



65th PITTSBURGH REGIONAL SCIENCE & ENGINEERING FAIR

INTERMEDIATE DIVISION ABSTRACTS



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Note: Due to processing time constraints, some abstracts were omitted and others were limited to the purpose of the research. Omissions should not be considered as a negative reflection on the student or their project.

INTERMEDIATE DIVISION – BEHAVIORIAL AND SOCIAL SCIENCE

Project Number: MBS001

Grade: 8

Title: Who's the True Threat?

Abstract: Have you ever wondered if age and experience have an effect on how different nationalities are perceived? I researched this by showing pictures of people of ten different nationalities to people of various ages. I asked questions about past experiences and which nationality type they thought was the biggest threat. I found out that age does have an effect on how people perceive different nationalities. The forty-five and older group was more likely to fear those of Muslim descent based on nationality, while the middle and youngest age groups feared the Vietnamese person the most based on appearance.

Project Number: MBS002

Grade: 7

Title: How Does Temperature Affect a Cricket's Chirp?

Abstract: The purpose of my project was to see what temperatures make crickets chirp in different speeds so that people who use crickets as food for reptiles can keep the crickets in a temperature so they can chirp soft and not disturb the household. My hypothesis was correct. The crickets chirped slow in 30 degrees, fast in 70 degree, sharp and loud in 80 degrees, and medium in 50 degrees. I learned how crickets mate and different ways to tell if a cricket is cold or hot.

Project Number: MBS003

Grade: 8

Title: Do You See What I See?

Abstract: Subliminal messages made the news recently when a father used them to try to get his older son to murder the younger one. This work intended to determine if subliminal messages could be used to affect a person's choice of number. Two PowerPoint presentations were prepared, one with a subliminal message containing the number "3", one without. It was determined that this kind of subliminal message did not affect the choice of number. Future work is planned to determine if a longer exposure time can affect choice.

Project Number: MBS004

Grade: 8

Title: Effects of Music on Blood Pressure

Abstract: I chose to do this experiment to find out if classical music is really a solution to lowering blood pressure. I first took each subject's blood pressure. Then, for each subject, I played two minutes of Sample A music. I then waited 30 minutes and repeated with all music types and all 40 subjects. I found out that classical music not only lowered blood pressure the most, but was the only music to lower blood pressure at all. In conclusion my hypothesis was proven correct, classical music had the most decreasing effect on blood pressure.

Project Number: MBS005

Grade: 8

Title: To Lie or Not to Lie

Abstract:

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Project Number: MBS006 Grade: 8

Title: Mnemonic Memory Enhancement

Abstract: Mnemonic devices are useful ways to help you to remember things. This experiment intended to determine which mnemonic device worked best for remembering a group of spelling words. Four different mnemonic devices were taught to the students. Each student used a specific mnemonic device to study for each test. All of the students used the same mnemonic device for each group of spelling words. The students were also given the same amount of time to study for each test using the particular spelling words.

Project Number: MBS007 Grade: 8

Title: Color's Effect on Depth Perception

Abstract: Depth perception is an integral part of human vision. The ability to deal with objects in a three-dimensional manner can even be necessary for our safety. This study looked at the effects of colored lenses on depth perception. Six colored lenses were used to test 25 subjects on three tasks involving depth perception. These tasks included shape matching, hand and eye coordination, and detailed work all in a 3-D form. The results showed that the subjects completed the tasks most successfully when wearing lighter colored lenses.

Project Number: MBS008 Grade: 8

Title: Do You See What I See?

Abstract:

Project Number: MBS009 Grade: 7

Title: Logos in Legoland

Abstract: This work intended to learn if children who are unable to read are still capable of recognizing corporate logos. This work was done because it was noticed that some young children that were unable to read could recognize these logos. Children were asked to give the company brand when shown a logo. Each correct answer was then recorded. It was determined that not many of the logos were recognized. From this experiment it was concluded that children are unable to recognize many logos but some that are more shown to children were recognized

Project Number: MBS010 Grade: 8

Title: A Human Lie Detector: Can Reactions Prove Someone Is Lying?

Abstract:

Project Number: MBS011 Grade: 8

Title: Who Can't See Colors

Abstract:

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Project Number: MBS012

Grade: 8

Title: Lingering Impressions

Abstract: Afterimages are the impressions retained by the retina of the eye, after the external cause has been removed. This project intended to learn if the time spent viewing an image would have an effect on the time that the image remained after the original stimulus was removed. One image was viewed for varying lengths of times and the time that the afterimage was visible afterwards was measured. It was determined that the amount of time the original image is viewed is proportional to the amount of time that the afterimage remains. Future work is planned to determine if color affects afterimages.

Project Number: MBS013

Grade: 7

Title: Ew Ew That Smell!

Abstract: My question was "Do odors affect your mood?" My hypothesis was that odors will have an affect on the mood of people, because certain smells may give you certain memories. I had 8 adult volunteers each smell 8 different odors. Then asked the following questions: What was it you smelled? How did you think the smell was? Did the smell remind you of anything? What mood best describes the smell? From the responses and the results it adequately shows that odors do have an affect on your mood, making my hypothesis correct.

Project Number: MBS014

Grade: 8

Title: Sounds: The Behavior of Horses

Abstract: This project was intended to discover horses' reactions to various sounds. The five sounds were recorded at the same decibel level using a decibel meter. A rating scale was devised to record the level of response of each individual horse. All sounds were played for the same time period to eight different horses and their reactions were recorded. This experiment was conducted twice. It was found that horses showed most reaction to the lawnmower sound. Research showed that many horse trainers state that horses do not always react to a sound automatically; they will first try to remember it, and then associate past stimuli with it in the future. Future work will try to determine how horses will react to different frequencies of sound.

Project Number: MBS015

Grade: 8

Title: Finger Reading

Abstract: The sense of touch is very important to visually impaired persons as they read Braille. This work intended to determine what finger is best suited to distinguishing little Braille bumps and should be used to read Braille patterns. Twenty letters of the Braille alphabet were used and a person's ability to identify each letter using a different finger was measured. It was determined that the pointer fingers and thumbs are most sensitive to the Braille bumps. Future work is planned to determine if extensive keyboard operation reduces finger sensitivity.

Project Number: MBS016

Grade: 7

Title: Doggie Want a Biscuit

Abstract: My hypothesis is if I change the position of 5 dog biscuits every day, then the dogs will eat the same one first every time no matter where the biscuit is placed on the board. The purpose was to find out what biscuits dogs like best. I wanted to see if a certain breed likes a certain brand of dog biscuit. The results showed that "Scooby Snacks" were favorite and "Just For Me" was

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least favorite. I learned that the dogs did not just devour the first one they saw. They sniffed out the ones they liked the best.

Project Number: MBS017

Grade: 7

Title: Monkey See Monkey Do

Abstract: The question for my project is "Do colored lights effect how sea monkeys act?" I hypothesis that different colors of light would cause sea monkeys to react in different ways. I thought that red light would make them the most active, then green, then regular, then orange and blue. I used sea monkeys because they are very active organisms. I learned from my research that sea monkeys are actually a type of brine shrimp. The first step of my procedure was to fill the sea monkey tank with distilled water to 1cm from the top. The second step was to purify the water. Third, I waited for 24 hours before putting the sea monkeys into the tank. Then waited for a few days until they hatched. Lastly, I shined five different colored lights on them and recorded their reactions. I shone each light on them for 5 minutes. Red light made them move the fastest. When the red light was shining on them they did flips and head stands. They were moving faster than usual. They were going away from the light. Regular light also made them go faster than normal. They were running into each other. They were in the middle of the tank. When I shone the green light on them they almost immediately went to the bottom and started to eat. I think because their food is green they thought that the tank was full of food. The blue light made them slow down and move toward the light. It made them more peaceful. The last light that I shone on them was the orange light. They started to go towards the light again and they just floated there the whole 5 minutes. So in conclusion red light made them go the fastest, then regular light, then green, then blue, and finally orange.

Project Number: MBS018

Grade: 8

Title: Birth Order & Personality

Abstract: This project was done to try to determine if the stereotypes concerning birth order were true. The three age levels that I tested, adults, college students, and grade school students had thirty people each. Four surveys were constructed to inquire about personality, job choice, and position in family. Subjects completed the surveys and returned them to the experimenter. It was found that the adults didn't fit any particular description. College students mostly responded like oldest children. Grade school students mostly responded like middle children. Most people did not fit their birth order's description. These results supported my hypothesis.

Project Number: MBS019

Grade: 8

Title: Battle of the Brains

Abstract: Have you ever wondered what causes people to lose memory? My parents keep on forgetting little things ,like play practice, and I wanted to see if their memory loss was caused by age or if they forget on purpose. After finding 36 volunteers in three age groups for my project, I tested each one for memory retention at various intervals of time and then recorded the results and compared them with each other. In conclusion, age has a small effect on how well people can remember.

Project Number: MBS020

Grade: 8

Title: The Effect of Population on Mice

Abstract: This project was to help future pet owners on the decision of whether or not to buy one male mouse or more than one. I hypothesized that a group of mice would thrive better than a solitary mouse because of their social personalities. Three cages were setup with different

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Project Number: MBS031

Grade: 8

Title: Different Genres of Music

Abstract: This experiment tested the effects of different genres of music on students' memories. This experiment could show ways to improve memory and learning. Students observed picture sheets with music playing, then recalled the pictures. There was a small difference between classical and the second best jazz, however folk and control (no music) were almost identical. It was determined that classical music improves memory. Further research could be done on the variation of tempo and instrumentation in the music.

Project Number: MBS032

Grade: 8

Title: Think First

Abstract:

Project Number: MBS033

Grade: 8

Title: The Stroop Effect

Abstract: The purpose of my study was to determine word/color recognition. Sixteen volunteers (8 males, 8 females) were shown a set of cards that had the names of colors written in a color other than the color of the name. Timed tests were conducted in which the subject was asked to identify the word and then the color. Data collected indicated an increase in time for color recognition in both groups. Future studies could include using words pertaining to objects rather than color.

Project Number: MBS034

Grade: 8

Title: Effect of Distractions on Driving

Abstract: The purpose of this study was to evaluate the effect of distractions on automobile driving performance. A video game, a steering wheel and gaming system were selected to simulate driving. A course was predetermined and involved realistic driving situations and conditions. All participants were of middle school age. After test trials, driving performances were evaluated without distractions, while drinking a soda and while using a cell phone. The data was recorded and analyzed. From the data collected, it was concluded that cell phone usage while driving adversely affected driving performance. This study is important because it clearly demonstrates the need for drivers to focus their attention on driving.

Project Number: MBS035

Grade: 7

Title: Do Domestic Cats Have an Adverse Affect on Wild Birds?

Abstract: The five days that I conducted my experiment proved conclusively that domestic cats have an adverse effect on the feeding habits of wild birds. The data collected with the cat in was that 110 birds came to the feeders. While the cat was out less than half the number came, a total of 51 birds came to the feeders. It does not matter that my cat is well fed: he has an inborn disposition to hunt and kill. Domestic cats should be just that- domestic. They should be kept indoors or on a leash if kept outdoors.

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Project Number: MBS036

Grade: 8

Title: The Effect of Optical Illusion Color

Abstract: This project was meant for people to be more knowledgeable about the way they see color. My hypothesis stated, "younger people would view lighter colors easiest, and older people darker colors easiest, because of the tint in the eyes lens over time." Each person would be given a book of 92 illusions, with a variety of 20 different illusions in 8 colors, and asked questions about them. My colors were red, orange, yellow, green, turquoise, blue, indigo, violet, and black. My hypothesis was incorrect. In the end my results were inconclusive, because there was only a 3-5% change between the age groups.

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Project Number: MBI001

Grade: 8

Title: The Effect of Color on Eyesight

Abstract: I performed this experiment to find out which color humans perceive best out of three choices. The choices were blue, red, and yellow; black was my control. I hypothesized that out of these three choices, blue would be perceived the best, because the number of rod cells in the retina is greater than the number of cone cells. To perform this experiment, I made four eye charts, had the subjects read the charts, and recorded their scores. My results prove my hypothesis is correct. So, I have come to the conclusion that blue is perceived best out of the choices.

Project Number: MBI002

Grade: 8

Title: Flocking Behavior in Robots

Abstract: Many animals exhibit a behavior pattern known as flocking. It is typically defined as a group behavior by animals that show goal orientation. Flocks generally move in the same direction and maintain a separation to avoid crowding. This complex activity is driven by simple behaviors. Solar powered robots were constructed and given the ability to move via two small solar powered motors, sense light, avoid dark, and avoid objects in its path. They have no instructions on flocking behavior. When placed in a small group they were able to demonstrate behavior clearly showing characteristics of flocking behavior seen in animals.

