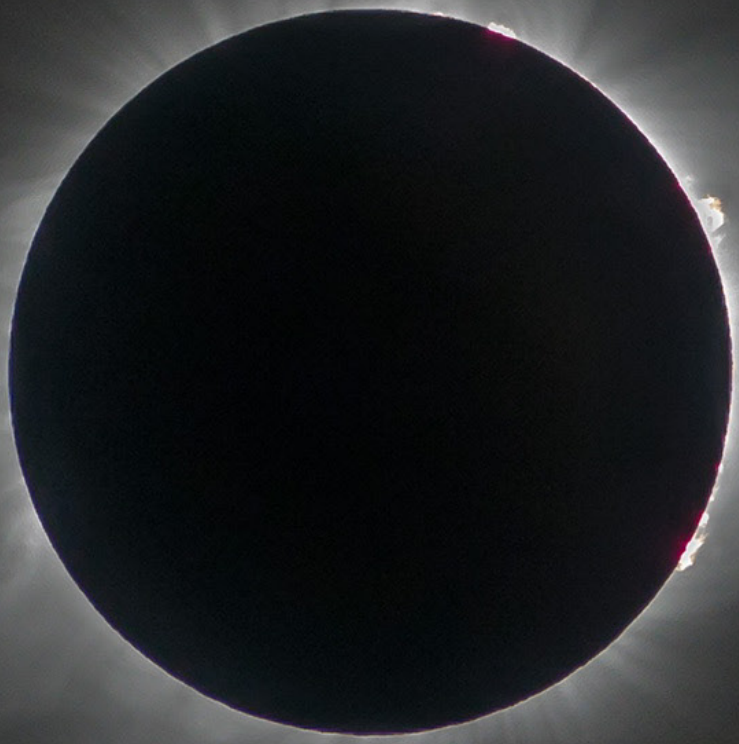
Midwood High School Research Program Science Fair



2018

2018 Midwood High School Science Fair
31 May 2018 — 3:30 to 5:30 PM

Michael McDonnell — Principal
Jenessa Kornaker — Assistant Principal
Tovia Rosenfeld — Assistant Principal
Glenn Elert — Research Coordinator
Stacy Goldstein — Research Teacher
Susan Katzoff — Research Teacher
Shaniece Mosley — Research Teacher

Timeline

Period 3–9

Sophomores park boards in A214 (Research Room)
Sophomores deliver snacks, drinks, plates, etc. to A300 (Physical Science Office)

1:55 PM (Period 9)

Junior and Senior judges congregate in library
Junior and Senior tasks are explained
Junior and Senior judging packets distributed (time to read abstracts)

2:45 PM (Period 10)

Scheduled classes on 3rd floor annex moved to main building
Junior and Senior judges perform assigned tasks
Guest judges arrive and pick up judging packets from Mr. Elert (3:00~3:30)

3:30 PM (Period 11)

Sophomores move to assigned rooms, boards already in position
Sophomores given time to make adjustments to boards and self
Judging begins at 3:45~4:00

4:30~5:00 PM

Judges return to A214 (Research Room) with completed packets (calculators available)
Judges given color-coded food tickets
Sophomore teachers provide students with color-coded food tickets
Sophomores return boards to A214 (Research Room)

4:30~5:30 PM

Food self-service in A313 (Physics Lab) in groups of 20~30 by ticket color
Juniors and Seniors assist with clean up

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Judges

Alumni

Mie Abouelkheir, Ilham Ahmed, Laila Akallal, Noor Asif, Christopher Ayala, Bilal Azhar, Charlynn Ben, Kieran Bissessar, Kaelah Blanchette, Nadia Brijmohan, Donald Ceus, Cindy Chee, Irissa Cisternino, Michael Dabrowski, Quetourah Dalencourt, Caroline Ellis, Tasnim Halim, Sana Ilyas, Rumsha Javed, Sophia Khoja, Anna Ku, Aviva Laurenti, Wendy Lee, Erica Levin, Jessica Liang, Cynthia Ly, Max Miloslavsky, Nomon Mohammad, Allan Nosov, Demetrios Papazaharias, Benjamin Rudshteyn, Patrice Sanderson, Peter Stanley, Christine Truong, Whitney Wong, Angel Zou

Juniors

Bareera Abid, Zuha Ahmed, Abby Beginyazova, Larissa Brijmohan, Jessica Chan, Rubhiyah Chaudhry, Amy Chen, Ashley Chen, Kevin Chen, Maggie Chen, Miao Yan Chen, Ahmad Choudhry, Nicole Demetrashvili, Jia Ci Deng, Dougeny Francois, Daniel Gaft, Abdullah Hafeez, Muhammad Hamza, Basirie Hoxha, Emily Huang, Yenny Huang, Esrat Islam, Nursat Jahan, Nusrat Jahan, Christal Jean-Soverall, Neolani Johnson, Humayara Karim, Maryam Khan, Sara Khasib, Andrew Kobrin, Eva Lai, Cong Wing Li, Rui Ting (Toby) Li, Sevara Mallaboeva, Rana Mohamed, Emily Movsumova, Zara Nadeem, Fizza Nayab, Jason Nisanov, Eduardo Peña Barrios, Kenny Pierre Louis, Nathan Reder, Elizabeth Redmond, Miguel Rendon Lucero, Shamima Sharmin, Rina Sheynin, Kamille Shivwkumar, Zuzana Simonova, Yvette Somersel, Tiffany Tang, Susana Tzunun Yax, Annabel Xie, Basimah Zahid, Amy Zheng

Seniors

Noran Abo Donia, Abby Beginyazova, Fern Bromley, Rafaella Bruzual, Linda Chen, Joyce Chow, Yiming Dai, Jennifer Duong, Sarah Elmosbah, Hafsa Fatima, Ellen Gyulbudaghyan, Md Hoque, Judy Huang, Calvin Huynh, Saba Iqbal, Hebah Jihad, Elizabeth Joseph, Shanjida Kamal, Sabina Kubayeva, Albina Kukic, Ivy Li, Beien Lin, Wendy Lliguichuzhca, Shawal Malik, Kathy Mania, Naila Mirza, Alice Mo, Christina Ng, Benjamin Nguyen, Katie Nikishina, Emily Orman, Soanne Saint Victor, Aushna Saleem, Alma Samarxhiu, Vincent Wang, Mei Mei Weng, Jessie Zheng, Michelle Zinger

Teachers

Alyse Anderson, Elizabeth Fenamore, Tong Lung, Stefan Riemersma, Howard Spergel, Talia Steiger, Joel Gumbiner (retired)

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Participants

318-16 Mahmoud Aboseria & Mustafa Hayder
Gum and memory

318-15 Marlie Adrien & Nisha Manahil
Personality and GPA

320-02 Naffisat Atanda
What Birth Order Says about your Average

320-11 Anna Azaryev
The Stroop Effect and Warped Words on Gender

316-04 Lachin Beginyazova
The Effects of Temperature on The Intensity of Chemiluminescence in Luminol and Perborate Solution

320-09 Sezer Benoit-Savci
How do different genres of music affects one's ability to solve multiplication problems

320-10 Mitchell Borshch & Alina Bennett-Dubin
Measuring Velocity of CME's

318-11 Ihtsham Chaudhry & Armin Pasukanovic
Planarian Worms Regeneration Process

316-11 Carina Chen & Gloria Glenn
Composite vs. Natural Faces

314-06 Hong Wei Chen & Kevin Ng
The Effect of Temperature on Frequency Produced by Tuning Forks

314-11 Ryan Chen & Jennifer Li
The Correlation between Taste and Smell

314-01 Ashley Chin & Justin Chow
Colors: The way to success

316-06 Carolynn Cortez & Shaireen Akter
Observing the Spectral Absorption of Different Colored Solutions Through a Cell Phone Spectrophotometer

