a conclusion because of my insufficient data size.

MPH130: The Perfect Shot

The title of my project is the perfect shot. I asked three participants to take three different shots from three different angles on the basketball court. according to my results it states that the free throw line is the most consistent area on the court to make a shot from, from 15 feet or behind.

MPH131: The Effects of Temperature on the Shatter Resistance of Glass

Purpose: Determine if temperature affects the ability of shatter resistant glass to break.
Hypothesis: As temperature increases of the ability of shatter resistance glass to break will decrease.
Procedures

1. Place 20 (5.08cm x 5.08cm) squares of shatter resistant glass in a container at 20º C (Control) for 60 min.
2. Place 1 of the shatter resistance glass test samples in the testing apparatus
3. Determine the amount of shattering that occurs.
4. Repeat steps 4-5 for the remaining glass test samples
5. Repeat steps 3-6 at -10C, 0ºC, 22C, 100ºC

Conclusion: Final results will be available at the fair.

MPH132: Getting Warmer...

How does the color of an object affect the amount of heat it absorbs when exposed to incandescent light? I thought that the darker the color is, the more heat can be absorbed because lighter colors reflect heat and darker colors absorb and attract heat. To prove my hypothesis, I used mason jars filled with water and covered with a certain color construction paper, then measured the temperature using a standard glass thermometer. In the end, I discovered that red was the color to absorb the most heat. Black following, and surprisingly yellow after black proving my hypothesis partially correct and leading me to the theory of the brightness of a color affecting the heat absorbed. Does the color of an object affect the amount of heat it absorbs when exposed to incandescent light? I thought the darker the color is, the more heat can be absorbed because lighter colors reflect heat and darker colors absorb and attract heat. To prove my hypothesis, I used mason jars covered in colored construction paper, filled with water, then measured the temperature using a standard glass thermometer. I discovered that red was the color to absorb the most heat. This proved my hypothesis partially correct and lead me to think that the brightness of color affects the heat absorbed.

MPH133: An Electric Charge

The purpose for my science fair project is now to get the highest charge possible from a combination of liquid and metals. The problem we solved was finding out whether or not there was a combination of liquid and metal that will possibly out charge a battery. I took household items and made a battery out of them. The answer I obtained was I could only reach 1.2v instead of the hoped for 1.6v level. I found out that you may not be able to get the voltage nor the amperage of a regular AA battery.

MPH134: It's What's on the Inside That Counts

Purpose: The purpose of this project is to determine if the core and temperature of a golf ball affect the distance it travels. A golf ball hitting device will be placed on the ground,and the golf balls will be heated to a temperature of 27°C and struck 3 times each. This will be repeated for all the golf balls for the 4 core types. Results will be recorded and the averages will be calculated. The experiment will be repeated for the golf balls, which will be cooled to a temperature of 4°C. Results will be recorded and analyzed.

MPH135: Can magnets remove water from lungs?

Water is very slightly repelled by magnets, but not enough to be useful. What if we could do something to it to make it more useful? I am testing different suspensions to hold fine iron particles, and use magnets to test the suspension's magnetic ability. I use ingredients like borax, cornstarch, and glue to hold the particles. The best suspension models magnetic water solutes, which have been created by a university. This technology could be used to remove excess water from human lungs.

MPH136: Rocket Science

The purpose of this experiment was to find out if standard model rocket fuel is better than homemade fuel. I used some potassium nitrate and sugar along with water for this experiment. Both mixtures had 60 grams of potassium nitrate and 40 grams of sugar, but mix2 got 30ml of water. My hypothesis was that mix1 would win and it did. Mix1 burnt at 6.42 seconds, mix2 10.12 sec, and control at 8.04 sec .Remember lower is better. In conclusion I was happy with the outcome of the experiment and would do it again. My project number is

MPH137: Thick Thin Large Small
The title of my project is Thick Thin Large Small. My hypothesis is that I believe that the thin rubber band will go the furthest. I believe this because it is less dense then some of the others. I tested four different sizes of rubber bands, launching four of each type and measuring the distance they traveled. In the end my hypothesis was proven incorrect. The rubber band that actually traveled the furthest was the thick rubber band. I believe that the thick rubber band was more dense and traveled the furthest based on the equation W=F x D.