Project Number: MBI003

Grade: 8

Title: DNA Fingerprinting in Twins

Abstract: Variation within a population is an important aspect of all individuals. Modern biology suggests that subtle differences among individuals and population of species may be due to variation in the hereditary material DNA. This work was done to see if DNA analysis will recognize the differences among identical and non-identical twins. Two identical and two non-identical twins were identified. DNA was extracted from the hair follicles of all the individuals. Several copies of the DNA were made by polymerase chain reaction and the resultant product was cut with restriction enzymes and analyzed by gel electrophoresis. Preliminary results indicate little variation among the DNA banding patterns of both identical and non-identical twins.

Project Number: MBI004

Grade: 8

Title: The Effects of Substances on Bacteria

Abstract: The purpose of my experiment was to see which substance killed bacteria the best. I went to the Passavant laboratory to perform my experimenting. I also took many pictures after my experimenting. The information that I learned through this experiment was that out of the five substances I used Bleach, Vinegar, Pine Sol, Mr. Clean, and water Bleach worked the best. The one that I can improve on my project was that the fact that I should of experimented more. I think if I did so it could effect my results.

Project Number: MBI005

Grade: 7

Title: Liar Liar

Abstract: My question was "Can you determine whether or not a person is lying or not by their body language?" My hypothesis was that you can tell if a person is lying by their body language. The purpose for doing my project was to determine whether or not a lie can be detected by a person's body language. My hypothesis was correct, you can determine whether a person is

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Project Number: MBI016

Grade: 7

Title: How Light Affects Goldfish

Abstract: In this experiment a colored light will be turned on when it is time to feed the fish, to see if goldfish can be conditioned to come to the top of the tank when the light is turned on with food or no food. 24 goldfish of the feeder-fish type, will be put into two tanks of equal size, with 12 fish in each tank. When feeding the fish the same amount of food and cleaning the tanks in the same way, one tank will have a colored light turn on at feeding time and the other will have no light. The fish will be fed the same amount of food. This experiment would be conducted for one month. It is believed that after this period of time, the fish will come to the top of the tank every time the light is turned on.

Project Number: MBI017

Grade: 7

Title: Where Has All the Water Gone?

Abstract: The purpose of the experiment was to find which flower absorbs the most water. There were five flowers tested; a daisy, fern, rose, mum, and mini carnation. The procedure included gathering 2 stems of each plant, and then putting the plant in half a cup of water for 4 days. Every day, the plant was regarding the amount of water absorbed. The experiment was done again. The results showed that: the rose absorbed 1/3 cup; the mum, 1/4 cup, the mini carnation, 1/6 cup; The fern 1/8 of a cup, and, the daisy, 1/20 cup.

Project Number: MBI018

Grade: 8

Title: Seltzer Water on Plants

Abstract: The project was designed to test whether CO₂ was able to the enhance growth of a plant when given through seltzer water, a CO₂ enriched solution. Different concentrations (100% tap water, 75% tap water/25% seltzer water, 50% tap water/50% seltzer water, 25% tap water/75% seltzer water) were used to feed moong and pea plants. The results were that the 100% tap water yielded the best results because of its nitrates. Further integration could include using distilled water instead of tap water and instead of soil cotton batting could be used. These changes could reduce (other than seltzer water's) enhancements.

Project Number: MBI019

Grade: 7

Title: What Is More Effective on the Bacteria that Grows On Hands: Antibacterial Soap or Hand Sanitizer?

Abstract:

Project Number: MBI020

Grade: 8

Title: The Growth of the Future

Abstract: Do plants grown hydroponically grow better than plants grown in soil? This was my problem. Hydroponics is the method of growing plants with a different growing medium besides soil. The goal during my project was to find a new and improved way to grow plants. After research, I decided on a hypothesis: If I grow *Lactuca sativa* seeds hydroponically then they will grow taller than *Lactuca sativa* seeds grown in soil. After 26 days of growing, my hypothesis was proved wrong and the soil plants grew much better than the hydroponic plants.

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Project Number: MBI021

Grade: 7

Title: Magnetism and Lima Beans

Abstract: Lima Beans are a major agricultural crop. The project was done for finding magnetic influence on the lima bean seed germination and growth. Five different groups of containers were set up on a tray. Each group of containers had more magnets than other groups. Group 1 was the control group with no magnet. Each other group had one more than the other did. They were documented for germination period and growth above the surface of the soil. The control group with no magnet had the most significant growth. Future includes test on other plants species and magnetism.

Project Number: MBI022

Grade: 8

Title: Frog Coloration Station

Abstract: The purpose of my research was to find out if an experimental group of frogs placed in various environments for 30 minutes would change skin color. To test my hypothesis I created four test environments; individual color backgrounds, color backgrounds/light/humidity, male/female and cricket stimulus. Each session was photographed and logged for comparison. The results showed what I hoped to prove, the experimental group responded with color changes to all test environments ranging from 70% to 100%. The male/female trial resulted in 88% color change. The color of the control group remained 100% unchanged for all tests.

Project Number: MBI023

Grade: 8

Title: In Which Soil Do Radishes Grow Best?

Abstract: The purpose of my experiment was to find out which soil radishes grow best in. I put 300 mL of potting soil in nine of the 27 sections for planting, 150 mL sand/ 150 mL soil in nine sections and 100 mL of small rocks and 200 mL of soil in the third section. Plant 3 seeds one centimeter deep in each section. Water every 2 days with 30 mL of water. After 17 days pull the radishes. Measure them in centimeters. The averages in centimeters were: Rocky Soil- 12.4, Sandy Soil- 7.6, and Potting Soil- 11.3. My hypothesis was incorrect because the plants in the rocky soil grew the tallest.

Project Number: MBI024

Grade: 8

Title: Effective Grass Growing

Abstract: This experiment was done to determine what type of fertilization works best for growing grass. The three types of fertilization were regular seed, regular seed with straw, and seed with fertilizer mixed into it. The grass was grown in greenhouse flats with one type of seed per flat. Every day after the seeds germinated, each flat was measured for height. The regular grass seed was at 17cm after 40 days, the regular seed with straw was at 20cm, and the fertilized seed was at 16cm. This experiment shows that fertilized seed isn't worth the extra money for slower growing grass.

Project Number: MBI025

Grade: 7

Title: Garlic vs. Honey: Which Kills More Bacteria?

Abstract:

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Project Number: MBI026

Grade: 8

Title: How Well Do You Smell?

Abstract: Have you ever wondered if you could smell better than someone else? I tested if age and gender affects the sense of smell. I measured the distance of 5 meters away and marked it with masking tape. I stood on one side and the people being tested stood on the other with stopwatches; I sprayed the cologne as they started their stopwatches. When they could smell the cologne, they stopped their stopwatches as directed. I discovered that boys could smell better than girls, and people age 35 and under can smell better than people age 35 and over.

Project Number: MBI027

Grade: 8

Title: Nature's Thermometers

Abstract:

Project Number: MBI028

Grade: 7

Title: A Study of the Allelopathic Effect of Plant Extracts

Abstract: There were three objectives in this study. One was to determine which tree; Walnut, Hickory or Pine, produced the most allelochemical. The second objective was to determine which part of a tree; leaves, seed or bark produced the most allelochemical. And finally, whether flower and vegetable seeds were equally effected by allelochemicals. Two types of vegetable and flower seeds were germinated in solutions containing emulsified leaves, seeds and bark from Walnut, Hickory and Pine trees. Results showed that Walnut seeds produce the most allelochemical. Both vegetable and flower seeds were equally inhibited by the plant extracts. This study shows that agriculture could use Allelopathy to naturally control unwanted plant growth .

Project Number: MBI029

Grade: 8

Title: Pedigree vs. Mutt: Difference in the World of Colors

Abstract: Scientists have been doing research to see if dogs are colorblind. A mutt and a pedigree were tested to see if there is a difference in the way they see colors. The dogs were trained for three weeks to recognize the yellow paper. Testing involved laying down gray and colored sheets of paper, and recording the color the dog responded to after giving the command "color". The procedure was repeated with the colors blue, red and green. From the data collected, the mutt chose the colored sheets more than the pedigree. Future studies may include testing other colors.

Project Number: MBI030

Grade: 7

Title: The Effect of Chocolate on the Inhibition of Bacteria Growth

Abstract:

Project Number: MBI031

Grade: 8

Title: Electrifying Veggies

Abstract:

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Project Number: MBI032

Grade: 7

Title: No Grain, No Gain

Abstract: My question was "Which grain absorbs the most amount of water?" I hypothesized that the lima bean would absorb the most amount of water, and grains such as white rice, would absorb the least. Fill a beaker with 200ml of water, add lima beans to 250ml mark. Wait 30 minutes, then strain into another beaker. Subtract the amount of water strained from 200ml to find the difference in water absorbed. When I measured the water level, I found the lima beans absorbed 10ml of water, navy beans and black-eyed peas, 35ml, and the white rice and caraway seeds, 25ml of water. In conclusion, I found that lima beans absorbed the least amount of water.

Project Number: MBI033

Grade: 7

Title: Do Protein Levels Vary in Eggs?

Abstract: Proteins are very important to have in your diet. The purpose of my project was to investigate if all chicken eggs regardless of their source contain the same quantity of protein in their albumin. Six types of eggs were used Eggland Best, Giant Eagle, and four types of farm fresh eggs, red, light green, olive and white. A Biuret test determined which egg had the most protein in the albumin. Protein levels do vary in different types of eggs. A future experiment would be to test if the age of the egg affects the protein levels.

Project Number: MBI034

Grade: 8

Title: Motor Oil's Effect on Wheat

Abstract: In the 21st century, treating rural roads with oil has become an acceptable practice. It has also been noted that wildlife and ecosystems along roadsides have been destroyed. The purpose of my experiment is to test if motor oil has an effect on wheat. I will plant 27 seeds and separate them into 3 groups. The first group will receive water; the second group and amount of oil and water; the third group twice the amount of oil and water. When the plants begin to lean, chromatography will be performed to determine the effects of oil on wheat.

Project Number: MBI035

Grade: 7

Title: Using Nitrogen Runoff

Abstract: When nitrogen is lost through leaching it causes environmental concern and a money drain. The purpose of my experiment is to find the best way to recycle nitrogen runoff after it has been applied to fields. Sloped fields and flat fields of wheat plants will receive either fertilized water or nitrogen runoff. Plant height will be determined and chromatography will be performed to determine which environment results in the healthiest plants.

Project Number: MBI036

Grade: 8

Title: Which Water is the One?

Abstract: The purpose of my experiment is to identify which type of water (tap, sugar, purified, and carbonated water) will help the amaryllis plant grow the best. First, I plotted all four of the pots. I watered each plant $\frac{1}{2}$ c of the water. I watered each plant when the soil was dry. I collected the data and took pictures every week. The data that I collected explained that tap water is best to use for plants because it has the most nutrients. In conclusion, tap water worked the best on the Amaryllis plant out of the four.

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Project Number: MBI037

Grade: 8

Title: Dancing Plants

Abstract: The purpose is to see what kind of music will have an affect on plant's growth. Nine plants were split into three groups of three. Each group will be exposed to differnt types of music=classical, rock, no music.After a month the results were recorded. The six plants with music next to them music fuller and had many more leaves than the three with no music next to them. In conclusion, Music does affect plants growth, but it does not matter what kind of music is used.

Project Number: MBI038

Grade: 8

Title: To Stretch or Not To Stretch-That is The Question?

Abstract: Recruit twelve female participants. Assign 3 participants to each group: control, 5 minute, 10 minute, and 15 minute. Each participant will stretch for the allotted amount of time, take their pulse and then record it. The control group will just take their pulse and record without stretching. Each participant will then run for 1/2 kilometer while being timed. Compare times and record.

Project Number: MBI039

Grade: 8

Title: How Does Your Garden Grow?

Abstract:

Project Number: MBI040

Grade: 7

Title: Antib. Eff. of Med. Plant Ext.

Abstract: Harmful bacteria can cause diseases like food poisoning and pneumonia. Overuse of antibiotics is causing resistance of bacteria to many antibiotics. Plant-derived materials are used in many cultures for medicinal purposes and for food preservation. In my experiment I will compare the effects of 3 plant extracts, curcumin, neem oil and oregano oil, on the growth of a non-pathogenic strain of Escherichia coli. Procedures will include recording of bacterial growth in liquid and solid medium. A systematic characterization of the antibacterial activities of various plants is of considerable significance in the pharmaceutical industries, and in our every day life.