316-14 Jaylene Cruz
RFID: Blocking Radio Frequency Identification Signals

320-12 Serena Duran & Victoria Habbchy
The Effect of Substrate Concentration on the Activity of the Enzyme Catalase

316-05 Basit Ejaz & Ali Leventeli
The Effect of Cardiovascular Exercise on Systolic Blood Pressure of Teens

316-12 Tristan Ene
Great White Shark Tracking

320-07 Nadzeya Fliaha
The Relative Probability of Banking a Basketball

318-10 Jason Goyfman & Arda Aydin
Different Rates in Which Different Proteins Denature

320-15 Kelly Guan & Jessica Zheng
Intelligent Slime Not Mindless Grime

320-13 Edward Guiracocha
Abstract Emotions

318-09 Cui Ling Guo
Feed the Scallions

316-09 Neal Haulsey
The Effects of Acid on African Marigolds

314-16 Nasrin Kashem & Almedina Mulic
The Degradation of Vitamin C Through Cooking

314-02 Alyssa Kattan
The Ability of Chiral Glucose Molecules to Rotate the Plane of Polarized Light

314-14 Chris Kelly
The Biomechanics of Pitching

314-12 Suraiya Khoja
Cracking Hashes

320-06 Anna Kozina
Effect of Chemical Stressors on Daphnia's Heart Rate

318-02 Garrett Lee
How First Looks May Be Deceiving

318-03 Jessica Lin & Lameya Rahman
Corrosion of Steel and pH

318-08 Sammi Lin & Vivian Chong
The Effect of Breaks on Learning New Information

320-14 Muhammad Mamarasulov
Testing Accuracy of Children, Teens, and Adults

314-08 Blessin McFarlane & Otabek Islomjonov
Calculating the Speed of Light Using a Microwave and a Laser

314-03 Jubaida Mehak & Zahra Mehdi
Fermentation on the Production of Biofuels

314-10 Jessica Meza Pineda & Laura Rosas
Aloe Vera Antifungal Properties Effect on the Molding Rate of Strawberries

316-03 Noor Mohammad & Alana Neria
Ladybugs vs. X-ray Radiation

314-07 Duha Mousa
Conformity in Midwood High School

316-13 Diyora Mullaeva & Sally Gao
The effect of climate on the sustainability of solar and battery powered cars

318-14 Mohammad Mustafa
Frictions role on Mousetrap Cars Distance

318-04 Victor Noel
Cybersecurity: Simulating Hacking through the Air-Gap

320-05 Tanisa Rahman & Nolani Carter
Makeshift Polarimeter: Chiral Molecules and Angle of Polarization

318-05 Joel Rakhamimov & Erin Ho
Generating Pi Using Random Digits

320-03 Robiya Ramziddinova & Emily Ly
Personality type of social media junkie

316-02 Marc Rivera
Electrolyte Concentration in Common Drinks

320-01 Stella Ruan & Yumei Jiang
The Effect of Invertase on Sucrose

316-08 Defne Sener & Joemax Klipp
Minimizing Bacteria Growth on Cooking Meat

314-13 Menahil Shahid & Maytha Chowdhury
Peppermint and Reaction Rate

318-12 Gabriella Shalumov
The Effect of Different Orange Juices on Vitamin C Concentration

316-16 Tracy Shi & Zyhra Casero
Luminol Glow vs. Heat

316-15 Sarah Sookoo & Idrees Ilahi
pH and Arsenic Correlation in Baby Formula

316-07 Meghan Stern
Cookie: Placebo Effect

316-10 Shakira Thompson & Christina Chen
Delaying Fungi Growth

314-15 Sonay Tsaryuk & Elizabeth Vool
The Effectiveness of Various Memorization Techniques

318-13 Enid Wong & Tanzena Haque
The reaction rates of different coffee brands

318-07 Jeniffer Wu
The Effect of Dissolving Urea Across Various Aqueous Solutions

316-01 Mehnoor Yousaf & Sophia Jules
Does acidity play a role in the refractive index and in turn potential energy of fruits?

314-05 Joey Yu & Henry Hua
Effect of Salt Bridge on pH

314-04 Alina Zanub
The Relationship Between Happiness and Intelligence Quotient (IQ)

318-06 Rebecca Zhang & Esther Lee
Effect of Magnetic Fields on the Flow Rate of Solutions

318-01 Linda Zhang & Oliwia Dankiw
Red Dye 40 Adsorption Rates

320-04 Victor Zheng
How do different dental hygiene practices affect the relative growth of oral bacteria?

314-09 Wei Tao Zhu
The Factors That Affect Fears in Teenagers

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Abstracts

318-16 Gum and memory

Mahmoud Aboseria & Mustafa Hayder (Ms. Katzoff – Behavior & Social Science)

The research conducted in this experiment was done to test whether or not chewing gum has an effect on one's short term memory. This experiment is different than previous ones as the participants used in this experiment were specifically Sophomore Research students. Also, a specific type of gum, Juicy Fruit, was used for this experiment. After conducting the experiment on a sample size of 30 students, the results showed that 80% of the participants' scores improved on the memory test. This proves that gum does have a slight effect on one's short term memory. This is significant as students can enhance their memory as they chew gum in school to help them improve academically, especially on tests or quizzes.

318-15 Personality and GPA

Marlie Adrien & Nisha Manahil (Ms. Katzoff – Behavior & Social Science)

The purpose of this study was to determine whether a correlation exists between personality and academic success, by utilizing a personality test based on Carl Jung's and Isabel Briggs Myers' personality type theory. This personality test/theory characterizes individuals into 16 different 4-letter personality types, with each letter representing a different variable. After analyzing the personality types and grade point averages of 44 Midwood students, the results demonstrated that there was a variance between specific personality types and GPA. These findings can greatly impact the real world because a direct correlation between certain personality types and academic success indicates that non-cognitive factors play a role in the ability of an individual to learn and achieve success. This project differs from other research in the fact that numerical values representing academic performance were used, rather than data from previously conducted studies.

320-02 What Birth Order Says about your Average

Naffisat Atanda (Ms. Goldstein – Behavior & Social Science)

Many factors are thought to play key roles in determining an individual's cumulative average. Have you ever considered birth order as one of these factors? There have been many hypotheses regarding how birth order influences the averages of students. Some include the ideas that older children regard authority and are more attentive in school, while younger children tend to rebel. The purpose of this experiment was to analyze the possible correlation between birth order of students at Midwood High School and cumulative averages. The project was chosen to determine which birth order is preferable when considering high averages in school. In order to investigate the problem, an anonymous survey was developed that asked participants to state their averages and

birth orders. In conclusion, there is no strong correlation between birth order and the cumulative averages of students at Midwood High School.

320-11 The Stroop Effect and Warped Words on Gender

Anna Azaryev (Ms. Goldstein – Behavior & Social Science)

The purpose of the experiment was to research whether warped words will eliminate the Stroop Effect and how this varies based on gender. The Stroop Effect developed by John Ridley Stroop in 1935, is a psychological test used to measure a person's nature of automatic processing versus conscious visual control. In the experiment, individuals had to say the color of the straight or wrapped word but not the name of the word. For example, 'blue' may be printed in red but the individual needs to say the color rather than the word. There were 50 participates, 25 males, 25 females, between the ages of 15-16 who took 12 trails. The brain's automatic reading function interferes with naming the color of the word. However, if words are warped the Stroop Effect will be eliminated. Individuals won't be able to read the words clearly thus, the brain will only send signals regarding the color of the word negating the experiment.