MPH138: Cracking Under Pressure
The reason I did this project was to find what type of egg could hold the most pressure. I tested a total of thirty eggs, ten of each type of egg. I tested duck eggs, white chicken eggs, and brown chicken eggs. Duck eggs are the strongest. This experiment is important to the egg industry. Stores and consumers do not want to purchase broken eggs. I researched a variety of sources, and experimented multiple times to find which egg holds the most pressure. With these results, better packing methods can be developed to decrease the amount of broken eggs.

MPH139: Jumping Distance
The purpose of this experiment is to see if you can increase jumping distance by increasing running distance before the jump. To conduct this experiment, I will jump from a standing position, and then keep moving back, and running, and jumping. The experimental results were measured by how far they jumped with a running start, and standing still. The results of my experiment showed that I had a farther jumping distance by running, and jumping. The results indicate that my hypothesis should be accepted, because, my hypothesis states that I would have a farther jumping distance by running, and jumping.

MPH140: Which Airplane Design Flies Farther?
There are many different types of different airplanes. The design of the airplane affects how far the airplane can fly. Drag is the force of air pushing against the plane as it flies. The most successful paper airplanes have designs that reduce drag. I have picked three different designs to test for this experiment.

MPH141: How to Choose a Golf Ball
There are different gold balls for different players. My project involved three different golfers, golf ball, and seven irons. I measured distance and ball speed using the ES12 launch monitor. The youngest test subject hit the high-end gold ball the furthest. I thought he'd hit the low-end gold ball further because he's smaller. My hypothesis stand correct for myself. My adult test subject hit the mid range ball further. Further data analysis as well as subjective comments may be the basis of further study.

MPH142: Sink or Float
The question of my project is "What weight can the tin foil boat hold while staying afloat?" I hypothesized that the boat will support 200 grams better than 400 grams. My procedure is: first, I filled the sink with water and got the tin foil to make the boat. Then I made the boat. Last I tested it by placing the boat in water with the weights. I concluded that my hypothesis was correct because the boat supported the 200 gram weight better than the 400 gram weight.

MPH143: Ecogyro -Tractor or Pusher?
The project centers on two of the most common body/engine layouts in the autogyro industry, both today and in the past.

MPH144: Warm or Cold: Temperature and the Energy from a Wind Turbine
I am investigating whether wind energy can be produced by a windmill on top of a car as it moves. Can the energy be harvested as ambient temperature changes? This experiment will test whether or not temperature has an effect on the amount of wind energy produced. My research findings can influence society to put more windmills in areas with certain temperatures, and can help improve the efficiency of windmills and wind farms.

MPH145: [Deleted]

MPH146: What Position Is Best For Soap Box Car Derby Weights?
The purpose of this project is to help Soap Box Derby participants understand whether or not it would be beneficial for them to put the weights in the car or not. As many as 70,000 people participate in the soap box derby each year. The hypothesis that I studied was whether a soap box derby car goes faster with weights or without weights. My hypothesis was the car would go faster with weights, which was proven incorrect. My procedure was to race the car down the hill as series of times with weights, then without weights.

MPH147: Baking Powder Effect on Cupcake Size
Baking powder is a leavening agent for baked goods. In my experiment I tested how a cupcake changes its size and density if more baking powder or less is used than asked for in a commonly used recipe. On 3 different days, I mixed the wet ingredients to bake 12 cupcakes, divided the batter by 3, and added flour and 3 different amounts of baking powder to each of the parts. It turns out that using less baking powder as asked in the recipe produced higher, less dense cupcakes than the default amount or than using more baking powder.

MPH148: Does golf ball bounciness affect the distance traveled?
The purpose of this experiment was to determine the effect of golf ball bounciness on the distance it traveled. I hypothesized that the golf balls that bounced the highest distance would go the furthest when hit by a golf club. After testing how high multiple gold balls bounced, I proceeded to see how far they would travel. After hitting all the balls, with the same force and golf club, I recorded the results. My hypothesis proved to be true because the bounciest balls did travel the farthest. This information will hopefully give me the edge in future golf endeavors.