Project Number: MBI041

Grade: 7

Title: Survivor: Worm Island

Abstract: This project was to determine whether worms thrived best in compost, sandy, rocky, top or fertilized soil. Five two liter bottles were used with tops removed and filled with the above soils. 10 worms were placed in each bottle. 45 ccc. of cornmeal and 120 cc of water were added as needed. Record observations for eight weeks. Fertilized soil was the best soil for the worms.

Project Number: MBI042

Grade: 7

Title: Cool Plants

Abstract: This project tested the plant, Hens and Chicks, to see what was best growiing temperature. There were three groups of plants with three plants per group. The three temperatures tested were 16-17 degrees C, 21-24 degrees C, and 26-29 degrees C. This project

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continued for 29 days and the plants were kept in the same source of light. Surprising results occurred.

Project Number: MBI043

Grade: 7

Title: What's a Viola's Favorite Drink

Abstract: Which liquid best promotes growth of violas: tap water, rain water, sugar water or skim milk? Twenty violas were grown and watered with the above liquids (5 plants per liquid) under optimal light and temperature conditions. These were grown for 2 months and growth was measured as well as appearance observed. Results were graphed.

Project Number: MBI044

Grade: 8

Title: Yeast Growth on Two Carbon Sources

Abstract:

Project Number: MBI045

Grade: 7

Title: Nutritional Nutrients

Abstract: Bean, Radish, and Marigolds seeds were put into cups with extra nutrients to see which would grow faster. This work was done to learn what nutrients work best in plants for a garden. The seeds were put into cups with extra nutrients and the seeds were measured everyday. It was determined that the control grew the most for the Radishes, the Peters grew the most for the Marigolds, and the Ironite grew the most for the Beans. It was concluded that the nutrients on average did not affect the plants.

Project Number: MBI046

Grade: 8

Title: Aquarium nitrogen cycle

Abstract: Toxic Ammonium and Nitrite from fish waste in new aquariums are converted to less toxic nitrate only after the natural growth of nitrifying bacteria through a process known as the nitrogen cycle. This work tested whether addition of a commercial bacterial preparation (Fritzyme) or gravel from an established aquarium (EAG) accelerated the disappearance of these chemicals. I found that the addition of Fritzyme and EAG shortened the time to the elimination of both nitrite and ammonia. EAG was most effective. We conclude that addition of nitrifying bacteria to a new aquarium is effective at decreasing toxic exposure to the fish.

Project Number: MBI047

Grade: 8

Title: How Heredity Affects Family Fingerprints

Abstract: Fingerprinting family members using each finger of the right hand was attempted to determine similarities of family members and effects of heredity on fingerprints. Rolling their finger from a left to right motion onto an inkpad and transferring that action to an area provided the type of print pattern. Of the nine members tested, four family members shared a similar print pattern with my own. Heredity has a strong effect on fingerprint characteristics. Experiments with more family members are considered to provide me more knowledge on heredity and fingerprints.

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Project Number: MBI048

Grade: 8

Title: The Effect of Ephedra on Cellular Respiration

Abstract: The purpose of this study was to determine the effect of ephedra on cellular respiration. Ephedra was added to the culture media of *Saccharomyces cerevisiae*, or brewers yeast. The carbon dioxide produced as a by product of cellular respiration was measure by displacement of water. The volume of carbon dioxide produced by the control and test cultures was measured and recorded. The data demonstrated that as the concentration of ephedra was increased the rate of cellular metabolism decreased. This experiment has shown that ephedra has a inhibitory effect on the metabolism of yeast cells. This study benefits man by determining that ephedra is detrimental to living systems and thus unsafe for human consumption

Project Number: MBI049

Grade: 7

Title: Let It Grow

Abstract: This project was to determine which fertilizer promoted grass growth the best in height, color and density. Grass was planted in nine pots and three each were given Miracle Gro and Scotts fertilizers along with water as needed. Three pots were the control and only water. Surprisingly the control did the best followed by Scotts fertilizer.

Project Number: MBI050

Grade: 8

Title: Effects of Chemical on Fruit Flies

Abstract: Fruit flies are a nuisance when they reside in our homes. This experiment intended to show that common household products that we may not think of as chemicals will eliminate this "pest" problem. I tested three commercial pesticides and three environmentally friendly chemicals and recorded how many flies out of a group of five were living at certain intervals of time. I learned that the environmentally friendly chemicals eliminated the flies completely. The commercial pesticides also eliminated them, but were also very toxic to humans and the environment. I learned that you don't always need the most toxic chemicals to eliminate pests.

Project Number: MBI052

Grade: 8

Title: The Effect of Antacids on Acid Reflux

Abstract: In my project I hoped to prove which over-the-counter antacid works the best on acid reflux. For each trial I used 10 mL of hydrochloric acid, then added the antacid and waited 30 minutes. I took the pH level of the new substance. First was Pepcid, then Gaviscon, Tagamet, and then Axid in fourth followed by Zantac. If I were to continue my project I would test more antacids. I would also test the antacids longer and do more trials. Another thing I would do is do more research, because I would have more time to elaborate more carefully.

Project Number: MBI053

Grade: 7

Title: Survival of Fresh Cut Carnations

Abstract: The purpose of my experiment was to see which liquid would keep fresh cut carnations alive the longest. I hypothesized that the Gatorade would work best because of the carbohydrates, which are one of the three organic compounds in cells. For this experiment, I put carnations into vases with different liquids. They include water, aspirin water, Gatorade water, pop water, bleach water, and soap water. I chose to do this experiment because my mom works at a flower shop and we frequently get flowers and need to keep them fresh. I determined that the pop-water solution kept the flowers alive the longest.

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Project Number: MBI054

Grade: 7

Title: Musical Plants

Abstract: This project was to determine if there was an effect of music on pansies. Six plants were placed in each of these categories: no music, rock, country, and classical. Music was played to them for four hours each day. They were left in the sunlight during daytime. Their height and width were measured at the beginning and after six weeks of growth.

Project Number: MBI055

Grade: 7

Title: Do Enzyme Detergents Work

Abstract: The purpose of my experiment was to investigate the effectiveness of laundry detergents containing enzymes compared to laundry detergents not containing enzymes in the process of breaking down protein stains. I made the protein substrate by using laboratory grade gelatin and boiling water. I prepared a solution of four different detergents. I tested their pH. I added gelatin to the surface of the test tubes. I concluded that detergents containing enzymes were more efficient.

Project Number: MBI056

Grade: 8

Title: Influence of Glucose & Insulin

Abstract: A pregnant diabetic mother can produce a child with any number of birth defects. Studies have shown that the risks are three to four times that of non-diabetics. This experiment was conducted to show the influence of glucose and insulin on chick embryos. Eighty eggs were separated into six groups. Three groups of eggs were injected with insulin, glucose, and a mixture of insulin and glucose. The three control groups were the non-manipulated, the punctured and the eggs injected with Ringer's Solution. This experiment has shown that insulin and glucose did have an effect on the developing embryo.

Project Number: MBI057

Grade: 8

Title: The Effect of Different Types of Water on the Growth of Mung Beans

Abstract:

Project Number: MBI058

Grade: 7

Title: The Effect of Different Color Light on the Growth of Mung Beans

Abstract:

Project Number: MBI059

Grade: 8

Title: Brine Shrimp Alive

Project Number: MBI060

Grade: 8

Title: The Effect of Mirrors on Plant Growth

Abstract:

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Project Number: MCH001

Grade: 7

Title: Osmosis in a Potato

Abstract: Osmosis is a function of a cell that happens every second of every day in our bodies and plants. This work intended to learn how salt changes the weight of a potato peice. Potatoes were left to set in salt water and were weighed each day; potatoes in water with salt lost weight. Future work can be planned to study if osmosis is the reason that certain animals can only live in salt water or fresh water.

Project Number: MCH002

Grade: 8

Title: Corrosion on Nails

Abstract: This project was done in order to find which nail in which liquid would corrode the fastest and lose the most weight. Four nails were placed in bottles of different liquids of either salt water or tap water. The nails were either coated or uncoated with Vaseline. Nail one was coated and nail two was uncoated, but both were only slightly rusted. Nail three was in salt water and coated, it was rusted and brown. Nail four was uncoated and put in salt water. Nail four was the most rusted. It also lost the most weight.

Project Number: MCH003

Grade: 8

Title: The Effect of Fire on Building Material

Abstract: The purpose of my experiment is to find out how long each building material will last in a fire. I tested five most commonly used housing materials. The materials are Osb, Pine, Framing lumber, Pressure treated wood, and Greenboard. My results indicate Pressure treated wood lasted the longest time. Second was Greenboard. Third was Pine. Fourth was OSB and finally Framing Lumber was the worst material. Next time I would like to add more building materials and use larger test pieces.

Project Number: MCH004

Grade: 8

Title: Electrolytes in Sports Drinks

Abstract: In this project on electrolytes in sports drinks, I researched how salt solutions conduct electric current and how to determine which solutions are strong electrolytes and which are weak electrolytes. I learned that electrolytes are important to athletes and that sodium and potassium are the common electrolyte ingredients in sports drinks. I tested six different sports drinks and measured their ability to conduct electric current to see which drinks have better electrolytes and should help to provide the best re-hydration for athletes. My data shows that some drinks have more electrolytes than others and are better conductors of electric current.

Project Number: MCH005

Grade: 8

Title: Which Fiz is the Wiz?

Abstract: Antacids are used to help neutralize stomach acid. My project was to find out which antacid works best. A solution was prepared to simulate the pH level of the human stomach and four different antacids: Tums, Roloids, Equate, and Pepcid AC were tested. It was determined that Tums worked the best in neutralizing the acid solution. Testing other brands of antacids could extend this study.

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Project Number: MCH006

Grade: 8

Title: Effect of Salt on Corrosion

Abstract: Heavy use of road salts in winter months in Pennsylvania can cause sheet metal used in cars to corrode. This project intended to learn if there was a correlation in the concentration of salt and time required to break or snap sheet metal. Ten squares of sheet metal were exposed to various concentrations of salt water three times a day for a period of 5 weeks. Corrosion rate was measured by determining how long it took for the sheet metal to snap in half. It was determined that salt concentration does affect the rate of corrosion. Future work is planned to see if wax can prevent corrosion.

Project Number: MCH007

Grade: 8

Title: Paints of the Past/Present: Creating a Lasting Work of Art

Abstract: To determine which paint is best for creating a lasting work of art, painted samples of oil, acrylic, tempera, and egg tempera were subjected to different lights and temperatures to test their colorfastness and adhesion, respectively. Light did not affect the paint as much as expected although there were detectable changes when the colors were scanned and luminance measured. Temperature affected the paints differently than predicted. Oil paint, in general, appeared to be the most durable of the paints tested. Exposing samples longer to the various temperatures and lights for more noticeable results is a possible follow-up.

Project Number: MCH008

Grade: 7

Title: Does Your Soap Rinse Off With the Type of Water You Use?

Abstract: My Hypothesis was: I think if I use the cheapest brand of soap with the cleanest water then it will rinse off best. The purpose of my project was to find a soap that rinsed off the fastest to decrease washing time. My generalized data is that at the end of my experiment was that the most expensive soap rinsed off with every type of water. In this experiment I learned that some soaps can be antibacterial soaps and that I think the more expensive the better quality soap you use the better and faster it rinsed off. But that was only a few things I learned in this project.

Project Number: MCH009

Grade: 8

Title: The Effect of Temperature on Oil Viscosity

Abstract: Have you ever wondered why your car takes longer to warm up in the winter and faster in the summer? Five different brands Pennzoil Motor Oils were tested in three different temperatures. Each oil was put in the freezer until the oil reached 3 degrees Celsius. The time was calculated when the marble reached the bottom of the container. The process was repeated with room temperature and then 60 degrees Celsius. The results from best to worst are 5W-20, 5W-30, 10W-30, 10W-40, and 20W-50.

Project Number: MCH010

Grade: 8

Title: Packing Power of Plastics

Abstract: My hypothesis is: I think if I wrapped packing materials around containers holding hot/cold water, then measured their temperature, I will find the beaded Styrofoam kept the water hottest/coldest. I chose to test the insulating abilities of plastics because it was Christmas-time and many packaging materials were lying about. So, I found another use for them. While researching and experimenting, I learned about the names and characteristics of plastics, and whether they had insulating abilities. After finishing the project, the beaded Styrofoam had

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Project Number: MCH016

Grade: 8

Title: Rainbow Separation

Abstract: This experiment deals with seeing how water based and permanent markers separate into primary colors using chromatography. Both Crayola markers and Sharpie markers were used. The hypothesis of this experiment states that the Crayola markers will separate in both alcohol and water, while the Sharpie markers will only separate in alcohol. The conclusion of this experiment is in agreement with the hypothesis that the Crayola markers separated in both water and alcohol solutions, while the permanent markers only separated in alcohol.