316-04 The Effects of Temperature on The Intensity of Chemiluminescence in Luminol and Perborate Solution

Lachin Beginyazova (Ms. Goldstein – Chemistry)

The purpose of this lab is to determine the effects of changing temperature on the intensity of the light produced in a chemiluminescent reaction. This experimental procedure provides a leeway into figuring out how to make the blue glow from the luminol reaction more intense such that in colder areas, forensic scientists are able to detect the presence of blood easier and sufficiently. To determine the effects of temperature in this reaction, the Science Journal app was utilized in measuring the changes of light. This app measured the light using the exposure value (EV) and the experiment was run 7 times at 287.2K and another 7 times at 328.2K. It was determined that at higher temperatures (328.2K) the exposure value of light reached an average of -3.2 EV while at cooler temperatures (287.2K) the average was -5.4 EV. Data suggests the hypothesis was supported, that at higher temperatures the chemiluminescence of the reaction would be more intense compared to cooler temperatures.

320-09 How do different genres of music affects one's ability to solve multiplication problems

Sezer Benoit-Savci (Ms. Katzoff – Behavior & Social Science)

The purpose of this experiment was to find out how different types of music affects concentration. Other studies have had mixed results some have found that music has had a negative effect and others have found the opposite. The experiment found that there is a relationship between music and one's ability to solve multiplication problems. This is because music like rock and rap cause people to dance and this music usually distracts people from their tasks, while classical stimulates the mind which can cause deeper concentration. Businesses can use this data to create more productivity in the office.

320-10 Measuring Velocity of CME's

Mitchell Borshch & Alina Bennett-Dubin (Ms. Goldstein – Physics & Space Science)

Coronal mass ejections, or CME's, are powerful eruptions that commonly occur above the Sun's surface. Though unlikely to strike Earth, their forthcomings include powerful electromagnetic fluctuations, and high energy particles such as those in coronal mass ejections may cause radiation poisoning at high altitudes. Fortunately, given their slow nature (Taking 12 hours to several days to reach Earth), their arrival may be predicted by calculating the velocity (The speed of an object in a given direction) of the coronal mass

ejections in relation to their size. Through the utilization of coronagraphs, the size of said CME's can be calculated and, in relation to their initial burst time, be plugged into the velocity formula to determine the presaged time of impact. No distinct correlation akin CME size and velocity has been attributed, however the velocity of all measured ejections were, for the most part, noted to increase as the time gap since the initial burst period widened.

318-11 Planarian Worms Regeneration Process

Ihtsham Chaudhry & Armin Pasukanovic (Ms. Katzoff – Microbiology)

This research was performed to understand how Planaria worms grow and reproduce based on different incisions. Previous research studied on how Planaria worms reproduce with magnets around them, this research studied on how different incisions impact reproduction in a normal stimulated swamp habitat. Some groundbreaking results were the first worm regenerated at the biggest rate causing a massive change in the length regrown. This was based on the worm's ability to adapt to the environment because it was placed into a new environment their genetic makeup allowed for faster reaction rates. The worms who stayed over time in the habitat adapted and were more accustomed being overall less alerted. Overall the worms with the most time given to regenerate grew the largest amounts. It's important to understand how this regeneration works so one day scientists may be able to adapt the system to the human body and allow for the regrowth of lost body parts.

316-11 Composite vs. Natural Faces

Carina Chen & Gloria Glenn (Ms. Goldstein – Behavior & Social Science)

Beauty standards are different for each individual. Factors such as symmetry or naturalness of a face play a role in perception of attractiveness. This project was conducted by surveying a large sample size of students to test whether gender affects the preference of composite versus natural faces. In this project 100 students from Midwood High school were tested, fifty of them being female and fifty of them being male. The ages of the volunteers ranged from 15 to 18 years old. Each participant was given 4 sets of images with one composite face and one natural face. They were then asked to choose which face they prefer as well as an explanation for their choices. The composite face seemed to be more symmetrical and proportional than the natural faces. The research reveals that gender does affect a person's preference over composite and real faces. Specifically, female volunteers were more likely to choose composite faces than the male counterparts.

314-06 The Effect of Temperature on Frequency Produced by Tuning Forks

Hong Wei Chen & Kevin Ng (Ms. Goldstein – Physics & Space Science)

The frequency of a tuning fork(in Hertz) is the measure of the number of waves passing a fixed point each second. Tuning forks with different lengths are manufactured to produce a fixed frequency each time it's struck. Tuning forks are used to tune musical instruments and their accuracy is important for performances. The study of frequency also has a substantial amount of real-life implications. The purpose of this experiment is to find out if temperature has an effect on the frequency of different tuning forks. This was done by changing the temperature of different tuning forks by heating them with hot water. Once the desired temperature was detected on an infrared thermometer, the tuning fork was struck with a rubber mallet and its frequency measured with a frequency recording app. After doing multiple trials with 256 Hz, 341.3 Hz, and 512 Hz tuning forks on 16°C 24°C 35°C and 65°C, it can be concluded that lower temperatures will cause tuning forks to have higher frequencies.

314-11 The Correlation between Taste and Smell

Ryan Chen & Jennifer Li (Ms. Goldstein – Behavior & Social Science)

The interaction of senses are the result of a series of sensory systems within the brain working together, which is sensory integration. This is when the brain would combine information from multiple systems to allow for the brain to trigger a system response. Smell and taste are two senses that often go hand in hand with one another and can be reflected by their use of majority of the same receptors, which includes that of chemoreceptors (sensing the chemical environment). However, as demonstrated in a study by the University of Oregon, it was reported that early hearing loss resulted in enhanced activity in Heschl's gyrus, however, their responses differed. This correlation has inspired the question of whether the hindering of smell would inflict upon changes in regard to taste. Various fruits are to be given to individuals to record the time it would take for one to accurately determine the produce. Gender correlations, in addition to overall correlations are to be studied.

314-01 Colors: The way to success

Ashley Chin & Justin Chow (Ms. Katzoff – Behavior & Social Science)

Studies have shown there is a direct correlation between color and a person's emotion. Colors such as yellow are considered to be positive and darker colors such as maroon and black have conveyed to be dull/negative. However, it's not yet known whether or not color can play a role in academic performance. Brighter colors that convey a positive message may improve how well sophomores do on their assessments, due to the fact that they are more eye-catching, and bring upon more positive emotions on humans. This study will be experimenting on a research group of approximately 100 sophomore students. Furthermore, this study has shown that students who were administered assessments on yellow paper received higher exam scores than the control (white paper) and the 3 other experimental groups (blue, green, and red paper).

316-06 Observing the Spectral Absorption of Different Colored Solutions Through a Cell Phone Spectrophotometer

Carolynn Cortez & Shaireen Akter (Ms. Goldstein – Chemistry)

Every day people are exposed to different colors and scientists have researched why different colors exist. Different objects consist of different colors because they absorb certain colors and reflect others. The colors that are reflected become the colors that people see. In this experiment we are going to be researching how colors absorb different amounts of wavelength, in order to see the impact on people in everyday life. To see this spectrum, different solutions are created by mixing food coloring and water. For this case a spectrophotometer is used to measure the intensity of light. A homemade cell phone spectrophotometer can be made at home through the use of different materials, including coin cell batteries and LED lights. To further analyze, a spectrophotometer software was used to create data of each sample. This research resulted in a better understanding of the colors that people see and observes the scientific reasoning behind why people may see colors a certain way.

316-14 RFID: Blocking Radio Frequency Identification Signals

Jaylene Cruz (Ms. Goldstein – Computer Science)

Radio Frequency Identification, also known as RFID is the use of radio waves at various frequencies to transfer data. This technology is used in credit cards, casino chips, dog trackers; even golf balls can use RFID. As RFID usage increase the risk of RFID credit card or passport theft also increases. One way to combat this issue is by finding a material that is capable of blocking these RFID signals. After testing several materials, using an RFID

kit that can read the emitting radio signals from RFID tags, solid metal materials such as aluminum foil and copper sheets has proven to be capable of blocking RFID signals. Metal materials interfere with radio waves which can be useful with the protection of anything that uses RFID signals.