MPH149: Effect of Gravity
The purpose is to find the effect of gravity on different objects. I dropped two balls onto the ground at different heights for three trials. The data that I collected was varying, but the higher the drop, the longer the time to impact. In conclusion, my hypothesis that the heavy ball would hit first was incorrect. Even though the speed and height varied, the balls still stayed together.

MPH150: Dance Till You Drop
My dance teacher always says to the younger girls, “stretch your legs as high as the older girls”. I wanted to see if the older girls’ legs were really higher than the younger girls. I tested a group of 11-15 year old female dancers and a group of 16-20 year old female dancers before and after stretch to see if the older girls’ legs were really higher. Both groups did better after stretching. But in the end the older girls did better before and after stretching.

MPH151: Magnetic Might
Purpose: to find how amperage, distance from the object being pulled, and diameter of core affect the strength of an electromagnet. I hypothisised that an electromagnet with high amperage flowing through it, close to an object, and a large core would be the strongest. to test these variables I created electromagnets with different core sizes, bought two copper and placed multiple batteries between them to increase the amperage, and to vary distance I created a spacer to place the electromagnets on. To find the strength I placed a lever with arms of equal lenth over a scale with an electromagnet pulling up on ne side and the other side pushing down on a scale. the reults showed an electromagnet close to an object with a small core would be the strongest. the test for amperage was inconclusive.

MPH152: Beam Bridge Vs. Suspension Bridge - MOVED to MER137
The purpose of this experiment is to see what bridge design would have the most strength, a beam bridge or a suspension bridge. To conduct this experiment I will build a beam bridge and a suspension bridge out of drinking straws and test which has the most strength by using coins as weight. The experimental results were measured by testing the strength of the bridges and seeing how much weight they can hold. The results of the experiment showed that a suspension bridge has the most strength. The results indicated that the hypothesis should be accepted because the suspension bridge had almost twice the strength of the beam bridge.

MPH153: A Better Ice Cube Procedure
I chose this project to design a better shape for ice that will cool drinks quicker and last longer than a traditional ice cube. I designed ice molds with CAD software and printed them on a 3D printer. I filled each mold with water and froze them. I then placed them into insulated cups of water and measured the temperature change over time. I analysed the data and determined the optimal shape. Overall, the square shape with several large blades was selected as the best design based on several factors.

MPH154: Right or Wrong Angle?
Have you ever tried to find a pattern for the angle that is made when two pool balls collide and move? I know I have. That is one of the reasons that I chose to do this experiment. My purpose was to determine the angle at which two equal-mass objects move away from each other after a glancing collision. My hypothesis was that the billiard balls would move away from each other at a 90 degree angle. Although my prediction was close, my findings did not match my hypothesis exactly. The average angle of the ten trials was 96.6 degrees.

MPH155: How Size and Weight Affect Buoyancy
Archimedes discovered that an object placed in water transfers a volume of water. If the object is floating, the amount of water that gets displaced weighs at least as much as the object. The displaced water creates an upward force on the object, called buoyancy. The strength of this upward acting force put forth by water is equal to the weight of the water that is displaced. Whether an object sinks or floats depends on its density and the amount of water it displaces to create a strong enough buoyant force. I have chosen this project to test which of 4 boats with different designs would float the longest in a certain amount of water. I created a long narrow boat, a rectangular boat, a small square boat, and a small narrow boat. I have tested the boat’s buoyancy with pennies. I placed 7 pennies in the boats to start out with. After two minutes, I would add 5 more pennies. This process would continue until the boat has finally sunk. By the time all the boats sunk, I have concluded that the long narrow boat was the boat that was the most buoyant out of the other 3 boats. After the testing was finished, I took the mass of the boats with and without pennies. Then, I measured the cubic volume of the boats. I calculated and recorded the boats’ densities and compared them to water’s density. The density of water is 1 gram per cubic centimeter. All of the boats’ densities measurements were near the density of water except for the small square boat. It had a small surface area, so it was incapable of holding a lot of pennies. If this experiment were to be used in real life, boat designers would know how to create a boat with the correct buoyant size and shape, so it could stay afloat.