Project Number: MCH017

Grade: 8

Title: Batteries -- Behind the Scenes

Abstract: Batteries are utilized daily but most people do not know how they operate. In this experiment different combinations of metals and acids were tested to see which produced the best battery. The voltage, current, and resistance were recorded. It was discovered that the voltage did not depend on the acid but only depended on the oxidation potential of the metals used. The acids used only affected the internal resistance of the battery and its lifetime. In future experiments, the lifetime of the battery would be measured by recording the time it takes the current to drop to half its magnitude.

Project Number: MCH018

Grade: 8

Title: Color Confusion

Abstract: Does the color of food influence the way it tastes? The purpose of the study is to determine if color affects taste. To conduct this experiment, I asked 10 volunteers to participate as taste testers. I filled 12 cups with 240ml of water and added 1 tablespoon of sugar to each. Eight of the cups had 1 teaspoon of flavored extract and a drop of food coloring. Volunteers were asked to predict what they thought it would taste like, and after tasting record their response. From the data collected, color did have an affect on taste. For further study, I could ask more volunteers to participate and test other colors and flavors.

Project Number: MCH019

Grade: 8

Title: Chemical Photoelectric Energy

Abstract: Have you wondered if energy is created from light? If so, can that energy be measured and possibly be put to use? Light bulbs of various wattages were tested using chemicals, metals, and a multimeter. The light from each bulb was focused to a copper plate and allowed to sit for a few minutes so that the chemicals and metals could react. The multimeter recorded the energy output in millivolts. As hypothesized, the higher the wattage of light bulb, the more energy the multimeter recorded. Also dim light emits almost no energy.

Project Number: MCH020

Grade: 8

Title: Fingerprint Fanatics: Which Surface is Best?

Abstract: Did you ever wonder exactly where a fingerprint could be lifted? My experiment is to find out which surface retains the best fingerprints. I tested ten surfaces, with ten fingerprints on each. To conduct my experiment I pressed each finger on each surface for 30 seconds, dusted over the prints, and recorded how much of the print showed up by comparing the print to a perfect print done in ink. I determined out that glass retains the best prints, with ten quality prints. I also

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determined that styrofoam, cloth, and cardboard were the worst materials, showing no prints at all.

Project Number: MCH021

Grade: 8

Title: To What Degree?

Abstract: In my experiment, I wanted to discover which type of thermometer would be the most accurate - an alcohol, bi-metal, or digital thermometer. I hypothesized the the alcohol thermometer would be the most accurate because of it's wide consumer use and ease of use. I recorded the display temperature of each thermometer, the time the thermometer took to reach a stable temperature, the average display temperature and average time taken for each thermometer to reach a stable temperature.

Project Number: MCH022

Grade: 7

Title: What Are the Effects of Different Liquids on Pennies?

Abstract:

Project Number: MCH023

Grade: 7

Title: The Effect of Different pH Liquids on the Rusting of Iron Nails

Abstract: In this experiment iron nails were placd in an acidic, basic, and neutral liquids to see if the different pH liquids would affect the way that the nails rusted.

Project Number: MCH024

Grade: 7

Title: Cleaning Coins at an Unlike pH

Abstract: In my science project, I cleaned pennies with lemon juice, distilled water, and ammonia to discover whether a high pH cleaned the coins best, or whether a low pH would remove the most dirt and tarnish off of the pennies. The lemon juice worked the best, with the ammonia not far behind. To continue this project, I could test the cleaning effects of other acids on pennies, or I could also test some of the same variables on different metals.

Project Number: MCH025

Grade: 7

Title: To Salt Or Not to Salt?

Abstract: People always wonder why we put salt on our sidewalks, so I decided to do a project to show why. The first experiment showed how a regular glass of tap water freezes compared to a glass of salt water. The second experiment shows the opposite, it shows how a regular ice cube melts compared to a salty ice cube. These two trials determined that the salt keeps water from freezing and in that case melts an ice cube faster. The time difference between each was recorded. Future experiments will be done to see if different salts proceed in the same results.

Project Number: MCH026

Grade: 8

Title: Slip or Stick? The Properties of Oil

Abstract: This project is designed to find out what motor oil grade lubricates a surface the best. It is hypothesized that 10W-30 motor oil grade would lubricate the surface the best. Five motor oils were tested for lubrication and viscosity. A pinball plunger was used on a Hot wheel tract to run the tests using 5 milliliters each time on the track

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Project Number: MCH033

Grade: 8

Title: Concentrated Crystallization

Abstract: Many factors influence the growth of crystals, such as temperature of solvent, shape of container, type of seed. This experiment intended to learn if concentration of the solute affects the amount of crystallization. Five concentrations of salt water were prepared, allowed to evaporate, and the growth of the crystals was recorded over a four-week period. It was determined that the concentration of the solute affected the total amount of crystals produced as well as the size of the crystals. Future work is planned to determine if controlling the rate of evaporation will affect the growth of the crystals.

Project Number: MCH034

Grade: 8

Title: The Effect of Solubility on Vitamins

Abstract: The main reason I did this was to see if vitamins really did dissolve in water or not. I thought this was a good project to do, because it's very helpful to someone who has to take vitamins for whatever reason. When taking a vitamin most of the times you take it with water, but what if that particular vitamin doesn't dissolve? If a vitamin doesn't dissolve then the benefits don't reach the person. It's eliminated through feces. By doing my project I hope to prove what vitamins dissolve, and how long it takes for them to dissolve.

Project Number: MCH035

Grade: 8

Title: Ice Breakers

Abstract: The purpose of this experiment was to determine the best alternative to road salt for melting ice on sidewalks and roads. To conduct this experiment, I placed 12 oz. of road salt, calcium chloride, fertilizer, sand, and kitty litter on water that had been frozen for the same amount of time. I concluded that road salt was the best substance to melt ice but fertilizer was the best alternative to road salt. Cat litter took the most time to melt the ice. If I were to do the experiment again, I would test different materials for melting the ice.

Project Number: MCH036

Grade: 7

Title: Patina: Changing the Color of Metal

Abstract:

Project Number: MCH037

Grade: 8

Title: There's Crayon on the Wall

Abstract: Many childcare givers experience children drawing pictures on walls with crayon. This experiment examined which cleaner will best remove crayon from painted drywall. The investigator predicted that Goof Off, WD-40, Formula 409, and Clorox Oxi Magic cleaners would perform equally because each is able to dissolve the nonpolar crayon wax. The water will not remove the crayon because it is polar. Black crayon was applied to 45 blocks of drywall and removed with the 5 groups. The results were analyzed using polar chemistry. Future trials would involve a different surface other than drywall.

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Project Number: MCH043

Grade: 8

Title: How Many Drops?

Abstract: I tested how many drops of lemon juice it takes to keep an apple from turning brown. I did this because I eat apples often and I have always wanted to know why they turn brown when you cut them. I did the experiment by continuously adding drops to the apples and recording the results. My results between each trail were similar but also different. In conclusion, I would probably research more on the topic the next time I plan to do more on this experiment.

Project Number: MCH044

Grade: 7

Title: Vitamin C is the Key

Abstract: What type of fruit would have the most Vitamin C content, grapefruit, lemon, lime, or an orange? The orange ended up having the most Vitamin C content, As opposed to the other fruit, the grapefruit, lemon, and the lime. Test four fruits for the content of Vitamin C. Make a starch and water mixture. Add iodine to make the indicating solution and. Add the Vitamin C to the indicating solution and the lighter the color turns, the more Vitamin C content is found. Funk & Wagnalls New Encyclopedia, Microsoft Encarta 98 Encyclopedia.

Project Number: MCH045

Grade: 7

Title: Iron Optimization

Abstract: Anemia is a large problem throughout the world. The main cause of anemia is an iron deficiency, and digesting more iron decreases anemia symptoms. Vitamin C helps the body absorb iron, hence the ascorbic acid amount was also tested. By making strong tea solution and putting it into juice samples, the iron can be separated from the juice. By adding iodine to the juice until it turned blue, the vitamin c amount could be tested. Pineapple juice had the most iron. Fresh orange juice had the most vitamin C. Anemics should drink pineapple juice.

Project Number: MCH046

Grade: 7

Title: What Liquid Replaces the Most Electrolytes?

Abstract:

Project Number: MCH047

Grade: 7

Title: Viscosity vs. Density

Abstract:

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Project Number: MCM001

Grade: 8

Title: Clean or Cleaner

Abstract: The purpose of this experiment was to test different detergents on stains and to see which worked the most effectively. I thought that the most expensive brand of detergent would remove stains the best. Tide, Wisk, Gain and Cheer were used to remove mustard, grape juice, and chili. Wisk removed two out of the three stains the best. Further studies could include the testing of different brands of detergents and different stains.

Project Number: MCM002

Grade: 8

Title: Cryptography Study

Abstract:

Project Number: MCM003

Grade: 8

Title: Butter It Up!

Abstract: The purpose of my experiment was to find out what kind of butter makes better cookies. I baked up 9 batches of cookies, using 9 different types of butter. I then got 8 test subjects to taste my cookies to see which they liked best. They enjoyed the cookie made with cream butter and they strongly disliked the ones made with the fat-free spray type butter. For further experimentation, I would increase the number of taste testers to increase the amount of data gathered.

Project Number: MCM004

Grade: 7

Title: The Relationship of Sugar to Jelly Firmness

Abstract: Jelly is a common gelatinous food prepared for sandwiches, crackers, etc. This experiment was completed to see which jelly had a firmer texture. Two pans of jelly were prepared using different quantities of sugar. One contained 225 ml of sugar and the other 450 ml of sugar. As a result the pan with the larger amount of sugar had a firmer consistency.

Project Number: MCM005

Grade: 8

Title: The Dickey Facts

Abstract: Statistics and Probability surround us everywhere in everyday life. To determine whether or not events actually occur at their predicted frequency, an experimentation was done by rolling dice, and comparing the actual frequencies to the predicted frequencies. It was concluded that an event can occur at their predicted frequency, but will usually only occur with a large sample size. The results of the experimentation can be useful in all fields of life (surveys, insurance, weather predictions etc.).

Project Number: MCM006

Grade: 8

Title: Evaluating Computer Algorithms

Abstract: The purpose of my experiment was to decide which algorithm is the most efficient. I judged algorithms based on speed, efficiency, accuracy, order of magnitude, resource utilization, and code preciseness. These are internationally acknowledged aspects of an algorithm, so can easily be interpreted by others. In my hypothesis, I stated that object-oriented programming was more elegant than simple programming, which proved false. I also hypothesized that binary

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searching and quick sort would be the most efficient, which was true. In conclusion, object-oriented programming is less efficient than simple programming, and binary search and quick sort are the most efficient.

Project Number: MCM007

Grade: 8

Title: Geometric Constructions

Abstract: Traditionally, geometry only covers constructions that can be built with a straight edge and compass. I wanted to identify the relationship between a set of constructions and a set of tools. I also wanted to see if you were able to convert complex geometric constructions into simple algebraic expressions/trigonometry. I started by converting simple geometric problems into algebra/trig. Unfortunately, this became too complicated. Thus, when I tried to convert difficult problems into algebra/trig it was very complex. I was, however, able to identify that there is a quantitative relationship between a set of constructions and tools.

Project Number: MCM008

Grade: 7

Title: Genetic Algorithm in Acoustics

Abstract: Last year, I investigated the properties of the acoustic insulation of classroom, using lattices. Simulations are an effective way to explore different lattice configurations. Coupling simulations with artificial learning methods can simplify the search for an optimal lattice configuration. I used genetic algorithms, an optimization method based on natural evolution, and an acoustic simulation java applet, to find the best lattice soundproofing for a virtual classroom. The solution steadily improves as the genetic algorithm progresses. The project demonstrates that genetic algorithms are effective acoustic design tools. Further work includes using a 3D simulation and exploring different types of lattice structures.

Project Number: MCM009

Grade: 8

Title: Seed Corn Comparisons

Abstract: Every summer, we wait for the farmers to produce delicious ears of corn. The purpose of my study is to determine which hybrid seed corn produces the healthiest plant. To perform this study, I planted Doblies, Agway 110, Agway Round Up Ready, NK and Seedway varieties of seeds. The seeds were allowed to grow for a 30-day period in a controlled environment and observations included data on height, structure and pigmentation were recorded. Doblies seed variety produced plants with dark green pigmentation, large leaves, and thick stems. To further the study, I would like to test the same seed varieties in a test plot on my farm during the summer months.