320-12 The Effect of Substrate Concentration on the Activity of the Enzyme Catalase

Serena Duran & Victoria Habbchy (Ms. Katzoff – Chemistry)

This project explored the reaction between hydrogen peroxide and the enzyme catalase using yeast. Case one explored the effects of different concentrations of hydrogen peroxide (H2O2) on the amount of oxygen gas (O2) released. Case two investigated the effects of a yeast solution heated to 30 degrees Celsius on the release of oxygen gas. It was found that heating the yeast solution resulted in the yeast catalyst, catalase, being denatured making it harder for the reaction to occur, varying the amount of gas released. This resulted in the volume of oxygen gas released from the reaction to be lower than in Case 1. Moreover, this exploration is relevant as hydrogen peroxide is found in hair dye and has a relation to hair color as people age. Furthermore, the same reaction is used to fight bacteria in the vagina and catalyzes the reduction of yeast bacteria. This project demonstrates how catalase is broken down and what it looks like while including elements of heat and concentration.

316-05 The Effect of Cardiovascular Exercise on Systolic Blood Pressure of Teens

Basit Ejaz & Ali Leventeli (Ms. Goldstein – Medicine & Health Science)

A person's measurements of their circulatory system has been shown to be reflective of overall physical well-being and health. For this particular project, we wanted to know if cardiovascular health had an effect on a person's blood pressure. To do this we took the blood pressure measurements of ten female and ten male individuals. Five out of the ten females and five out of ten males got regular amounts of cardio exercise. Regular meaning at least one hour a day for five days a week. And we compared the systolic blood pressures of the male and female persons who exercised to those who didn't to see if there was any correlation between exercise and lower systolic blood pressure.

316-12 Great White Shark Tracking

Tristan Ene (Ms. Goldstein – Animal Science)

Great White Sharks are very active throughout their lifetime. They are known to be found all over the world and can migrate thousands of miles in a single year. The purpose of this project was to identify patterns in these migrations and how temperature may affect them. This was completed through the use of the Ocearch shark tracking website, which tracks sharks through satellite tags as they migrate and through the use of the seatemperature.com and NOAA databases of ocean temperatures. By looking at where a shark was during a certain month and the average sea temperatures during that time, it can be determined where sharks are during certain months and if the temperatures are the cause of them being there. Overall, there was a correlation between the sea temperatures and the locations of the sharks as shown by the data.

320-07 The Relative Probability of Banking a Basketball

Nadzeya Fliaha (Ms. Goldstein – Mathematical Science)

Playing basketball and getting the shot in is all dependent on one's distance from the basket and the angular position of the player relative to the basket. The amount of 'backboard space' (amount of space one has for making mistakes and still making the shot) is an indicator of how easy it is to score. This study was performed to test how different positions on the basketball court from a fixed distance, impact the probability

of getting the shot in given that the height, spin, and speed of the ball is constant. Through the use of geometry and basic statistics, the angular position of the ball can be calculated. This information can then be compared to other positions on the court to determine which position, statistically, is the best to shoot from. This experiment involves basic mathematical concepts such as the Pythagorean Theorem, relative probability, angle of reflection and angle of incidence, and basic algebra.

318-10 Different Rates in Which Different Proteins Denature

Jason Goyfman & Arda Aydin (Ms. Goldstein – Biochemistry)

Protein denaturation is a chemical process in which proteins the molecular structure of proteins break down due to applications of heat or radiation, heat in this experiment. in this experiment we are trying to find out rates in which different proteins denature, and what temperature it occurs. The proteins that were used in this test were eggs (albumen) and powdered milk (casein). Variables were kept constant with accurate results during measurement. This topic is very important to understand because proteins are one of the most abundant organic compounds in the human body. They aid the body in completing biological processes that consist of protein denaturation, such as breaking down food in the stomach, keeping the body healthy, and aiding in psychological events. Proteins and the process of denaturation keeps the body at equilibrium and achieves homeostasis.

320-15 Intelligent Slime Not Mindless Grime

Kelly Guan & Jessica Zheng (Ms. Katzoff – Microbiology)

The purpose of this study is to identify the ability of the slime mold Physarum polycephalum to find the shortest path through a maze with different food sources. Previous researches have tested the ability of the P. polycephalum using only one food source (oatmeal flakes) within the maze. However, in this study, two food sources with nutritional characteristics were used in the maze. The goal was to test how fast the slime mold can grow to complete the maze with oatmeal flakes compared to being grown with cooked rice. We found that the P. polycephalum completes the maze the fastest when fed with cooked rice. Scientists are able to use this information provided by the P. polycephalum to establish the most efficient routes within the railroad system. In addition, the P. polycephalum doesn't have a brain nor nervous system however, it can still solve mazes, connect substances together, escape from petri dishes, and control its diet. This introduces new ideas into the field of science.

320-13 Abstract Emotions

Edward Guiracocha (Ms. Goldstein – Behavior & Social Science)

Art is well known to affect people's emotions. A specific form of art called abstract art especially influences the emotions of people in several ways. Throughout this experiment, 25 adolescents, 25 adults, and 25 children were asked to describe their emotions on a scale of 1 to 10 where 1-4 indicated a depressed emotion and 5-10 indicated a content emotion after viewing 4 distinct images of abstract art. From the results obtained, it is depicted that both the adult group and children group within this experiment mainly felt content after viewing the 4 distinct abstract images. On the other hand, the adolescent group mainly felt depressed after viewing the 4 distinct abstract images. In conclusion, from this experiment, it was seen that abstract art was proven to affect the emotions of people of all ages in both beneficial and detrimental manners.

318-09 Feed the Scallions

Cui Ling Guo (Ms. Goldstein – Plant Science)

Though it may not be realized, much of our food wastes can be recycled into food composts. Food composts are comprised of inedible, decaying leftovers that can be used effectively as organic fertilizers. The purpose of this experiment is to observe the effectiveness of different food composts on plant development. The height of scallions, which is a type of herb, will be measured as the dependent variable. Four composts from different food groups (banana peels, shrimp shells, chicken bones, lettuce) are tested as the independent variables. In a two-week time frame, it was found that the lettuce compost produced the tallest scallion. This finding is relevant, because there is an urgency of mass food production in many third world countries. Not only can food composts be reused as natural fertilizers, they can improve agriculture in an environmental, budget friendly way.

316-09 The Effects of Acid on African Marigolds

Neal Haulsey (Ms. Katzoff – Plant Science)

This project aims to determine the effects acid will have on the survival of African Marigold plants. Information was required on what pHs they are most compatible with, as well as what pHs are considered dangerously acidic to serve as a simulation of acid rain. Three groups of six African Marigold plants with numerous flowers on each were showered regularly over a 14-day period with pH-neutral water, a sulfuric acid dilute, and a nitric acid dilute. ANOVA tests revealed that the acid had no significant statistical difference on the frequency of the flowers dying. However, the mean death rates show that sulfuric acid slightly has the worst effects, while pH-neutral water has the lowest rates. If this experiment were to be performed for a longer period of time, the differences could be much more significant. This experiment and the data gathered can be used as a warning of the effects of acid rain on the flowers, and what acids must be used less in industries to prevent this phenomenon.

314-16 The Degradation of Vitamin C Through Cooking

Nasrin Kashem & Almedina Mulic (Ms. Katzoff – Chemistry)

The purpose of this experiment is to figure out the effects of heating vitamin C for different periods of time. The vitamin C or orange juice was heated for two different intervals of time and the degradation of the vitamin was compared. The results that were discovered was that there was no correlation between the amount of vitamin c being destroyed and the amount of time the orange juice was heated. An ANOVA was performed with the resulting p-value being 0.0678270745303981, it is above 0.05 which allows the null hypothesis to be accepted. Overall there were no difference or correlation with the boiling times of orange juice and vitamin C degradation. This information will be beneficial for public knowledge because it clearly shows that not all vitamins could be degraded from cooking, so it should not be a concern when it comes to getting vitamin C through cooked meals.