MPH156: Vortex Rings
In this project I studied the production and properties of ring vortices in water. I studied how the size of the hole the vortices were created from affected the number and quality of the vortices created. I used my data to determine the optimal hole sizes for making ring vortices. I did this by pushing water through a hole, drilled in a piece of wood. My hypothesis is that the optimal radius for the hole size can be found by putting the volume of the water being displaced into a sphere, and calculating the radius. The radius of the sphere is hypothesized to be the optimal hole size for creating vortices.

MPH157: Wing Design
I chose this project because I wanted to see what kind of paper airplane wing design would do the best. I made a front heavy wing design paper airplane and middle heavy wing design paper airplane. I threw the planes and got the distance. I did this for all the types of paper. The printer paper went the farthest for font heavy design and the notebook went the farthest for middle heavy design. I can conclude that the printer paper went the constant average distance overall.

MPH158: Bernoulli Effect:Music To My Ears
The purpose of this experiment is to see if a compressed airstream passed between two empty soda cans suspended from string can be used to illustrate the Bernoulli Effect. Household items were used to construct the device, and the air source was a can of compressed air. The results indicate that the hypothesis should be accepted, because a narrow high velocity stream of air passed between the two cans will cause them to mover closer together, illustrating the Bernoulli Effect. By contrast, the same volume of air, discharged in a wider patter and at a lower velocity will cause no such movement.

MPH159: Elevation and It's Effect on Diostance
My project teaches you the effect elevation has on the distance a rolling object can impact a block. To represent this, I built a ramp with three adjustable piers out of Hot Wheels track and Lego Duplo blocks. I released three balls of different weights down the ramp and tested them on each level. After completing all the tests, I recorded the outcome. The data supports that the heavier the ball, the higher the height. the farther the block is moved. When I completed the experiment, I concluded that each time you elevate the ramp a predictable pattern will arise.

MPH160: Does the amount of drag on a paper airplane affect the distance it flies?
This aerodynamic experiment tests to see if the amount of drag on a paper airplane affects the distance it can fly, and speculates that if the amount of drag increases then the distances it flies decreases. Using a basic paper airplane design, determine the flying distance of three planes. Add drag by folding up both wings at a 90 degree angle and test the flight of all three planes again. As hypothesized, when drag was added, each plane flew approximately one-third the distance compared to the plane without drag. This experiment proves that added resistance (drag) will diminish flying capability.

MPH161: Are start-stop engines more fuel efficient?
The purpose of my study is to test the hypothesis that cars with start-stop engines are more fuel efficient than other cars. I conduct two tests. First, I collect data related to fuel efficiency and compare these between tanks of gas where we simulate a start-stop engine with tanks of gas where I don't. Second, I estimate the gas usage of the car while idling for a tank of gas. Controlling for variables that I expect will influence fuel efficiency, the evidence supports my hypothesis that start-stop engines are more fuel efficient. My study has implications for cost-savings and the environment.

MPH162: Visualizing Viscosity
The purpose of this experiment is to determine if a specific heated temperature affects the viscosity of a liquid. To conduct this experiment I dropped a marble into the heated liquids(90 degrees Celsius), and timed the marble until it reached the bottom of the liquids. The experimental results were measured by how long it took the marble to reach the bottom of the liquids. The results of the experiment showed that on average a specific heated temperature did affect the viscosities. The results indicate that my hypothesis should be accepted because the specific heated temperature did affect the viscosities.

MPH163: How the thickness of gelatin affects the bounce of an object?
Project : How the Thickness of a Layer of Gelatin Would Effect the Bounce of an Object Falling on it. Gelatin has a springy property which will cause lighter object to bounce off of it. I tested to see if this was practical. To do this, I dropped an unsharpened pencil into three different thicknesses of gelatin; 1 centimeter, 1.5 centimeters, and 2 centimeters. The 2 centimeter slab bounced the pencil the highest, followed by the 1.5 centimeter, then the 2 centimeter. This was in agreement with what I hypothesized.