Project Number: MCM010

Grade: 7

Title: Best Javascript Password Protector

Abstract: What is the Best Java Script Password Protection. I plan on developing a program using Java Script for password protection. Today, the only things some programs can do for a user is to slow a hacker down. The reason I am doing this project is because I like programming and particularly data security. Since the internet is so large, people feel secure in web sites that require a "membership" not just being open to anyone to enter the site. My goal is to find the best Java Script password protection and eliminate the password protection software's that do not work.

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Project Number: MCS001

Grade: 8

Title: An Insulation Investigation

Abstract: My hypothesis was that the use of cellulose in a 3" wall spacing will provide the best hot/cold insulation. The project's purpose was to discover the best hot/cold insulation. The water temperature with foam pellets dropped to 23 degrees Celsius. The water temperature with cellulose dropped to 18.7 degrees Celsius. The spray-in insulation dropped the temperature down to 17.6 degrees Celsius. The water temperature with styrofoam boards went down to 15.4 degrees Celsius. The water temperature with fiberglass fell to 15.2 degrees Celsius. The air dropped the water temperature to 10.6 degrees Celsius. I have learned that air is not a sufficient insulator, foam pellets are the best type of insulation, and cellulose did not perform as hypothesized.

Project Number: MCS002

Grade: 8

Title: The Effect of Yeast Brands on Bread

Abstract: Many types of bread are eaten around the world. I designed my project to help people find which yeast brands would cause white bread to rise the most and taste the best while baking white bread. In my hypothesis, I thought that the results would be SAF first, Fleischman's second, Red Star third, and finally the bread without yeast. Using three brands of yeast and one without yeast, I baked bread, measured its height, recorded it, and then determined which rose the highest. The actual results were Fleischman's first, SAF second, Red Star third, and finally the one without yeast. Therefore, only part of my hypothesis was true.

Project Number: MCS003

Grade: 8

Title: Just for the Taste of It?

Abstract: Food labels seem to affect the choices made by consumers when products are purchased. This work intended to learn if seventh and eighth grade students could detect a difference between lite and regular ice cream. Three brands of lite and regular ice cream were tested. Each subject would taste the ice creams when labels were switched, visible, and not visible; with a drink of water between each taste. It was determined that Edy's lite brand was preferred because it contains almost as much cholesterol as its regular brand.

Project Number: MCS004

Grade: 8

Title: Vitamin C In Orange Juice

Abstract: My hypothesis is I think Tropicana Orange Juice has the highest level of Vitamin C. I did this experiment because I wanted to find if brand named orange juices like Tropicana had as much Vitamin C as advertised. My hypothesis was wrong showing that Awake 100% Vitamin D Orange Juice had the highest amount of Vitamin C, and that Donald Duck Orange Juice had the lowest Vitamin C level. I learned from this experiment what brand of orange juice has the highest level of Vitamin C, and the amazing affect when the cornstarch solution mixes with orange juice.

Project Number: MCS005

Grade: 8

Title: The Fat Content in Potato Chips

Abstract: I chose this project because I wanted to know which potato chip brand is least in fat. This information would benefit people who want to watch their weight. Hexane was used to extract the oils. I mixed it with the chips, and then drained the liquid out. I found that rippled chips

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are least in fat. The order from second to fifth place is: Pringles, Snyder's, Lays, G.E. original. If I would test again, I would use a variety of snacks.

Project Number: MCS006

Grade: 7

Title: Litter Literate

Abstract: Cat litter can be made of any absorbent material. Litter made from newspaper, pine woodchips, corn, silica, clay and clumpable clay were tested for ability to absorb water. The hypothesis was that the newspaper/base litter would be most absorbent. Each litter was tested three times. Water was added to 100 grams of litter until the litter became saturated. Pine woodchip litter was the most absorbent (2.45 ml/gram litter) and was 20% better than recycled newspaper litter. Clay litter was the least absorbent. Litter made in a pellet form (pine, newspaper) was most absorbent.

Project Number: MCS007

Grade: 8

Title: Ice Busters

Abstract: Many substances are used to melt ice. The purpose in this study was to determine which substance is most effective for melting ice and preventing ice formation at -25°C and -15°C . The substances tested were: Petsafe commercial ice melter (urea), calcium chloride, table salt, rock salt, cat litter crystals (silica gel), rubbing alcohol (ethanol), and windshield cleaner (methanol). My hypothesis was that the calcium chloride would be most effective at melting and preventing ice formation. These substances were applied to frozen pans of water in a freezer. The degree of melting was measured in 10-minute intervals over a two-hour period. My results showed that the calcium chloride was most effective in the given tests proving my original hypothesis.

Project Number: MCS008

Grade: 8

Title: The Big Kiss Off

Abstract: Which lipstick truly stays put all day long? This project was designed to determine which brand of lipstick would remain the longest. Six different brands of lipstick were used to mark synthetic leather fabric (to simulate skin) and then agitated in the washing machine until the mark wore off. It was determined that there is a difference in the amount of time that a lipstick will stay put, and that the longer lasting ones are not the most expensive. Future work is planned to see if the color will affect the amount of time that a lipstick lasts.

Project Number: MCS009

Grade: 7

Title: Keeping Dry

Abstract: I am a civil war re-enactor and a Boy Scout. I do a lot of camping with both of these groups, and therefore spend many nights in the rain. I want to know, what is the best way to water canvas? I think if I waterproof with linseed oil, less water will get through. I conducted my experiment using linseed oil, beeswax, Thompson's water sealer, Camp Dry, and a control. The best performing water-proofer was beeswax. Linseed oil did the worst. I have discovered that out of these four water-proofers, beeswax is the best.

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Project Number: MCS010

Grade: 8

Title: Testing Battery Efficiency

Abstract: My project's title is "Testing Battery Efficiency." It involves testing batteries to find which brand can provide the greatest voltage and current outputs. I built a custom circuit to test the batteries. I then calculated their power outputs based on these values, which provided me with my answers. To find these answers, I graphed the values and observed the charts. I found that the Duracell brand of AA battery is most efficient.

Project Number: MCS011

Grade: 8

Title: Ice and Salt

Abstract: The purpose of my experiment is that I wanted to find the average time it takes for salt to melt ice in the different temperatures. My procedure was I got four cups all the same size, put water in, and let them freeze. I took them out and put 1tsp. of salt layered on top. I recorded the results for each one every 25 minutes. The graphs show my data and conclusions. The cups in the freezer were the most effective. The cups in my dad's office were the ones that melted the fastest due to the temperature.

Project Number: MCS012

Grade: 8

Title: The Power Stain

Abstract: My purpose was what beverage stains your teeth the most? My hypothesis was that coffee would stain the eggshells the most. I had two procedures; the first procedure I conducted was to leave one eggshell in each of my drinks for one hour. My second procedure I did was to leave one eggshell in each drink for fifteen minutes everyday for seven days.

Project Number: MCS013

Grade: 8

Title: Bouncing Basketballs

Abstract: This project attempted to prove which basketball would bounce the highest when air pressure was decreased. Air pressure was recorded on three types of basketballs and then dropped from a height of 1.5 meters. This was repeated 9 times changing the air pressure after each trial. The composite leather ball had the highest bounce followed by the synthetic, then the rubber basketball.

Project Number: MCS014

Grade: 8

Title: What Popcorn Is the Best Buy?

Abstract:

Project Number: MCS015

Grade: 8

Title: Toothpaste's Ability to Remove Stains

Abstract: The purpose of this experiment was to determine which whitening toothpaste could remove stains from teeth the most. My hypothesis was that Crest toothpaste would remove stains from teeth the most, because fluoride is the active ingredient that whitens your teeth in toothpaste, and Crest contains the most then, Aquafresh, then, Colgate, then Pepsodent. In conclusion Crest had whitened the teeth the most with an average whitening color of 5 then,

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Colgate with an average whitening color of 4.71 then, Pepsodent with an average whitening color of 4 then, Aquafresh with an average whitening color of 3.85.

Project Number: MCS016

Grade: 7

Title: High Charge for Low Charge

Abstract: A battery is a series of connected electrochemical cells. This work intended to learn which brand of dry cell battery produces the most energy for a reasonable price. Five different brands of batteries were used in five mini Value Bright Rayovac flashlights. Bulbs were of the same wattage. Voltage was recorded every hour with a voltmeter.

Project Number: MCS017

Grade: 7

Title: Insulation Nation

Abstract: My problem was "which type of insulation keeps a house cooler?" I chose the following insulations: isco, cellulose, and pip. I used one control (no insulation). I hypothesized isco would keep the house cooler because it fills the whole space - less space between the fibers. My hypothesis was correct.

To start my experiment I first built a house and made it so it is double walled so I could place insulation in between the walls; I also drilled holes for the thermometer. I cut dowel rods to plug the holes that were not in the test. I then conducted four tests, first recording the temperature before the trial, then I pointed a halogen work light at the wall of the model house being tested for ten minutes and recorded for that trial. I repeated for the remaining wall leaving time in between to get the house to the original temperature. My results showed that the isco insulation kept the house coolest, with the difference in temperature of 2 degrees. The pip and cellulose insulation were both equal, with a difference of 4 degrees. The control had a difference of 8 degrees. In conclusion the isco insulation kept the house the coolest.

Project Number: MCS018

Grade: 8

Title: Which Wood Works?

Abstract: The purpose of my project was to see if different manufactured logs worked better than the ash wood. I got three different manufactured logs; one 'duraflame', one 'superlog', and another 'great value'. My conclusion was the 'great value log proved to get hotter quicker and stay hotter longer. It also evaporated the most water and it was the cheapest manufactured log I burned at \$1.50. The manufactured logs proved to work better than the ash wood for a log fire.

Project Number: MCS019

Grade: 8

Title: "Swim" Fast

Abstract: Swimmers are often depending on their swimsuit to help out with their time. This project showed which commonly used swimsuit material produced the least amount of resistance in water. Eight different swimsuit materials were tested by calculating the average time it took to fall 1 meter. It was determined that nylon/lycra spandex took the least amount of time to fall. Testing other materials for the least resistance in water could extend this study.

Project Number: MCS020

Grade: 8

Title: The Effect of Various Ph Levels and Plants' Growth

Abstract:

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Project Number: MCS021

Grade: 7

Title: Milk's Effect on Ice Cream

Abstract: The goal of this experiment was to determine the effects of varying types of milk in making ice cream. The ice cream was made with four different types of milk while the rest of the ingredients were kept constant. Taste testers rated the different ice cream batches based on taste and texture. The 2% batch was preferred and it also produced the most at the least cost.

Project Number: MCS022

Grade: 8

Title: Stain, Stain, Go Away

Abstract:

Project Number: MCS023

Grade: 8

Title: Stains vs. Cleaners

Abstract: There is carpeting and carpeting cleaners, Goo Gone, Capture, and Oxy Clean. There are stains, Jelly, Ketchup, Mustard, Butter, and Coffee. The stains were smashed into the carpeting and allowed to soak into it for two hours. After they were over cleaner was sprayed and allowed to soak in. The cleaner was rubbed into the stains. These are the results: Capture cleaned the Ketchup best. Jelly was hard, Goo gone did it best. Mustard was hard but Goo Gone did it. Butter was hard too but Oxy Clean did it. Coffee was the easiest but Oxy Clean did it best.

Project Number: MCS024

Grade: 8

Title: Duracell Beats the Bunny

Abstract: Different types of batteries have cost different amounts and last different amounts of time. My project was to determine which common household battery was the most cost-effective, unit cost divided by time. I tested four different types and brands of batteries in the same fan in the same room. I then used my cost-effective equation and found how cost-effective they are.

Project Number: MCS025

Grade: 8

Title: Watching Paint Wear

Abstract:

Project Number: MCS026

Grade: 8

Title: Acid Indigestion

Abstract: In life's daily routines and situations that pop up unexpectedly, sometimes there are funny feelings in some stomachs due to stress or nervousness. This is called acid indigestion or acid reflex. The purpose of the project was to determine which antacid works the fastest and the longest. The project was done, by placing four different antacids chosen randomly from the store, and testing them in separate containers. Along with simulated stomach acid, created by concentrated lemon juice. In conclusion, the findings were that overall the Roloids worked faster and longer than the other competitors.

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Project Number: MCS037

Grade: 7

Title: Which Store Will I Save the Most Money At?

Abstract: The purpose of my Science Fair Project is to try to save people more money on the thing they buy or in other words "Get more for the money." The procedures I used are as followed: Make a list of the food needed for the meal. Compare the prices of the needed food. Make sure all food is the same brand and same size. Calculate each store total. Compare list to see if the hypothesis is correct. I collected data at three different sources. The conclusion I came to was you do save more money at a big supercenter than at a small locally owned store.