314-02 The Ability of Chiral Glucose Molecules to Rotate the Plane of Polarized Light

Alyssa Kattan (Ms. Goldstein – Chemistry)

Chiral molecules are pairs of chemically identical particles that are constructed in the mirror image of one another. Some are considered 'optically active,' which means that they possess the ability to rotate the plane of polarized light; When a light wave penetrates through an optically active solution, elastic scattering results in the rotation of the light wave's plane of propagation. This process is known as polarization. Being that glucose is an optically active molecule, you can screen light waves through it and observe

how it rotates this plane through a visible change in brightness. The higher the concentration of glucose, the larger the angle of rotation will be.

314-14 The Biomechanics of Pitching

Chris Kelly (Ms. Katzoff – Physics & Space Science)

Baseball is considered America's game and the nation's favorite pastime. This experiment observes the effects of altered biomechanics, which is of the human body in motion, on an intrinsic role on the baseball field, the pitcher. Pitchers deliver the ball to the plate through use of the stretch, which requires only a leg lift, whereas the windup requires multiple steps prior to a leg lift. Observations were made on what throwing motion allowed subjects to attain a higher velocity. Research pertaining to the experiment was collected by measuring the velocity of pitches thrown through the use of a radar gun, from different pitching motions, and statistically analyzed through the use of t-Test: Two-Sample Assuming Equal Variances and ANOVA Single Factor tests. Findings indicate that there is a statistical difference between the stretch and the wind up, however, higher velocities are attained in both the windup and stretch over the course of the trials.

314-12 Cracking Hashes

Suraiya Khoja (Ms. Goldstein – Computer Science)

The length and complexity of a password dictates the amount of time it takes for the information being protected to be exposed through hacks. Since concerns over simpler passwords not being efficient in protecting information emerge, this experiment was designed to provide statistics proving that shorter passwords take considerably less amounts of time than a longer password with numbers, lowercase and uppercase letters, and special characters would. Using the Hashcat algorithm, five different attacks are used to crack various passwords, ranging from the simpler four lettered passwords to the most complex of the ten lettered passwords. This procedure ultimately determines the time it takes to crack the password, which either shows how easily or how difficult it could be to crack a password, depending on the variations being used. Results of this experiment are meant to illustrate the importance of creating more complex passwords to ensure protection of information.

320-06 Effect of Chemical Stressors on Daphnia's Heart Rate

Anna Kozina (Ms. Goldstein – Animal Science)

Daphnia, commonly called water fleas, are a freshwater zooplankton found in ponds and lakes all over the world. Daphnia advancing not only their own survival, reproductions, and development but also playing a vital role in the ecosystem and for humans. Ecologically, Daphnia is an important component of freshwater food chains, consuming primary producers such as algae, bacteria, and other small organisms, and in turn being prey for other carnivorous aquatic animals. Also, for humans, Daphnia is a valuable species for biological study and as an indicator species. Their translucent body makes them excellent subjects under the microscope, as one can observe the beating heart. This experiment can also be done by testing different chemical stressors on Daphnia such as using caffeine or energy drinks and observe an increase in heart rate. The data collected from this experiment reveals that two different chemical solutions have a significant effect on the heart rate of Daphnia.

318-02 How First Looks May Be Deceiving

Garrett Lee (Ms. Goldstein – Behavior & Social Science)

The project being conducted is meant to test how the perspective of an individual can change so drastically in a short period of time, and also to identify if most individuals

avoid those who have committed crimes. Most individuals tend to believe in stereotypes, which causes them, to avoid others based on their background or ethnic group. Now do most people in society follow these stereotypes, and avoid people based on this. Asians, homeless people, Muslims, and prisoners are examples of these stereotypes. Exactly 25 people were tested by scoring how much they would be acquainted with each of the people in 4 sets of images, with 2 images in each set. They will score using a scale of 1-10. After background information will be presented to the same 25 individuals and they will score the images a second time. The goal will be to find information if the individuals opinion's change.

318-03 Corrosion of Steel and pH

Jessica Lin & Lameya Rahman (Ms. Goldstein – Chemistry)

This experiment tests the effect of pH on the corrosion rate of steel nails. The hypothesis was that lower pH increases corrosion rate. To test the hypothesis, steel nails were submerged in 80 grams of either bleach, Windex, white vinegar, Listerine Cool Mint, HNO3 and H2SO4. The days it took for corrosion to appear on the nail was recorded. The pH of each liquid, was calculated using red cabbage as the pH indicator. When the nail corroded, it was removed from the liquid and the liquid was weighted. This weight was subtracted from 80 grams, the original starting weight, to represent the weight of the corrosion amount. The ANOVA Single Factor test showed that pH affects corrosion, therefore 15 t-test between each liquid were conducted to know specifically where the difference occurred. The results showed a significant difference between 2 testing conditions; the mouthwash and white vinegar, and bleach and HNO3.

318-08 The Effect of Breaks on Learning New Information

Sammi Lin & Vivian Chong (Ms. Goldstein – Behavior & Social Science)

The primary role of a teacher is to make sure that their students understand the concepts being taught. While there is a lot of information to be taught, teachers make sure that their students are given enough time to absorb it before testing them. However, is this method actually effective? Some students may learn better when given time to process information and others may forget it. This experiment tests the effectiveness of giving breaks on a student's ability to learn new information. In order to test this, participants were split into two different groups—Break Group and No Break Group. Both groups were taught 10 new words through a video and were later quizzed on. The Break Group received the quiz a day after learning the words, while the No Break Group received it immediately after. Results showed that there was no significant difference between the two groups' scores, implying that regardless of whether or not students are given a break, it won't affect their performance.

320-14 Testing Accuracy of Children, Teens, and Adults

Muhammad Mamarasulov (Ms. Goldstein – Behavior & Social Science)

The purpose of this project is to explore whether humans can take a grasp of numeric values greater than 3. There is a theory that humans can only intuitively grasp the numbers 1, 2, & 3. Any more than that and the humans understanding is not numeric value but patterns or abstractions of what the brain is looking at. Therefore when seeing significant amount of green dots on a given board the human brain may see patterns. This project is testing the accuracy of three groups of people within the ages 12 and under, 13-19, and 20-60 within a time frame of a couple of seconds. The results from the experiment supported the hypothesis and proved the fact that adults tend to be less accurate when looking at significant amounts of green dots. This is primarily due to the fact as humans age their nerve fibers breakdown and their conduction of speed decreases. Therefore the study proves that the lack of reaction time has an effect on the subject's ability to accurately define the number of dots.

314-08 Calculating the Speed of Light Using a Microwave and a Laser

Blessin McFarlane & Otabek Islomjonov (Ms. Goldstein – Mathematical Science)

Electromagnetic waves are waves that can travel through the vacuum of interstellar space. These types of waves cover a huge range of frequencies, from high-frequency gamma rays and x-rays, to ultraviolet light, and infrared light, and on into microwaves. As the frequency decreases, so does the energy. The wavelength of an electromagnetic wave is inversely proportional to its frequency. So waves with high frequency have short wavelengths, and waves with low frequency have long wavelengths. The purpose of this experiment is to use waves' physical properties to find the relationship between frequency and wavelength and their effect on wave speed. We found this relationship using a microwave and egg whites (wavelength & frequency), as well as a laser and gelatin (refractive index & velocity). While the microwave experiment was used to detect the accepted speed of light, the laser experiment was used to find the speed of light through a medium as opposed to a vacuum.

314-03 Fermentation on the Production of Biofuels

Jubaida Mehak & Zahra Mehdi (Ms. Goldstein – Chemistry)

This experiment was conducted in order to discover a new method of producing biofuels. Biofuels are used as substitutes for oil, oil is needed for various reasons. Oil powers our motor vehicles and machines. However, due to tension amongst oil-bearing countries and the United States, obtaining oil in the near future might become quite difficult if relations doesn't ease up. When cornstarch and yeast are mixed together and fermented, ethanol is then produced. Ethanol is a type of biofuel that is able to power cars and machines, just like oil. Therefore, if cornstarch is abundantly used then we would have huge amounts of ethanol to power our devices. In this experiment, the concentration of cornstarch is increased as the concentration of yeast and water remain the same. The cornstarch and yeast are mixed together and timed for 5 minutes. Then it is determined whether or not the solution has been fermented, which can be achieved by measuring how far the solution had rose in millimeters.

314-10 Aloe Vera Antifungal Properties Effect on the Molding Rate of Strawberries

Jessica Meza Pineda & Laura Rosas (Ms. Katzoff – Plant Science)

This experiment is primarily based on the works of Prakash P Athiban, Bikash Jyoti Borthakur, S Ganesan, and B Swathika, of the National Health Institute. The experiment conducted in class was simpler and consisted of the use of only a mixture of aloe vera and 20% ethanol, and raw aloe vera. It was found that neither aloe vera nor the solution makes any significant impact on the molding of strawberries.

316-03 Ladybugs vs. X-ray Radiation

Noor Mohammad & Alana Neria (Ms. Katzoff – Animal Science)

X-rays are an essential type of technology used to assist those associated within the medical world. Compared to previous studies where gamma and nuclear radiation were used, the main purpose of this project is to determine the effects of X-ray radiation on ladybugs. This can be related to real world situations in order to understand how electromagnetic radiation, coming from X-rays, can be harmful to organisms including humans. As a result of this experiment, the data shows that there were several physical changes in the ladybugs including color change to a darker tone, loss of spots, becoming more energetic and an increase in death rates. In conclusion, irradiating ladybugs using an X-ray results in multiple physical changes within them.

314-07 Conformity in Midwood High School

Duha Mousa (Ms. Katzoff – Behavior & Social Science)

Peer pressure is the idea of being influenced by one's peer group. Teenagers, in particular, are known to be easily influenced by others. This study not only tests whether peer pressure really has an influence on midwood high school students, but also evaluates whether the subjects of the questions or grade of those being tested are influential factors that should be assessed. The conclusion reached is that there is indeed statistical evidence proving the presence of peer influence on midwood freshmen, sophomores, and juniors. However, there is no statistical evidence that indicates that the subject and grade of the participants have an effect on their ability to answer said questions. This information is useful in many professions that incorporate social interaction with teenagers because in order to properly communicate, one must first take into account the situation and social pressures that the other party may be facing.

316-13 The effect of climate on the sustainability of solar and battery powered cars

Diyora Mullaeva & Sally Gao (Ms. Katzoff – Engineering)

Using past studies conducted by HOMER software analysis on a designed car as a guideline, the purpose of this experiment reinforces the sustainability of SPC and BPC under sunny and cloudy conditions. Battery powered cars (BPC) are nonrenewable since disposing the lead acid batteries release toxic hydrogen gas and sulfuric acid. Technological advances in solar powered cars (SPC) have introduced alternate forms of transportation that utilize electrical motors to generate electricity without pollutant emission. Upon this experiment, the speed acquired by both cars to reach a certain distance was observed, thus the climate effects on the cars was identified. The analysis confirmed that the SPC acquired a higher rate of speed on a sunny day while the BPC obtained a high speed rate on a cloudy day, depicting an inverse relationship. This research will indicate the use of transportation that will benefit humans while persisting environmental problems such as global warming and pollution.

318-14 Frictions role on Mousetrap Cars Distance

Mohammad Mustafa (Ms. Goldstein – Engineering)

Friction is defined as being the resistance to motion of one object moving to another. Focusing on how friction is applied on real world vehicles is the goal of this experiment. To simulate the effects that friction has on the movement of vehicles, two mousetrap cars are made. These being cars that are powered by the lever of a mousetrap, to move it forward. By adding rubber to the back wheels of one of the two identical cars (a variable that is added- known to reduce friction so it will serve as the car with less friction) and testing it with the other car (control of the experiment) for variance in distance traveled, this experiment will reveal the effects friction plays on distance traveled and what this means.

318-04 Cybersecurity: Simulating Hacking through the Air-Gap

Victor Noel (Ms. Goldstein – Computer Science)

The safety of air-gapped computers is left to be desired as a result of the 2010 Stuxnet attack on Iranian nuclear facility. This project is created to simulate and reenact this process of hacking through the air gap without the actual use of a malware. A physical quantity was chosen (ultrasound) and was emitted by a source (computer). The sound that was emitted by the source is detected through the use of Google Science Journal on a smartphone, which can detect the frequency of the sound. In this way, the computer is able to emit data through using ultrasound. The distance of the 'signal' was determined through finding out the distance between the computer and the phone. Certain mediums

(cardboard and aluminum foil) were placed in between the computer and the phone to simulate the signal having an affected range. Five trials were made and it was hypothesized that if cardboard was the medium, the range of the 'signal' would decrease and have the most significant change.

320-05 Makeshift Polarimeter: Chiral Molecules and Angle of Polarization

Tanisa Rahman & Nolani Carter (Ms. Goldstein – Chemistry)

Chirality is a property of a molecule in which the mirror image of the molecule cannot be superimposed. Glucose ($C_6H_{12}O_6$) is a chiral molecule. Glucose exhibits chirality. Glucose was used to demonstrate how chiral molecules change the angle of polarization of light propagating through a polarizing filter. Unpolarized light vibrates in many directions. Light can be made to vibrate in one plane using a polarizing filter. The transmission of this light can be blocked using a second polarizing filter placed orthogonal to the first. A polarimeter was created to observe the intensity of light transmitted through glucose. Increased concentrations of glucose were observed to exhibit greater changes in the angle of polarization. A 0% solution produced an average 0.1° change; a 100% solution produced an average 20.65° change in polarization. Chirality is important in the drug industry. A drug must bind to specific receptors in the human body to be effective.

318-05 Generating Pi Using Random Digits

Joel Rakhamimov & Erin Ho (Ms. Goldstein – Mathematical Science)

The probability that any two given positive integers {1, 2, 3…} are coprime (do not have any common factors) was proven to be $6/\pi 2$ (~0.6071) by Leonhard Euler using the Riemann zeta function and infinite products. This problem may be easily tested with means to generate random numbers, such as a number generator and dice. Using these tests, it becomes trivial to be able to approximate the value of pi which serves as an easy verification of Euler's findings. This allows a very important mathematical proof to be confirmed. Prime numbers, coprime pairs, and pi are ubiquitous in nature and the sciences and are used in many formulae and foundations of the world. Confirming a proof with many essential aspects of math will strengthen their position as important parts of our world.

320-03 Personality type of social media junkie

Robiya Ramziddinova & Emily Ly (Ms. Goldstein – Behavior & Social Science)

Social media sites have changed the way people communicate with each other and individuals with certain personality types are more likely to use social media as their primary method to communicate with others. The purpose of this experiment was to determine if certain personality traits are common in frequent users of social media. The research question of this experiment is: 'Are frequent users of social media more likely to be extroverted or introverted?' Our hypothesis was that frequent users of social media are more likely to be extroverts based on their extroversion percentages resulted from the Myers-Briggs assessment. Two ANOVA tests were done to compare the percentage of introversion and extroversion between low, moderate, and high users of social media. There was a significant difference between percent introversion and percent extroversion in the two ANOVA tests, so several t-tests were conducted to show this significant difference between the three experimental groups.

316-02 Electrolyte Concentration in Common Drinks

Marc Rivera (Ms. Goldstein – Chemistry)

According to the Journal of the American Academy of Physician Assistants, in 2016, sales of energy and sports drinks continued on a 7% annual rise to $25 billion dollars. Athletes worldwide spend money on sports drinks to get the electrolytes they need to stay hydrated. In this experiment, the goal was to find out which, if any common drink has the highest concentration of electrolytes. In order to test this, I used a multimeter to measure the voltage each drink produced as a current went through them. The higher the voltage, the higher the electrolyte concentration. Based on T-Tests run, it was found that among orange juice, Gatorade, Powerade, Vitamin Water, Essentia water, and tap water, there was no significant difference in electrolyte concentration. Therefore, in regard to which drink is most worth it when looking for electrolytes only, tap water was found to be the answer. Of the flavored drinks with electrolytes, the blue PowerAde was found to be the most worth it.

320-01 The Effect of Invertase on Sucrose

Stella Ruan & Yumei Jiang (Ms. Goldstein – Chemistry)

Many foods are sweet because it contain sucrose (sugar). When consumed, the sucrose will break down into glucose and fructose. In this experiment, the amount of glucose consumed from different foods will be investigated. Invertase is an enzyme in the human body that helps break down sucrose. Invertase will be added to high sugar foods such as honey, soda, and orange juice in order to determine the amount of glucose that will be digested. The purpose of the experiment is to determine how invertase will affect the amount of glucose digested and the pH of the foods. The results showed that invertase will increase the glucose concentration digested and will have no effect on the pH of the foods.

316-08 Minimizing Bacteria Growth on Cooking Meat

Defne Sener & Joemax Klipp (Ms. Goldstein – Microbiology)

Bacteria growth is everywhere but, in some areas, its more. There is bacteria growth especially on food, but we barely pay attention to it. In this instance, bacteria growth of oven and microwave cooked meat were compared to see which is perhaps a better option. A homogenize sample of meat was taken (blended and diluted sample) and was plated on a bacterial culture plate. The goal is to dilute the sample sufficiently so that individual bacteria are separated from one another on the plate, meaning that each colony will have arisen from an individual bacterium—referred to as a colony forming unit or CFU. The plate was then incubated for 4 days, and visible colonies of bacteria are then counted. The samples of raw, microwaved and oven cooked meat was placed onto a plate separately. After this process and the 4 days, it was evident that the microwave cooked meat had the least amount of CFUs. Thus concluding that microwave cooked meat has the least amount of bacteria growth.

314-13 Peppermint and Reaction Rate

Menahil Shahid & Maytha Chowdhury (Ms. Goldstein – Behavior & Social Science)

The importance of this experiment is to evaluate the effects of peppermint on one's rate of reaction, determine and test whether or not its composition has any effect on the human's ability to perform on the Human Benchmark and Sheep tests by improving concentration, in this case the reaction rate on the experimental tests. In the experiment, 20 teachers and 20 sophomore students from Midwood High School took both reaction tests for three trials; one without peppermint, one whilst taking peppermint and lastly after finishing the peppermint. Reaction rates were recorded in the data table and

analyzed by a series of ANOVA and T-tests. After having finished the experiment, it is uncertain that peppermint has a significant effect on one's concentration in terms of the reaction tests since the experiment concluded with mixed results, as half of the data from the ANOVA tests showed that peppermint did have an effect on one's concentration, while the other half showed no effects were present.

318-12 The Effect of Different Orange Juices on Vitamin C Concentration

Gabriella Shalumov (Ms. Goldstein – Chemistry)

Vitamin C is known as ascorbic acid. Ascorbic acid is a water-soluble nutrient found in some foods. People need at least 60 mL of vitamin C every day in order to prevent diseases such as scurvy. In order to determine which type of orange juice has the greatest amount of Vitamin C, an iodine solution was used on fresh squeezed, Florida orange and from concentrate. Then, different temperatures were tested to determine if the temperature has an effect on the amount of vitamin C in different orange juices. These experiments are necessary because within the last few decades, there has been an increase in sugar in orange juice rather than Vitamin C. Today's orange juice is composed of sugar, processed flavors, and other additives; these changes in orange juice are linked with the rise in obesity.

316-16 Luminol Glow vs. Heat

Tracy Shi & Zyhra Casero (Ms. Katzoff – Chemistry)

Luminol is often used in crime scenes due to its ability to detect even the slightest trace of blood. We inquired if different temperatures were able to affect how luminol reacts. Two factors were taken into account: how long does the brightness of luminol last and how bright does luminol get in different temperatures. Three different temperatures were used: cold, hot, and room temperature. Unlike previous studies, we used $CuSO_4$ crystals rather than an aqueous solution with physical interference. The most shocking result was that while there was significant difference of both how bright and how long luminol lasts in room and cold temperatures as well as in cold and hot temperatures, there was in fact no significant difference of how bright and how long luminol lasts in hot and room temperatures. This can be valuable towards real world situations since this implies that crime scene investigators have to take in account of the environment the luminol is in before concluding results.

316-15 pH and Arsenic Correlation in Baby Formula

Sarah Sookoo & Idrees Ilahi (Ms. Katzoff – Chemistry)

Many parents feed their infants baby formula which has been increasing in previous years. With few Americans looking at food labels, it is important to know what is being given to their children. This led to the question of whether or not baby formula contains harmful ingredients. When tested with an arsenic indicator kit, some baby formulas were shown to have arsenic while others showing no trace. To explain for this, the baby formulas were then tested for pH, to see whether or not there is a correlation between pH and arsenic levels. However, looking at data from the t-test, when compared to the degrees of freedom, there was no correlation between pH and arsenic levels whatsoever. When looking at an ANOVA test, there was also no correlation. This research is important in science because with infants having more susceptibility to illness compared to other age groups and Americans not looking at food labels, the lives of babies may be severely affected, which is why arsenic was tested.

316-07 Cookie: Placebo Effect

Meghan Stern (Ms. Goldstein – Product Testing)

Using the placebo effect, this experiment explores how it affects how many people enjoy two different cookies. One recipe contained brown sugar while the other contained granulated sugar. There is not much of a difference between granulated and brown sugar, except their calories. According to Anahad O'Connor, 'brown sugar contains 17 kilocalories per teaspoon, compared with 16 kilocalories per teaspoon for white sugar.' Although not significantly different, white, also known as granulated sugar is slightly healthier. Therefore, the cookies with granulated sugar is slightly healthier. As concluded by the results, there was no correlation between the rating of chocolate chip cookies with granulated or brown sugar. The original hypothesis of the experiment was not supported as demonstrated by the results found. The placebo effect did not impact students choosing the chocolate chip cookie with granulated sugar, the healthier sugar.

316-10 Delaying Fungi Growth

Shakira Thompson & Christina Chen (Ms. Goldstein – Microbiology)

Many forms of fungi grown within the environment may cause allergic reactions. Within the experiment, the correlation between essential oils and the delay of fungi growth is analyzed. A commonly known fungus is mold which can be easily grown on many objects including, bread, wood, and plants. Essential oils such as Tea Tree oil, coconut oil, cinnamon oil, and lavender oil are said to have properties that help delay the growth of fungi. By testing if these properties indeed delay the growth, a possible solution to the outbreak of allergic reaction may be found.

314-15 The Effectiveness of Various Memorization Techniques

Sonay Tsaryuk & Elizabeth Vool (Ms. Goldstein – Behavior & Social Science)

While studying for an exam, many students use memorization techniques as a tool in order to retain information and apply it properly. Techniques like storytelling, rote memorization (repetition) and photo flash cards are all common when it comes to memorization. The purpose of this experiment is to identify the most effective short-term memorization technique. Students were given a 15 minute test, where all three techniques were applied. A PowerPoint was presented to those who were tested, where they had to memorize the name of a person and their hair color. Using a Google Form, the tested individuals were required to respond to questions regarding their memory of what they had observed and heard. After a close analysis of the responses, the results revealed that using photo flash cards is the most effective memorization technique. This information can benefit teachers and students by influencing their decisions in choosing the most effective method of memorizing information.

318-13 The reaction rates of different coffee brands

Enid Wong & Tanzena Haque (Ms. Katzoff – Product Testing)

The purpose of this study is to display the correlation between caffeine content in coffee and its impact on the nervous system, due to the stimulants eliminating fatigue, increasing concentration, and improving focus. This study uses three different brands of coffee; Nescafe, Folgers, and Starbucks, to test out which product is most efficient in improving one's alertness and concentration rates through the examination of reaction rates after consumption, thus showing how alert it makes consumers. When comparing reaction rates of the participants prior to consuming coffee and after consumption, it shows that there is a significant difference in the data relating to how fast their reactions have changed. This shows that coffee has a relatively high caffeine amount; strong enough to quicken a person's brain functionality. As coffee is consumed daily, it should

be taken in account how fast the stimulants would respond within their bodies and if brands really matter.

318-07 The Effect of Dissolving Urea Across Various Aqueous Solutions

Jeniffer Wu (Ms. Goldstein – Chemistry)

Cold packs are a convenient and accessible component to first aid treatment. Most common cold packs contain urea and water. When a cold pack is used, the water bag is squeezed and the water then reacts with the urea in a process of endothermic reaction. An endothermic reaction signifies an absorption of heat by urea which causes the water to cool down rapidly - leading to the instant cold relief provided by the cold pack. in this experiment, the rate of reaction of urea is analyzed based on its interaction with electrolytic (salt) and non-electrolytic solutions (sugar). The results of the experiment could help replace water as a reactant by implementing a solution that would help increase the reliability and longevity of a cold pack.

316-01 Does acidity play a role in the refractive index and in turn potential energy of fruits?

Mehnoor Yousaf & Sophia Jules (Ms. Katzoff – Chemistry)

The purpose of our experiment is to show how different fruits in different pH ranges affect the refractive index of the fruit and in turn change the energy value of the fruit. Then juice different fruits across different ranges like orange, apple, watermelon, lemon, grapefruit, and cantaloupe juice. Calculate the refractive index using a refractometer, by placing 2-3 drops of the juice on the refractometer and record the refractive index. Then we calculated the energy by using a calorimeter, heated up the fruit juice and poured it into the calorimeter and used a thermometer to calculate the energy change. Furthermore, based on the research conducted it is concluded that the hypothesis was incorrect and that acidity does not play a role in the refractive index and in turn potential energy of fruits. We can conclude that the higher the sugar content the more likely there is to be more energy produced by the fruit.

314-05 Effect of Salt Bridge on pH

Joey Yu & Henry Hua (Ms. Goldstein – Chemistry)

This experiment utilized an electrolytic cell with NaCl or MgSO4 for each salt bridge. A battery with copper electrodes was submerged into each half-cell containing distilled water, and pH changes were observed. What is known about this subject is that the cathode is the negative side of the electrolytic cell while the anode is the positive side. While the electrolytic cell is running, gas bubbles may start to form due to water being able to reduce better than the substance at the cathode, forming hydrogen gas, or water being able to oxide better than the substance at the anode, forming oxygen gas. The purpose of this experiment was to determine what solution of the salt bridge has the largest pH change and produces hydrogen gas that can be used at a greater scale as a sustainable energy resource. It was found that the cell using the salt bridge saturated in an NaCl solution yielded more drastic pH changes and produced more hydrogen gas due to the higher pH.

314-04 The Relationship Between Happiness and Intelligence Quotient (IQ)

Alina Zanub (Ms. Goldstein – Behavior & Social Science)

Studies on the effect of happiness on IQ have brought about inconsistent results thus, the purpose of this experiment is to determine whether IQ is dependent on happiness. As IQ is a factor used to predict potential academic success, the data is significant because if a relationship exists perhaps promoting mental welfare in students can induce prosperity in educational environments. The experiment was conducted via survey where subjects

completed the 'Oxford Happiness Questionnaire,' answering 29 questions relating to life satisfaction and then completed the 'Mensa IQ Test'. It was predicted that unhappy respondents would have lower IQ scores, yet, when IQ scores were graphed against happiness on a scatter plot, a correlation coefficient of approximately -0.15 emerged, suggesting a weak correlation where increasing happiness resulted in a decrease in IQ. Finally, after an ANOVA test was conducted, it was found there is no statistically significant correlation between happiness and IQ.

318-06 Effect of Magnetic Fields on the Flow Rate of Solutions

Rebecca Zhang & Esther Lee (Ms. Goldstein – Chemistry)

This research was conducted to test the effect of magnetic fields on the flow of different solutions. While previously done research tested out the flow of salt water solutions, this research enhanced on those studies by testing solutions at a higher temperature with and without the appliance of magnetic fields. These solutions are tested out at a higher temperature to find out whether an increase in temperature will alter the results. The experiment portrayed that solutions heated at a higher temperature flows faster while applying magnetic fields will slow the flow rate. Understanding the impact of magnetic fields on the flow of water and other diamagnetic substances is essential as this may expand to the study of the ocean. Earth's magnetic field may play a role in the motions of the ocean due to its possible attraction to minerals that makes up seawater, where testing the substances at an increased temperature could mimic the effect of global warming on the flow of the ocean.

318-01 Red Dye 40 Adsorption Rates

Linda Zhang & Oliwia Dankiw (Ms. Goldstein – Chemistry)

Most clothing go through a dying process that allows one to get the intense color desired on the fabrics. The dying process is predominantly adsorption. In order for adsorption to work and for people to get the color that they want, the conditions of the dying process have to be very precise. One of the most important conditions is the concentration of the dye. The concentration of the dye determines how intense the color of the given fabric is. In order to investigate the adsorption process, Kool-Aid was used as a dye and wool felt pieces was used as the fabrics. Building the spectrophotometer allows for the testing of the concentration of the Red 40 in the Kool-Aid. Using these materials, it was determined whether the concentrations of a given dye has an effect on the rate of adsorption and the color intensity.

320-04 How do different dental hygiene practices affect the relative growth of oral bacteria?

Victor Zheng (Ms. Katzoff – Cellular & Molecular Biology)

The aim was to compare different oral hygiene practices and the respective amount of bacteria present in people's mouths for each. While this was inspired from a similar project, it compares different oral practices, while previous studies focused on one practice. Based on the results, chewing gum may actually increase bacteria, opposing a few studies showing gum's bacteria-killing properties, while mouthwash killed off much more bacteria, as expected. Likewise, brushing had the same effect. Although gum may trap bacteria as it is chewed, it may spread this bacteria after prolonged periods of chewing, which could be why it had adverse effects. The toothpaste used had triclosan, and the mouthwash contained mostly Thymol and Methyl Salicylate, all of which are effective bactericides. Gum diseases often occur due to plaque and bacteria in gums. Once affected by such diseases, treatment options are available, but there is no known cure. By reducing bacteria, it can preclude these diseases.

314-09 The Factors That Affect Fears in Teenagers

Wei Tao Zhu (Ms. Goldstein – Behavior & Social Science)

The purpose of this study was to examine whether some factors may affect a teenager's fears. These factors include their gender, age, who they live with, etc. Fear is when a person may feel afraid or in danger when facing a certain situation/object. Intense fear of a situation/object is classified as a phobia, which may interfere with a person's life as they may attempt to avoid the fear by any means necessary. It is known that fears are caused by traumatic events experienced by people, but complicated fears are still not well explained. For this study, high school sophomores were given a survey regarding their fears and information by asking on a degree of 1 to 5 on how scared they are by a picture(5 meaning most scary, 1 meaning not scary at all). Understanding the factors that affect the fears teenagers have may help teenagers to better overcome these fears by adjusting their lifestyles or find new factors that may affect fears in teenagers or human beings in general.