MPH164: [Deleted]

MPH165: Pay Attention! Break the Tension!
In my experiment I added different liquids to water to see if it would affect surface tension. The solutions I used were soap, dish soap,dishwasher detergent and isopropyl alcohol. I predicted that the hand soap would affect the surface tension the most. However, the dish soap made the tab sink the fastest at 1.4 seconds and hand soap was close behind at 2.173 seconds. The isopropyl alcohol didn't make the tab sink at all. The purpose of this experiment is to help with cleaning to know which type of liquid to use.

MPH166: Does Temperature Affect Batteries
The purpose of my experiment was to determine whether temperature affects how long a battery lasts. Before starting, I chilled one set of batteries. I put one flashlight in a refrigerator, and one on a table at room temperature. I then recorded the brightness every hour with a light meter. During my three trials, each flashlight in the refrigerator lasted five hours, and each flashlight at room temperature lasted six hours. In conclusion, the flashlight in the refrigerator lasted one hour shorter than the flashlight at room temperature. This experiment indicates that storing batteries in a refrigerator is not beneficial.

MPH167: Psychological Anchoring
The purpose of this experiment is to see if psychological anchoring affects how a person answers questions. To conduct this experiment I asked a few questions to my participants about the number of African Nations in the UN and questions about the height of the tallest redwood tree. The experiment results were measures by comparing the amount of anchoring used and my participants' response.The results of the experiment showed that a persons' answer would be bias toward a number that you give them. The results indicate that the hypothesis should be accepted. My hypothesis states that, if individuals are provided with a specific value for an unknown quantity, then their estimates of an unknown quantity will be biased toward the specific value they are presented.

MPH168: Do You Want to Build a Circuit?
Did you ever wonder how you could take a bath while playing with your mother's blow dryer? Well the answer is really quite simple, use distilled water. Not all liquids conduct electricity, so my question is which basic household liquids is the most conductive? As I suspected, out of the five liquids tested, lemon juice is very conductive allowing 75% of the voltage to pass through, and distilled water was not conductive allowing only 0.004% to pass through.

MPH169: The Strength of an Egg
People for centuries have created architecture that resembles the shape of an egg. I was curious as to why people created these magnificent architecture. My experiment was to see how much pressure an eggshell could stand. I predicted that the eggshell could only withstand 1 pound of pressure. I used 1/2 of an eggshell, balanced books on a board on top of the eggshell and recorded how much weight the eggshell could withstand. My hypothesis was proven incorrect- eggshells can withstand between 10-14 pounds of pressure. Applications for this experiment would include civil engineering for the design and implementation of bridges.

MPH170: Solar Angle vs. Heat
A solar mirror was used to measure the amount of heat produced when hit with light from different angles. This project has many applications in renewable solar powered energy fields.

MPH171: Drop It!
Ever wondered which falls faster? The answer is neither. This work was intended to test the previous theory of Galileo Galilei, that all objects fall at the same rate. This was done by dropping 5 different masses of clay balls out of a window and measuring the speed. By doing this, the result was that each of the clay fell at approximately the same speed. But of course the major factor of air resistance did play a part, and this means that the results are not perfect. To conclude, Galileo's theory is correct.

MPH172: How can I make the fastest store bought arrow even faster?
I want to find a fast tip that I can wipe the competition with and from my research I believe I found it. Can I make an arrow (known to be fast) go even faster with tip modifications? To find this, I first started by getting a chronograph and shooting a Easton ACC hyperspeed with different tips. From my research (in moderation) I found that a good tip weight to arrow weight ratio and light weight material is key to fast and accurate results. In moderation a light tip is the way to go.