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results I found were that the rainbow light shone the brightest and that the lowest reading was the smiley face light bulb. In conclusion to these results, I proved my hypothesis wrong.

Project Number: MES007

Grade: 8

Title: Batteries, how fruity?

Abstract: Batteries are a household object used in every day life. What other objects could be used to make a battery? For this experiment six fruits were linked together then to a light bulb to see if they could make a battery or enough power to make a light bulb light. The fruits that were used in this experiment were grapefruits, oranges, kiwis and lemons. All four types of fruits produced enough potential difference to trigger the voltmeter, but did not light the light bulb.

Project Number: MES008

Grade: 8

Title: The Effect of Water Source on Contaminants

Abstract: Millions of people become ill from contaminated water every year. My project is intended to show how safe different types of water are. I hypothesized that creek water would be the most contaminated, since there are many ways contaminants can get into it. I tested all of my samples for contaminants with water testing kits, and recorded the level of contaminants found in each sample. I found that well water contained slightly more contaminants than creek water, and that the rest of the samples hardly contained any contaminants at all. However, both samples met the EPA set standards for contaminants.

Project Number: MES009

Grade: 8

Title: Solar Powered Heating

Abstract: Many swimming pool owners use blue solar covers and thought was that it is the best color for a solar cover. By using a heat lamp on the blue and clear solar cover that was on the top of a bowl of water, it showed they both absorbed heat into the water. The clear solar cover however heater the water faster than the blue cover. Therefore the clear solar cover is a better for heating water at a faster rate. The blue solar cover is probably used more for the safety reasons because it is more visible than the clear cover.

Project Number: MES010

Grade: 8

Title: Green Roof Ecology

Abstract: This purpose of this project was to compare the volume and water quality (pH, alkalinity) of rainwater runoff from asphalt roofs versus green roofs. Rainwater runoff was collected from an asphalt roof and 3 grass-covered green roofs of equal size over a 3-month period. The data collected in this project was used to show that green roofs reduce rainwater runoff by over 50% and that both the surface runoff and water that filtered through the soil of the green roofs to have a better water quality (higher alkalinity, optimal pH) than rain water from an asphalt roof.

Project Number: MES011

Grade: 7

Title: Does Temperature Affect Brine Shrimp

Abstract: Brine Shrimp are vital animals in the food chain. The work intended to learn is if Brine Shrimp are affected by water temperature. Brine Shrimp were placed in a tube with hot and cold packs surrounding the tube and they swam to the section they like the best. The Brine Shrimp

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seemed to like the cold section better, only slightly. If this experiment were to be done again more trials would be done to make sure the data collected was valid.

Project Number: MES013

Grade: 8

Title: Friendly Fertilizers

Abstract: Fertilizers can increase the amounts of nitrates and phosphates in the water, which can lead to the process of eutrophication. The purpose of this experiment was to determine how a fertilizer affects the dissolved oxygen in water that aquatic plants and animals depend on. Four sets of jars were filled with water and a frill plant to replicate an ecosystem. Then, varying amounts of fertilizer were added to each group. The dissolved oxygen was measured weekly for five weeks. It was determined that greater amounts of fertilizer resulted in higher levels of dissolved in the water. Future work is planned – to determine effect of natural fertilizers.

Project Number: MES014

Grade: 8

Title: Effects of Pesticides on Mealworms

Abstract: Pesticides destroy insects that kill crops. Are large amounts of pesticides really safe? Four different pesticides were tested at dilutions of 25, 10, 1, 0.1, and 0.01 percent and the number of dead mealworms was recorded. There was no pattern to how successful the types or dilutions were but the control, water, caused no deaths, while all the pesticides caused some deaths. Pesticides can be dangerous to all life forms including humans. Humans come in contact with pesticides all the time. In the future, variables such as clay in the soil would be removed from the experiment.

Project Number: MES015

Grade: 8

Title: Effect of Acid Rain on Iron

Abstract: Bridges in Pennsylvania are falling apart. Acid rain contributes to the corrosion of metals. This work intended to learn if acid rain affects the corrosion of iron. Two acid rain solutions were prepared by mixing nitric, hydrochloric and sulphuric acid with distilled water until pH reached 3.5 and 5.25. 10 iron nails were added to each “acid rain” solution; the nails were massed weekly for a period of 6 weeks. It was determined that acid rain caused the iron nails to corrode at a higher rate than those nails kept in the control water.

Project Number: MES016

Grade: 8

Title: Effect of Temperature on Snow Crystal Formation

Abstract: This project examined the effect of temperature on snow crystal formation. Previous work, developing a procedure for digital imaging of snow crystals, had uncovered differences in snow crystal shape on different days. In this work a snow crystal shape classification was researched and created. Many snow crystals were photographed using a digital microscope, and their shapes classified. The shape classifications were plotted against five different temperatures, and no observable trend was found. Ground temperature was not observed to be a determining factor in snow formation. Other more important factors may exist, such as humidity or temperature at higher altitudes.

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Project Number: MES017

Grade: 8

Title: Mining Soil Defeciciencies

Abstract: I tested the pH and nitrogen levels of two different mining soil samples. I added nitrogen and lime to Samples A and B depending on the results of my tests. I added nothing to Samples C and D. I did this to see what chemical would enhance local mining soil. I predicted that adding nitrogen to mining soil would enhance it. I planted grass in each sample. Samples A and C are from an area that was a strip mine. Samples B and D are from an area that was a deep mine. Samples A and B grew much better than Samples C and D. I concluded that adding nitrogen to mining soil would enhance the soil.

Project Number: MES018

Grade: 7

Title: The Sun's Effect on Colors

Abstract: The sun's rays effect the colors and objects in the environment. This experiment is intended to explore the differences between the fading of the seven main colors, black, blue, green, pink, red, orange, and yellow. The weather and amount of sunlight will be recorded through the two weeks that the colors are exposed to sunlight. The colors will then be compared using two different techniques and then observations will be made.

Project Number: MES019

Grade: 8

Title: Tornado In a Box

Abstract: The title of my project is Tornado in a Box and I chose to research this topic because tornadoes captured my interest. To start my project, I had to build the "Tornado Box" that is made out of cardboard. To form the tornado, I needed a bowl with water, a light source and a hot plate. I heated water to different temperatures and measured the height of the formed tornado. I did 5 trials. I found that the higher the temperature, the higher the tornado.

Project Number: MES020

Grade: 8

Title: Melt Away

Abstract: I will be testing to see which substance sand, calcium chlorite, rock salt, and commercial brand ice melter will melt ice the fastest. I used sand, calcium chlorite, rock salt, and commercial brand ice melter, of water, a timer or clock, a shallow pan, measuring cups, a digital camera, computer, printer and data sheet. The calcium chlorite melted the ice the fastest, but that's not what surprised me it was that if calcium chlorite melts so fast and efficient then why do you never see it to melt ice on sidewalks and driveways. I researched on a science forum filled with professional scientists. They said that the reason that you never see calcium chlorite is because that it is very expensive and hard to get unlike rock salt and commercial ice. It also pollutes the air and leaves rather discusting whited patches of calcium chlorite. But the main reason is it is hygroscopic (it attracts moisture from the air, making storage a problem). Eventually making it break down.

Project Number: MES021

Grade: 7

Title: How Colorful Colors Affect Melting Ice

Abstract: This project tested various colors of construction paper covered over glasses of ice inorder to see which ones caused the ice to melt the fastest. Two glasses had no covers and two each were covered with glue, green, black, red, white, and orange. They were checked every 15 minutes and the amount of melted ice was measured.

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Project Number: MES022

Grade: 8

Title: Is the Grass Greener When There Is a Flood?

Abstract: Which grass will survive the best when there is a drought or a flood? I tested five commonly grown grass seeds. I planted all of them according to their germination time and then put them in different precipitation environments. One group got no water, one group got flooded, and one group was the constant. The Kentucky Bluegrass survived the best during a drought and the Turf Type Fescue survived the best during a flood. This experiment could help homeowners around the United States when planting grass according to the environment they live in.

Project Number: MES023

Grade: 7

Title: What Are the Effects of a Grow-Light on Regeneration of Planaria?

Abstract: Planaria are a species of flatworm that have the power to regenerate. I wanted to see if a grow light would effect the regeneration. A grow light was set on a clean table. Four groups of fifteen planaria were placed next to the grow light. After fifteen minutes, group 1 was removed and measured. Group 2 was 30 minutes, group 3 was 45, and group 4 was 60 minutes. The control group grew the most. That showed the grow light slowed down the regeneration rate. Because planaria don't like direct exposure to light, it slowed down their ability to regenerate.

Project Number: MES024

Grade: 8

Title: River, PA : River, pH

Abstract: The purpose of this project was to determine if the pH of a river in my community is affected by rainwater and temperature changes. Over a one month period I measured the amount of precipitation that fell at the river with a rain gauge. The air temperature was measured in celcius and the pH was measured from water taken at the bank of the river. It was determined that the pH of the river was not affected by the rainwater during this one month period. The river appears healthy and safe for recreational purposes.

Project Number: MES025

Grade: 8

Title: Effect of Filtration on Water

Abstract: The purpose of my experiment is to see which filters work best on different types of water. I made a homemade column and put the filter medium into the column. Water was poured through the column to see the visual and chemical changes. The filtered water was tested for pH and alkalinity and then compared to the non-filtered water. My results showed that the Cat Ion Resin affected the waters most. It changed the water both physically and chemically. I hope that scientists can build off of my experiments and go farther with what I have already done.

Project Number: MES026

Grade: 8

Title: Sky Brightness and Weather

Abstract: This project researches the effects that the weather has on the brightness of the sky. Instruments for windspeed, temperature, dew point temperature, and amount of precipitation were placed outside in the yard. Record data from each for a 30 day period throughout different months. Look for similarities in the weather and the brightness of the sky. A light meter was used to measure brightness.

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Project Number: MES027

Grade: 8

Title: I will Survive

Abstract:

Project Number: MES028

Grade: 8

Title: Rocking with Riprap

Abstract: The purpose of this experiment was to determine which material-plant or rock-is the best creek bank erosion blocker. Basically, I had to set up three separate boxes and line each one with a garbage bag on the inside. Then one box was lined with soil, another with moss, and another with rocks, to make up the creek bed. Each one had to be tested. The results were weighed to compare the amount of debris from each test. I found that the box with rocks as the creek bed eroded the least. Riprap can be very effective on river banks.

Project Number: MES029

Grade: 7

Title: Nature's Water Treatment System

Abstract: Fresh water is limited when it comes to drinking water. That's why it's so important to clean as much of the used polluted water by natural means. This project was selected to determine if water could be treated by natural ways. Two filter beds were constructed by using large gravel, limestone, pebble gravel, and all-purpose sand. Then charcoal was added to one of the filters. After pouring polluted water through each, it was determined that the filter containing charcoal did a better job of filtering out pollutants. I would like to do further experimentation in seeing if a different combination of natural materials would filter polluted water better than my current experiment.

Project Number: MES030

Grade: 7

Title: The Effect of Chlorine on Plants

Abstract: The purpose of this experiment is to determine the effect of water containing low, medium, and high levels of chlorine on the growth and health of a common houseplant (Golden Pothos). It is hypothesized that the higher levels of chlorine will have a negative effect on the growth and health of the plants. Twenty plants were placed into groups: distilled water, tap water, low level chlorine, medium level chlorine and high level chlorine. They will be sprayed and watered daily for six weeks. Growth and change in health will be monitored and recorded.

Project Number: MES031

Grade: 8

Title: Mine Run-Off

Abstract: Have you ever wondered if what you were drinking and fishing for is polluted. Well I did so for my project I tested for mine run-off in my local creek. I did this to see if what people are drinking and what people are fishing in are being polluted and for my own safety. I went and collected a total of 25 bottles of creek water. I then took them into school and every day I tested for Copper, Iron, and Sulfide. I found out that there was few differences in the different waters.

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Project Number: MES032

Grade: 8

Title: A Real Tension Breaker

Abstract: Water pollution can be harmful to living things. One type of water pollution (soap) may impact an organism's life functions and essential activities. This experiment was designed to see if liquid detergent, added to water, would significantly reduce the surface tension of water. Varying amounts of detergent were added to water and the force necessary to break the surface tension of the water was measured. It was determined that the amount of detergent added to the water proportionally decreased the surface tension of the water. Future work is planned to determine if liquid soap is safer than detergent.

Project Number: MES033

Grade: 8

Title: BRRR, Bring Back The Clouds

Abstract: The object of this project was to find out if clouds can affect the earth's surface temperature. To accomplish this task a system had to be devised for observing and understanding the amount of cloud cover on seven successive nights. The temperature was taken each night at sunset, then the percentage of cloud cover was noted along with the time. Before going to bed the same measurements mentioned above were taken again. This experiment confirmed my hypothesis that clouds do affect the earth's temperature by absorbing heat and then radiating it back to earth. As can be seen on the bar graphs the surface temperature of the earth remained warmer as cloud cover increased.

Project Number: MES034

Grade: 7

Title: Wind: It's Turbine Time

Abstract:

Project Number: MES035

Grade: 8

Title: A Study of Pesticide Effectiveness

Abstract: The purpose was to examine two of the most common pesticides (Sevin and Enforcer) to determine their effectiveness and the concentration needed to produce lethality. The second phase is seeking to determine the number of generations it takes for insects to develop resistance to these pesticides. *Drosophila* were exposed to concentrations of Sevin and Enforcer ranging from 5% to 100% of the recommended dosage. Sevin was found to be the most potent pesticide and produced 100% lethality at a concentrations of only 25% of the recommended dosage. In phase 2, flies are currently being raised in cultures containing the LD50 dosage of insecticide to determine if they develop resistance. This study helps consumers to select a lower, safer dosage of insecticide and thus help protect the environment.

Project Number: MES036

Grade: 8

Title: Neutralizing Mine Drainage

Abstract: Pennsylvania experiences severe acid mine drainage pollution causing a great loss in fish life. I wanted to find a solution to this issue so I decided to test the effect of limestone size on the amount of AMD neutralized. I constructed a streambed, ran an acid solution through it, and titrated the end solution. The large size of limestone neutralized an average of 0.010, the medium neutralized 0.033 of the AMD, and the small size neutralized 0.095. Based on these results, I found that the smaller the size of limestone would neutralized the most AMD if put into a streambed.

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Project Number: MES037

Grade: 8

Title: A Rotting Environment

Abstract: The purpose of my experiment was to test the effects of acid rain on metals in the environment using common pH levels for western Pennsylvania. I created an environment of pH 5.5, and tested the effects of that pH level on steel, tin, and aluminum. After thirty days, all of the metals began to show changes in color under the simulated environment. My conclusion is that metals exposed to pH levels of 5.5 were affected by the environment. A possible research extension could be designing new metals resistant to acid rain.

Project Number: MES038

Grade: 8

Title: Measuring Light

Abstract: What if your house was different than most other houses; what if your house were underground? My project compares the amount of light in an underground house with an above ground house. The underground house uses a periscope for windows to get actual sunlight into the room. I thought that the energy of light would be about the same for the periscope and the direct tests. After the periscope and house were constructed the light was shone in and the energy was measured. A camera was used, a light was shown in and the button was pressed on the camera to take a picture half way down and the number was recorded. The results showed that the periscope only let half the light through. The tests rejected my hypothesis.

Project Number: MES039

Grade: 8

Title: Creepy Crawlers

Abstract: Ladybugs have long been questioned on whether they help plants to grow. This experiment was designed to test this theory. Two different containers were made with equal amounts of everything, except one container had thirty ladybugs in it. It was determined that the container with the ladybugs had more plants with a healthier look. This meant that not only do ladybugs speed up plant growth, but they also enrich the plants and soil.. This experiment proved to be a success.

Project Number: MES040

Grade: 7

Title: Can We Clean It Up?

Abstract: The main purpose of my project is to find out if I can make an effective method of oil spill clean up. IF: Several methods of cleanup already exist And IF: I research and experiment with several of them

THEN: Yes, I can create my own effective method of oil spill clean up. I proved my hypothesis correct. The existing method of using a suction hose cleaned the most oil but also removed more than half the water. My method removed almost as much oil, but removed very little water from the environment.

Project Number: MES041

Grade: 8

Title: Does Solar Energy Like It Hot?

Abstract:

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Project Number: MER001

Grade: 8

Title: Waffling For Strength

Abstract: Safety plate steel has a raised grip pattern that improves safe footing. It is used mainly in land and sea transportation and general industrial applications. This project intended to determine if a raised grip pattern would also increase the strength of aluminum. Increasing amounts of a raised pattern (waffle) were produced on 100 sheets of aluminum foil and the strength of each sheet was measured. It was determined that the strength of the aluminum foil was increased in proportion to the amount of raised grips (waffles) added to the foil. Future work is planned to see if a specific grip shape is most effective.

Project Number: MER002

Grade: 8

Title: Wind: Energy of the Future

Abstract: Windmill farms are becoming a more feasible source of energy production. For windmills to be efficient, is a specific angle better than others? In my project, I tested several blade angles to determine which blade angle works the best. After building the windmill, I marked various blade angles on the propellor wheel and rotated the blades, testing each angle. I had anticipated that the 180 degrees angle would work the best; however, the 30° angle was the best. So, in conclusion windmills would operate at maximum efficiency if their blades were at 30 degrees.

Project Number: MER003

Grade: 7

Title: How Supports Effect How Much Weight A Bridge Can Hold

Abstract: The hypothesis of this project was "I think if I change the number of supports on each bridge, then the weight amount will increase." The purpose of this project was to demonstrate the increase in strength of a bridge by adding supports. We used three bridges for testing and a fourth for demonstrating that with the most supports the bridge would hold considerably more weight than the first bridge. By working with one type of bridge, we learned that bridges are complex structures that are built with many variables in mind. This makes each bridge different and very interesting.

Project Number: MER004

Grade: 8

Title: Suited for Space

Abstract:

Project Number: MER005

Grade: 8

Title: Brian's Fan Club

Abstract:

Project Number: MER006

Grade: 8

Title: Wood Pressure

Abstract: Have you ever wondered which wood type would be the strongest out of the following? the purpose of the project was to find out which of the selected wood might handle the most pressure. Pressure was applied to the following wood: Birch, Cherry, Pine, Walnut and Basswood. Pressure was applied to every kind of wood available. The most pressure was

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applied to birch meaning that it is the strongest. Followed by pine, then pine, then walnut, then cherry, and finally Basswood.

Project Number: MER007 Grade: 8

Title: Man vs. Nature

Abstract:

Project Number: MER008 Grade: 8

Title: Bridge Durability

Abstract: Bridges are important structures in our lives. This project is aimed to discover which bridge, beam, cable-stayed, or triangle truss, was the most sturdy. First, wire was tested so it would have the same strength as the sticks. The three bridges were assembled and tested with weights. The triangle truss bridge withstood the most mass (4525g) and the beam and cable-stayed bridges both held (475g). However, text explains that the cable-stayed bridge should hold many times more than the triangle truss and beam designs. This tells that there should be multiple trials instead of one for added dependability on data.

Project Number: MER009 Grade: 8

Title: Breakin' Bridges

Abstract: The purpose of this project is to evaluate different structural designs of bridges to determine which is the strongest. If a bridge design is built with the most materials, then it will be the strongest type of structure. The strongest bridge design was determined by comparing the failure weights for each design, then comparing the results from two trials. The strongest bridge designs (best to worst) were: Truss, Suspension, Beam and Arch. I discovered the bridge built with the most materials was the strongest. However, I was wrong in believing that the amount of materials always indicates which design would be stronger. The Arch used more materials than the Beam, but supported less weight in both trials.

Project Number: MER010 Grade: 8

Title: Bridges and their Effect on Modern Society

Abstract: Bridges have a great effect on modern society in the means of travel, communication, and trade. To conduct my experiment, I designed models of arch, cantilever, suspension, girder and truss bridges. Over all strength was tested by stacking quarters on them until they collapsed. Total weight to collapse the structure was determined by multiplying the amount of quarters by 6.74 grams, the mass of one quarter. The strongest model was the suspension followed by the girder, truss, arch, and cantilever models. In conclusion, suspension bridges supported the most mass. Bridges and their designs are very important to our society.

Project Number: MER011 Grade: 8

Title: Magnetic and Air Lock Brakes

Abstract: Ever since airlock and contact brakes were created there have been faults between the two. The 2 main faults were accuracy in stopping at a certain point and friction while stopping that causes back problems. To test these faults I built a track that could be converted to magnetic or airlock brakes. I hypothesized that the magnetic brakes would have a smoother stop with barely any friction but it would lack accuracy and that the airlock brakes would be most accurate but would have a lot of friction. My results were that the accuracy for the airlock brakes were 9/10

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Project Number: MMH001

Grade: 7

Title: Effectiveness of Natural Heartburn Remedies

Abstract: Many people suffer from heartburn. This study was set up to analyze the effectiveness of five German-approved natural heartburn remedies. The pH of an average dose of the remedy added to 30 milliliters of vinegar was taken at constant times throughout each experiment. All five remedies made the vinegar less acidic with licorice causing the most significant change in the vinegar's pH. Future work is planned to compare the most effective natural remedies to popular anti-heartburn drugs.

Project Number: MMH002

Grade: 8

Title: Lung Capacity and CO₂ Content

Abstract: Have you ever wondered what your lung capacity was? Or how much carbon dioxide was in your lungs when you breathe out? For my experiment I tested lung capacity and carbon dioxide content in lungs of people in various age groups. I did water displacement to determine the person's lung capacity. I had each person breathe into a hose inserted into a tank of water and recorded how much water was displaced. For my project I found that males have a greater lung capacity than females. Males also have a greater carbon dioxide content. This supported my hypothesis.

Project Number: MMH003

Grade: 8

Title: Can Receiving a Massage Lower Blood Pressure?

Abstract: This experiment was performed to determine if receiving a massage has an effect on blood pressure. Six clients were divided into two groups. The Experimental Group was tested to see if a massage had any effect on blood pressure and the Control group was used to show regular blood pressure readings. Each client received an initial blood pressure reading. Blood pressure was retaken after massage and/or after resting sessions. Data shows that the blood pressure was reduced after receiving the massage. Future studies may include more participating clients and increased number of sessions.

Project Number: MMH004

Grade: 7

Title: Liquid Soaps: Do They Work?

Abstract: The project that I did was Liquid Soaps- Do They Really Work? I rubbed my hands on the floor and swabbed it into each petri dish. I put disks with soap on them in the middle and labeled the zone of inhibition from the disks to the bacteria and the number of bacteria colonies. From my results, the brand of soap that worked best was Dial. I would recommend people to have more of this brand of soap.

Project Number: MMH005

Grade: 8

Title: Healthy Hearts

Abstract: A healthy heart rate for teens falls between 80 and 90 beats a minute. I tested groups of boys and girls to determine which group had better heart rates. My groups include active girls and boys and inactive girls and boys. I tested my groups by taking the resting heart rate, had each run in place, and checked the heart rate again. I found that the active boys overall had better rates than the active girls. Also I found that the inactive boys had better heart rates than the inactive girls. I found that all my information supported my hypothesis.

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Project Number: MMH007

Grade: 8

Title: Brushing and Video Instruction

Abstract: Proper brushing habits are essential in preventing tooth decay . This project intended to learn if tooth brushing could be improved by video instruction. The spots that people miss the most when brushing were examined using a periodontal probe both before and after viewing a video on proper brushing techniques. It was determined that tooth brushing could be improved by video instruction. Future work is planned to determine if the effects of video instruction are temporary or long-lasting.

Project Number: MMH008

Grade: 7

Title: What Antibacterial Hand Soap Works Best

Abstract: Soaps are essential to life. My project's purpose was to find out what hand soap works best. Five different soaps were chosen to test to see which was most effective. I took my soap and put soap on agar plates with bacteria. Then, I put them in a bunsen burner and measured the zones on inhibition. It was determined that Homebest worked best, then Eckerd, Target, Dial, and last was Softsoap. My conclusion was that Homebest hand soap works best when washing the hands to get rid of bacteria. No future work is planned for this project.

Project Number: MMH009

Grade: 7

Title: In A Heart Beat

Abstract: Video games are a normal part of most teenagers' lives. My experiment will test the heart rate on three 17 year-old males when relaxed and when playing "Halo", an intense video game. Using a stethoscope and watch, I will test the heart rate 1 minute previous to play, half way through play, and 1 minute after. I will also monitor how long after play it takes for the heart rate to return to about the pre-play rate. My hypothesis is, playing the intense game will raise the rate over the pre-play rate.

Project Number: MMH010

Grade: 8

Title: Dirty Herbs

Abstract: The problem investigated is the affect of herbs on bacterial growth. The hypothesis is that green onions will produce the most bacterial growth and thyme will produce the least. Research states that hepatitis A outbreaks have been associated with eating raw or undercooked green onions. The purpose of this investigation is to determine which herbs promote the most bacterial growth. I choose this investigation because I was curious about the hepatitis A outbreak. The herbs used were bay leaves, thyme, marjoram, curly parsley, green onions, sage, oregano and cilantro.