MPH173: How Fast Can It Go?
Urban legend states that a penny falling off of the top of the Empire State building will kill someone if it hits them on the ground. The purpose of this experiment is to findou tif there is a relations hsip between the distance the meter stick or dollar bills falls and the time that the object spends falling. The focus of the first part of this experiment is on the distance and acceleration of a free-falling object. In addition to this, I wanted to find out if the mass of an object affects the rate at which it is falling and if all objects fall at the same rate. My hypothesis is that the meter stick will fall at a faster rate than the dollar bill. I chose this project because I wanted to learn more about acceleration and how it affects free falling objects

MPH174: Exciting Electrolytes
The creators of sports drinks spend tens and a hundred million dollars advertising their products each year. In their ads, they feature high level of electrolytes, which your body loses as you sweat. In my science project, I will compare the amount of electrolytes in three different sports drinks with those in orange juice to find out which has more electrolytes to replenish the ones you lose as you do exercising activity. I hope to find a less expensive way to receive electrolytes when I do dance, soccer, and other exercising activities.

MPH300: [Deleted]

MPH301: A Battery That Makes Cents
Please visit student's exhibit on Fair Day for abstract.

MPH302: [Deleted]

MPH303: Save Our Heads
We started off this experiment by deciding our topic; head injuries in sports that involve helmet protection. Once we organized a list of materials and a procedure, we began experimenting. We organized three occasions to experiment. After getting through the confusion of setting the parts up correctly, the experimenting began. We ran 25 tests altogether and came to the conclusion that the more air you have in the helmet's padding, the more protected you are from collision. We also found out that if too much air is in the padding, head on collision could cause the pads to burst.

MPH304: Trajectory of a Ball
Was interested in linking standard trajectory physics to real life applications. Researched by experimentation and engineering the best angle of launch to achieve maximum distance.

MPH305: Can Insulators Stop Thawing Ice?
The rationale behind this project is to discover which reflector best keeps ice frozen. With this information, we can create inventions to naturally keep ice frozen. That can include helping the polar ice caps or keeping food fresh when there is no electricity. If we test aluminum foil, white paper, a transparent container and wool,then aluminum foil will reflect maintain the coldest temperature. We will cover the same amount of ice with a reflector and record out observations at time intervals. When the ice has completely melted, we will record that time as a final answer. Risk and safety precautions include moving plastic items away so heat does not bounce off the reflectors and melt them, and keeping ice in some container so it doesn't spill on the floor.

MPH306: Aerodydamics for Beginners
We tested how the overall design of different cars affects the speed and velocity of motion. We constructed and tested various shapes of wooden cars on a test track and calculated and compared speeds.

MPH307: [Deleted]

MPH308: [Deleted]

MPH309: Burn Baby Burn
Has the question, which metal at a constant temperature starts showing signs of melting, ever made you think? If so, then the assumption aluminum would sound familiar. I made an educated guess and determined that aluminum would show signs of melting faster. In my project, I melted aluminum, brass and copper at a constant temperature. Aluminum started melting earliest. Brass and copper had some kind of coating on it so it took longer. If I were to change my project, I would use different metals. I would melt metals at higher temperatures and use smaller pieces of metals.

MPH310: [Deleted]

MPH311: How Sight Affects Balance
The purpose of our experiment is to help people who have been visually impaired, whether it was of natural causes or not. We watched the participants as they walked forward, walked backwards, shuffled sideways, and cross-stepped. They did each task once with their eyes open and again with their eyes closed. The data we found was that impairing someone's vision affects them more than taking it away all together. No one fell over, but several people stumbled. In conclusion, sight does affect balance.

MPH312: I Got It?
Our project, I Got It?, is an experiment to test which is the most efficient way to catch a fly ball. We wanted to know so we could have the best possible chance of winning our softball games. We conducted our experiment using the help of Kelsey's younger sister and Sarah's two older brothers. We all caught the ball five different glove positions, using each of those positions we attempted to catch the ball ten different times. Those five different glove positions were above your head, directly in front of you, to your right, to your left, and behind you.

MPH313: Shots Fired

This experiment is all about how to get better at hockey. Lots of people start out playing hockey, and do not really have the right mechanics. This experiment will help fix that problem. We will be testing what is the ideal distance away from your body to shoot from. This will help solve the problem of beginners who might be using the wrong mechanics. During my experiment most of the distances had around the same speeds, except for the distance of 2 feet. Because of that, my hypothesis was disproved. What we can learn is that farther away is better.