Project Number: MMH011

Grade: 7

Title: Got Germs?

Abstract: This work is intended to find out if the amount of bacteria varies in milk from different breeds of cows. I will get milk samples from four different breeds of cows and determine which has the most bacteria. For each milk sample I will inoculate and incubate pre-poured agar plates for one week and then count and compare the number of bacteria colonies. The four breeds of cows I will be using are: Jersey, Holstein, Red Holstein, and Brown Swiss-Holstein mix.

INTERMEDIATE DIVISION – MEDICINE/HEALTH/MICROBIOLOGY

Project Number: MMH012

Grade: 8

Title: Is Your Reed a Hazard?

Abstract: For my project I tested clarinet and saxophone reeds for harmful bacteria. I learned that human saliva teems with bacteria. I play the clarinet and wanted to see if I needed to change my reeds more often. I cut six different reeds from clarinets and saxophones left in mouthpieces, in music cases, and in plastic storage cases. After this I put them in MacConkey agar for incubation for five days checking for new growth each day. When I finished taking data I found that the reeds inside of a plastic storage case developed the most bacteria.

Project Number: MMH013

Grade: 8

Title: Natural Buffers?

Abstract: Are chemical buffers present in plant and animal tissues? Will eating certain foods combat changes in acidity and alkalinity? This experiment was designed to compare the ability of plant and animal foods to neutralize acids and bases. Hydrochloric acid and sodium hydroxide (a base) were added to tap water, a commercial buffer (pH 7), potato homogenate, and ground meat homogenate. It was determined that animal tissues resisted changes in pH when an acid and base were added. Future work is planned to determine if different types of animal foods have stronger or weaker buffers.

Project Number: MMH014

Grade: 7

Title: Chicken Growth Rate

Abstract: My hypothesis is if I give chickens food with vitamins, then they will grow faster than the chickens eating food with no vitamins. The purpose of my project was to prove that whether or not chickens consume food with vitamins has a measurable effect on their growth rate. The chicks eating the Chick Starter Feed, which contains vitamins, grew an average of 7.6 grams more per day than the chicks eating non-vitamin, Chicken Scratch Feed. I concluded that vitamins in chicken feed have a positive impact on the growth rate of chickens.

Project Number: MMH015

Grade: 8

Title: And the Beat Goes On . . .

Abstract:

Project Number: MMH016

Grade: 8

Title: The Use of Allelopathy to Control Common Bacteria

Abstract: The purpose was to determine if plant extracts can be utilized to control bacterial growth. Extracts of a variety of plant materials were prepared. E.coli was plated onto nutrient agar. Paper disks were saturated in the test solutions. Control and test discs were added to the surface of the cultures. The zones of inhibition were measured and recorded. Horseradish, garlic and cayenne pepper were found to inhibit bacterial growth. A second phase was conducted combining the horseradish, garlic and pepper to determine if their individual effects would be amplified when combined. Horseradish combined with garlic had the greatest inhibitory effect. This study benefits man by finding safe, natural products to control bacteria.

INTERMEDIATE DIVISION – MEDICINE/HEALTH/MICROBIOLOGY

Project Number: MMH017 Grade: 8

Title: What Are the Effects of the 5-Second Pick-Up on Bacteria?

Abstract:

Project Number: MMH018 Grade: 8

Title: The Effect of Different Solutions on the Inhibition Rate of Bacterial Growth on Contact Lenses

Abstract: Three different solutions (a commercially produced saline solution, tap water, and saliva) were used to test their effectiveness on bacterial growth on contact lenses.

Project Number: MMH019 Grade: 7

Title: How Clean Are Your Hands?

Abstract:

Project Number: MMH020 Grade: 8

Title: Does the price of handsanitizer affect quality?

Abstract: Hand sanitizers are used by many people and are sold at many different prices. I did an experiment to try and discover which product was the most efficient compared to its price. I placed sanitizers on agar plates swabbed with e-coli and placed them in an incubator to grow the bacteria. Then I measured the zone of inhibition to determine which product was the most efficient. I found that just because a sanitizer has a higher price does not mean it is of a higher efficiency. The quality depends wholly on the product itself and its manufacturer.

Project Number: MMH021 Grade: 7

Title: What's the Effect of Bleach on Mold?

Abstract:

Project Number: MMH022 Grade: 7

Title: Yikes! I'm Getting Older ... What's Happening to My Heart?

Abstract: A strong and healthy heart is required in order to live a long life. This experiment was performed to see if age is a factor in increasing heart rate with exercise. Six subjects, of various ages, were exercised on a treadmill at various speeds, and their heart rates were recorded at rest and each minute thereafter. It was hypothesized that the older you are, the faster and higher your heart rate will go with exercise. The outcome of the experiment was that regular exercise rather than age is more important in determining heart rate with vigorous exercise.

Project Number: MMH023 Grade: 7

Title: Amount of Bacteria on Lettuce

Abstract: This experiment compares the amounts of bacteria on different types of washed and unwashed lettuce. Leaves from bagged lettuce and head lettuce were swabbed. Then, the leaves were washed in vinegar and water and swabbed again. The bacteria from each swab were incubated on agar plates, and the numbers of colonies were counted. Washing the lettuce

INTERMEDIATE DIVISION – MEDICINE/HEALTH/MICROBIOLOGY

Project Number: MMH029

Grade: 8

Title: Have you washed your hands lately?

Abstract:

INTERMEDIATE DIVISION – PHYSICS

Project Number: MPH001

Grade: 7

Title: Which Solar Oven is the Most Efficient?

Abstract: Solar ovens are being used to help people in countries where energy resources for cooking food and sanitizing water are becoming scarce. This work was an attempt to improve the efficiency of a simple box-type oven by adding two small steel plates. All tests, with and without steel plates, were performed using the same oven. It was determined that the steel plates caused the internal temperature of the solar oven to rise faster and reach a higher peak temperature. Future work is planned using larger steel plates.

Project Number: MPH002

Grade: 7

Title: Overcoming Color Blindness

Abstract: This project solves the problem of color matching paint, blind, and carpet samples for colors that people with common color blindness have difficulty seeing and matching – reds and greens. I visited a technical center and used a spectrophotometer to measure my samples and generated the spectral reflectance data for each. I used a spreadsheet of the data to create charts and compare the spectral curves for each sample. Based on these curves alone, I was able to select reasonable matches for my paint, blind, and carpet samples, which were confirmed by visual observation.

Project Number: MPH003

Grade: 8

Title: A Dilemma: Silver vs. White Fillings

Abstract: A common dilemma that people face today when visiting the dentist is what type of filling to choose. I focused on two different types of fillings—silver amalgam fillings and white composite fillings. I performed this experiment to find out what type of filling is stronger. A total of 40 samples were made and tested with a Concrete Compression Testing Machine. Since the machine read in pounds I converted pounds to megapascals using formulas that can be found in a Metric/English Unit Conversion publication book. The conclusion was drawn that composite fillings are stronger than amalgam fillings.

Project Number: MPH004

Grade: 8

Title: More Lube More Move

Abstract: The hypothesis of this project was the lubricated Abec 7 bearings will spin the longest due to the bearings having a higher Abec rating meaning they were built to spin faster and withstand high speeds. Lubricant just helps clean them and spin faster. To prove this, three skateboards with different types of bearings were tested to find which spun the longest. After this was completed, lubricant was added to the experiment to attempt to make a difference in the spin time. The hypothesis was proven correct. This proved that the higher Abec rating in a wheel on any skate will spin faster.

Project Number: MPH005

Grade: 8

Title: The Effect of Building Design on Stability

Abstract: This project was intended to find what shape of beam would withstand the longest during an earthquake. It was hypothesized that the square beam building would hold the longest because most building frames are square beams. Three different shapes of beams were used to make five of each type of building. One building was fastened to an upside down, stabilized palm sander. The sander was turned on and off to simulate an earthquake. The time each building

INTERMEDIATE DIVISION – PHYSICS

Project Number: MPH022

Grade: 7

Title: The Flight of a Rubber Band

Abstract: Proving that thicker rubber bands travel the greatest distance was the hypothesis that I set out to prove. Rubber bands with various thickness, but with the same diameter were tested. A three speed household fan was used to introduce the effects of wind to test and record the aerodynamics of the rubber bands. The data collected during testing proved that the thicker rubber bands did indeed travel further distances, with or without the variable of the wind. In addition to the hypothesis being tested, I learned that additional factors such as weight, size, and aerodynamics affected the performance of the rubber bands.

Project Number: MPH023

Grade: 7

Title: Do Shingles Affect Room Temperature?

Abstract: Different types of materials and colors are used for roofing houses. My projects was to test how white, black, orange singles affected the inside temperature. I made houses out of boxes and glued on the shingles with thermometers inside each house. I measured the temperature three times a day. The dark colors were the warmest, and the lighters colors cooler. But the big difference came during cool down periods. Future study could be done earlier in the fall with higher temperatures more direct sunlight.

Project Number: MPH024

Grade: 7

Title: Splitting Hairs over Atoms

Abstract:

Project Number: MPH025

Grade: 7

Title: Principles of Magnetic Levitation

Abstract: We all know of the repelling and attracting properties of magnets. And we know that magnets can produce electricity. But can electricity affect the strength of magnets? That is the question my project is based on. I built a device that shows how that repelling properties of two permanent magnets can cause one magnet to levitate. Moving the levitating magnet produced an electric current. I experimented by adding weight to the levitating magnet, introduced an electric current, then reversed the polarity of the current. The results showed that electricity did affect the strength of the levitating magnet.

Project Number: MPH026

Grade: 8

Title: The Effect of Guitar Strings on Sound

Abstract: The Reason I wanted to do this project is because I play guitar and wanted to see which strings will play for the longest. I thought the heaviest gauge strings would play for the longest time. I used my model that I made to pick each string 20 times. Some results are that the lightest gauge E string played for 5.622 seconds, and the heaviest E-string played for 7.3395 seconds. I found out the heavier the gauge of strings the longer it will play for, but the harder it is to pick when it is heavier too.

INTERMEDIATE DIVISION – PHYSICS

Project Number: MPH034

Grade: 7

Title: Effect of Volume on Kinetic Energy

Abstract: My hypothesis is that spheres with larger volumes will produce greater amounts of kinetic energy when rolled down a track. Many studies have been done relating the mass of an object to kinetic energy but not relating volume to kinetic energy. Two groups of spheres with similar masses but different volumes were released at a set height on one side of a U-shaped track and their resultant heights on the opposite side of the track were recorded. In general, the spheres with larger volumes had greater kinetic energies; however, the hypothesis is not categorically proven in this experiment.

Project Number: MPH035

Grade: 7

Title: Can Noise Pollution be Controlled?

Abstract: The purpose of this investigation was find an expensive, recyclable material to insulate against sound pollution. A wooden box was constructed to completely enclose the sound source, the material to be tested and the measuring device. In order to produce a consistent sound source, computer software generates noise and sine waves at frequencies of 250, 500, 1000, and 2000 Hz was used. The recyclable materials tested included plastic jugs, plastic sheets, Styrofoam, newspaper, cardboard and carpet remnants. Cardboard proved to be the best sound barrier for all levels except for 250 Hz, for which plastic sheets were the best and carpeting was the second best sound barrier. This study will help man to learn how to reduce noise pollution while recycling waste materials.

Project Number: MPH036

Grade: 8

Title: Weather's Effect on Painted Surfaces

Abstract: Weather conditions affect various painted surfaces according to research. This work intended to discover if the type of paint used affected the fading, peeling, or chipping of wood and aluminum surfaces. Two exterior paints, oil and latex, were selected. Three different weather conditions (mild, harsh, and no exposure as a control group) were tested with these pieces of aluminum and wood. It was later determined that different weather does have an effect on particularly oil-painted aluminum strips. Future work is planned to see how other painted surfaces (plastic, brick) are affected by weather.

Project Number: MPH037

Grade: 8

Title: Slope of Science

Abstract: Most people think that there is not too much science when a car goes down a ramp. Actually there is. In this experiment the ramp is the inclined plane, gravity pulls down on the car, which makes it accelerate while going on an angle. What happened was the angle was being changed on the ramp, then I measured the distance the car traveled. I found out that the 75 degrees angle went the furthest. Also my hypothesis was correct.

Project Number: MPH038

Grade: 7

Title: Siphon -- Go With the Flow

Abstract:

