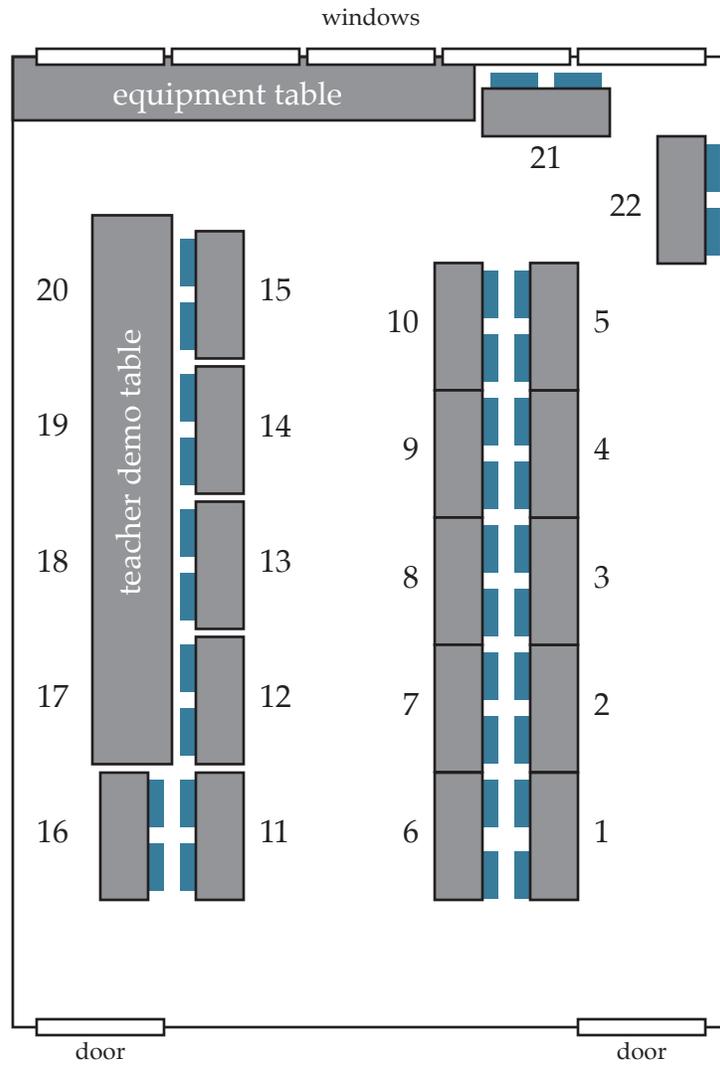


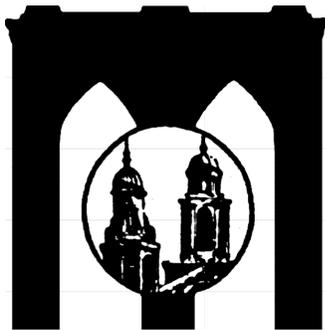


*Midwood High School
Research Program
Science Fair 2019*

Room Arrangements

A314, A316, A318, A320





2019 Midwood High School Science Fair

30 May 2019 — 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

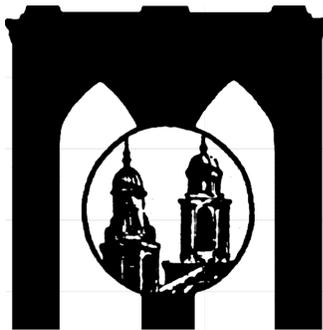
Sophomore teachers provide students with color-coded food tickets

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

Noran Abo-Donia, Mie Abouelkheir, Ilham Ahmed, Noor Asif, Ron Baazov, Kieran Bissessar, Kaelah Blanchette, Rafaella Bruzual, Dan Hong Chen, Irissa Cisternino, Jennifer Duong, Sarah Elmosbah, Mohammed Hasan, Calvin Huynh, Saba Iqbal, Hebah Jihad, Elizabeth Joseph, Jasleen Kaur, Sophia Khoja, Sabina Kubayeva, Aviva Laurenti, Wendy Lee, Kathy Mania, Naila Mirza, Alice Mo, Christina Ng, Meghan Ng, Demetrios Papazaharias, Benjamin Rudshteyn, Soanne Saint Victor, Aushna Saleem, Saleh Salem, Alma Samarxhiu, Almas Shafiq, Crystal Soo, Vincent Wang, Whitney Wong, Yukie Wong, Raymond Yu, Jessie Zheng, Mavis Zhou, Michelle Zinger, Angel Zou

Seniors

Bareera Abid, Zuha Ahmed, Amy Chen, Ashley Chen, Kevin Chen, Ahmad Choudhry, Alena Cradle Morgan, Jia Ci Deng, Daniel Gaft, Yenny Huang, Nursat Jahan, Christal Jean-Soverall, Humayara Karim, Maryam Khan, Andrew Kobrin, Eva Lai, Rui Ting (Toby) Li, Sevara Mallaboeva, Rana Mohamed, Emily Movsumova, Zara Nadeem, Fizza Nayab, Eduardo Peña Barrios, Kenny Pierre Louis, Nathan Reder, Elizabeth Redmond, Miguel Rendon Lucero, Rina Sheynin, Kamille Shivwkumar, Yvette Somersel, Susana Tzunun Yax, Annabel Xie, Basimah Zahid

Juniors

Shaireen Akter, Naffisat Atanda, Anna Azaryev, Sezer Benoit-Savci, Zyhra Casero, Ihtsham Chaudhry, Hong Wei Chen, Ashley Chin, Justin Chow, Oliwia Dankiw, Serena Duran, Tristan Ene, Nadzeya Fliaha, Gloria Glenn, Kelly Guan, Victoria Habbchy, Tanzena Haque, Henry Hua, Jasmine Huang, Idrees Ilahi, Anum Jabeen, Mariyum Jahan, Nasrin Kashem, Suraiya Khoja, Esther Lee, Jessica Lin, Emily Hoan Ly, Nisha Manahil, Blessin McFarlane, Noor Mohammad, Alana Neria, Kevin Ng, Lameya Rahman, Tanisa Rahman, Robiyakhon Ramziddinova, Laura Rosas Vidal, Stella Ruan, Defne Sener, Gabriella Shalumov, Tracy Shi, Sarah Sookoo, Meghan Stern, Shakira Thompson, Linda Zhang, Jessica Zheng, Victor Zheng

Teachers

Farhan Chowdhury, Cynthia Ly, Stephan Riemersma, Howard Spergel, Trevor Stokes, Lawrence Yu, Joel Gumbiner (retired)



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Participants

- 320-15 Mohinur Abdullaeva
pH vs. Bacteria
- 320-04 Alexiz Aguilar & Edward Li
Thermal Conductivity and TEG
Efficiency
- 314-14 Fariha Ahmed
Impact of School-Accrued Stress on
Students' Performance on Assessments
- 316-05 Sarah Akram
Can you separate the dyes in grape soda
using space sand?
- 320-17 Muskan Ali
Botany Science: Hydroponics vs. Soil
- 318-10 Zilola Ashurboyeva
Variation in Acidity in Different Types
of Vinegars
- 318-01 Salma Awan & Muhammad Javed
Effect of Time Pressure on Performance
on IQ Test
- 318-03 Jenane Benhalima & Lyna Ammi
The Effect of pH on the Regeneration of
Planaria
- 318-05 Jenna Bolonik & Monica Mesiha
Testing the Accuracy of Eyewitness
Testimony
- 316-13 Elizabeth Bozo
Which bottled water brand is the best
for you?
- 320-02 Abraham Brown & Shehan Hussain
Blocking Sound with Different Materials
- 316-02 Abide Bunjaku & Jonathan Shulman
Amount of Electrolytes in Orange Juice
vs. Gatorade
- 320-07 Jason Calangi
The Effect of Special Characters on a
Brute Force Attack
- 318-02 Abeni Chen
Clean Water through Flocculation
- 318-13 Ivy Chen & Emily Chen
Desalination vs. Salt Water
- 318-12 Tinnie Chen
Gender and the Value of Life
- 320-12 Sarah Chesser & Amanda Zhou
Banana Ripeness and Sugar Content
- 314-13 Mason Chin & Aliyah Gordon
Bacteria vs. Water
- 316-12 Winnie Chu & Sonya Liang
The Comparison of Pop Music and No
Music on the Students' Ability to
Complete Cognitive Tasks
- 316-17 Treazure DaBreo
Does Studying = Good Scores?
- 320-06 Hui Lian Deng & Shao Hua Cai
The Effect of Oxidation on Rusting Rate
of Metals
- 320-11 Briana Domingue
Chemiluminescence of Luminol
- 320-13 Talia Eman
The effect stereotypes have on
perception of others
- 314-07 Nitu Farhin & Malayka Mudassar
Constructing an Artificial Pancreas
- 314-05 Darryl Francois & Hongbin Pan
Voltage vs. Rate of Electroplating
- 314-09 Victoria Garcia & Sena Akturk
Bacteria Resistance vs. Cleaning
Products
- 314-12 Maham Ghori
The Effectiveness of Hand Sanitizer
- 320-01 Ilirjana Gocaj
The Effect of pH on Lead Testing
- 318-08 Nichole Gutierrez
The Effect of Varying Magnetic Fields
on Planarian Regeneration
- 318-17 Fion Hon & Anna Chen
Vitamin C Concentration vs.
Temperature

- 316-15 Suzayet Hoque
X-Ray Vision: Coloring the Universe
- 316-06 Xinyi Huang & Marlen Mendieta-Camaron
Phytoplankton Under Global Warming
- 314-11 Aya Ibrahim & Afzalbek Fayzullaev
The Effect of Differing Amounts of Electrolyte Salt on the Rate of Production of Hydrogen Gas
- 316-16 Zainab Ishfaq & Nicole Kravets
Best and Safest Paint Remover?
- 316-09 Dennis Kaplan
High-Speed Magnets: Exploring Faraday's Law and Lenz's Law
- 320-05 Khushpreet Kaur
Test Start Times Effect on Student's Performance
- 316-07 Aliyeh Khan
Impact of Gene Expression on Effectiveness of Transcription Factors
- 314-17 Emily Kogan & Rafaele DiMaggio
Efficiency of Aquaponics
- 318-14 Ilana Kolomiyets
Which drink has the most electrolytes?
- 314-03 Tamari Kvaratskhelia & Helen Pan
Homemade Antiseptic Soap and its Effectiveness on Killing Bacteria
- 316-04 Karen Lam & Kirsten Shyu
The Effect of Subliminals on our Decisions
- 320-16 Christina Lamar & Ellen Mokhevishvili
Filthy Phones
- 318-07 Jinnan Li & David Wu
Purifying Contaminated Water
- 314-15 Lucie Lim & Judy huang
Let's Get This Cheesy Experiment
- 316-11 Declan Lin
The Effects of Gaming on Divided Attention
- 314-16 Lanxi Lin
Determining the sugar concentration of solutions using laser pointers
- 314-02 Nhu Lu
Hormone Ethylene
- 314-10 Rachel Malinkovich
Science and Art of Cyanotype
- 314-06 Anna Mark
Vitamin C in Homemade vs. Branded Orange Juice
- 320-10 Zita Mimer & Lazizakhon Ibrakhimova
Effect of Potassium on Degradation of Gelatin
- 318-06 Harmain Munir
Man vs. Nature: Comparing the Effectiveness of Different Antacids
- 316-08 Amanda Ng & Kimberly Nguyen
Comparing Bacteria on Everyday Objects
- 316-10 Tiffany Ng & Jacklyn Vu
The Viability of Ferrofluids on Oil Spills
- 314-04 Alina Ongeyberg
The Electrolyte Challenge
- 320-08 Hannah Ramasami & Winnie Li
Vitamin C: Processed vs. Organic orange Juice
- 318-11 Hassan Rizwan & Oscar Rojas
The Effect of Varying Temperatures on Voltage Produced
- 314-08 Walter Rosales
The effect of various metals on electrical conductivity
- 316-03 Evelyn Schwartsman
Gel Electrophoresis on Food Coloring Dyes
- 318-04 Abigail Seales
Seeing Eye to Eye
- 320-03 Jessica Serheyeva
Environmental Pollutants and Their Effect on Ivy Plant Transpiration Rates
- 318-15 Victoria Tatarynova & Madelynn Yung
The effect of electricity on pH
- 314-01 Michelle Tcherevatenko & Jeanine Jourdain
Beasts of the Meat
- 318-09 Jaden Thomas & Tasnia Shadat
Water Purification Using Solar Energy
- 320-09 Samiha Uddin
The Effect of Fluorescence and temperature on the emission of chemiluminescence
- 318-16 Rachel Wong
Going Green as You Clean
- 316-01 Christy Wu
Personality Profile of Social Media Users
- 320-14 Nelly Zhang & Jenny He
Salt on the Rate of Crystallization of Solutions



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Abstracts

320-15 pH vs. Bacteria

Mohinur Abdullaeva

(Ms. Katzoff – Microbiology)

The human body is mostly filled with bacteria especially in the mouth, which is home to many fast growing microbes. In this experiment, oral ecology was studied to compare the way pH can influence salival bacteria by testing the the acidity and basicity of different substances. Throughout the experiment, orange juice, vinegar, water, clorox and ammonia were tested on salival samples to see if different levels of pH affect bacterial death. The results indicated that the products of basic pH are able to deteriorate salival bacteria unlike the acidic products. This discovery is important to show the way salival bacteria is used to break down foods through the acidic products that are consumed.

320-04 Thermal Conductivity and TEG Efficiency

Alexiz Aguilar & Edward Li

(Ms. Katzoff – Engineering)

A substantial amount of attention has been placed on renewable fuels in the past few years. Thermal power is one of many forms of energy being used today. It has been used to convert waste heat to electricity, act as a power supply for spacecraft, etc. By using a thermoelectric generator (TEG), thermal energy can be converted to electricity through a temperature differential by the Seebeck effect. However, the actual application of a TEG is both costly and inefficient. The effect of thermal conductivity on watt output was investigated to test for the changes in efficiency of a TEG. The changes in current and voltage produced by the TEG were the characteristics observed to determine changes in efficiency. Results indicated a significant increase in voltage and current by increasing thermal conductivity on the hot side and decreasing it on the cold side, ultimately leading to a direct increase in power output.

314-14 Impact of School-Accrued Stress on Students' Performance on Assessments

Fariha Ahmed

(Ms. Goldstein – Behavior & Social Science)

Previous studies have determined the effects of academic stress and its impacts on students' mental health. The stress hormone, cortisol, tends to remain consistently active during such periods of stress and can improve students' memory. However, limited studies have determined the nature of how stress can have underlying effects specifically on students' cognitive abilities. Results from this experiment suggested that most of the 22 sophomores observed categorized themselves as experiencing moderate to extreme levels of stress. A t-test proved there was no significant correlation between students' intelligence and their perceived stress levels. The stress levels support previous studies relaying how high school students tend to experience extreme levels of stress, although, the association with students' intelligence is limited and requires improved experimentation. Future experiments should contain larger samples and categorize students' stress based on the cortisol levels observed.

316-05 Can you separate the dyes in grape soda using space sand?

Sarah Akram

(Ms. Goldstein – Product Testing)

When grape soda is made we would think purple dye is used for its color. But actually it isn't, blue and purple dye is used to make the color purple. Now is it possible to separate the two dyes again. With this simple experiment at home you can do it. To separate the dyes I would be using a process called column chromatography. Column chromatography involves separating chemicals that are mixed together. I'll be using syringe, packing it with space sand and 3 different liquids-alcohol, distilled water, and grape juice.

320-17 Botany Science: Hydroponics vs. Soil

Muskan Ali

(Ms. Goldstein – Plant Science)

This study will focus on comparing two methods of plant growth that will allow a plant to grow healthy given the same seed type and growing conditions. My hypothesis is that plants grown in the hydroponic system will grow healthier and taller compared to the ones grown in soil. When doing my experiment, I discovered the hydroponic system allows plants to directly absorb the nutrients but seeds grown in soil aren't as good because the soil can hold soil-borne diseases and detrimental insects. For the plants in the soil, the average height, in centimeters, was 20-25cm. As for the average height, of the hydroponics method, was 26-30cm. These results helped me conclude that the null hypothesis should be rejected and my hypothesis was correct, hydroponics can be used as an alternative in growing plants. This means plants grown in a hydroponic system do result in taller, more healthier plants in comparison to plants grown in soil.

318-10 Variation in Acidity in Different Types of Vinegars

Zilola Ashurboyeva

(Ms. Goldstein – Chemistry)

Different types of vinegars have different acidities. In this experiment, titration was used to test the acidity of three different types of vinegars, red vinegar, rice vinegar and standard white vinegar. The vinegar solution consisted on 1 mL of vinegar, 25 mL of distilled water and 2 drops of phenolphthalein. The titrant was 0.1 M of sodium hydroxide. The results didn't show much significant difference between the red and rice vinegars. However, the standard white vinegar required more amounts of sodium hydroxide to titrate. For neutralization, the amount of H^+ ions and OH^- ions has to be equal. Since more sodium hydroxide was required to titrate the standard white vinegar, this means that the standard white vinegar is more acidic compared to the red and rice vinegars.

318-01 Effect of Time Pressure on Performance on IQ Test

Salma Awan & Muhammad Javed

(Ms. Goldstein – Behavior & Social Science)

We investigated how time and pressure affects performance between students pertaining to an IQ test. Students will be given an IQ test under a time of four minutes and see how well they perform versus students who are given as much time as they want to complete the IQ test. The controls for our experiment include the amount of questions on the IQ test and the types of questions asked. Furthermore, the students being tested will have an above ninety average and derive from the same period ten sophomore research projects class, which will be considered when determining the accuracy of the test. Upon completing this experiment, it was observed that the null hypothesis was rejected because the data showed that time pressure did have an effect on the accuracy of the results on the IQ tests between the period ten sophomore research projects class students that were timed versus the students who weren't.

318-03 The Effect of pH on the Regeneration of Planaria

Jenane Benhalima & Lyna Ammi

(Ms. Mosley – Biochemistry)

This lab was conducted in order to determine the impact of pH on the regeneration of planaria. Planaria were bisected in petri dishes containing solutions with pHs of 5, 6, 7 (the freshwater solution/control), 8 and 9. The growth of the planaria was observed and measured in cm. It was hypothesized that if an environment is too acidic or alkaline, it will slow down the rate of regeneration in planaria. Over the course of 7 days, the planaria exposed to acidic and alkaline environments regenerated at a slower rate than planaria in neutral solutions. Upon analysis, the p-values of the solutions with pHs 5, 6, 8, 9, were roughly 0.0072, 0.0059, 0.0058, 0.0009, respectively. This led to the conclusion that there is a statistically significant difference between the rate of regeneration among planaria in acidic/basic solution when compared to that of neutral solution. Based on this data, we can conclude that acidic and alkaline environments slow the rate of regeneration of planaria.

318-05 Testing the Accuracy of Eyewitness Testimony

Jenna Bolonik & Monica Mesiha

(Ms. Goldstein – Behavior & Social Science)

Our project focuses on the accuracy of eyewitness testimonies after crimes occur. When an event occurs, the brain remembers it in pieces. Studies show that human memory is altered after an event occurs, potentially changing the real story. This is significant because many people's fate is reliant on such testimonies. In the experiment, it was expected that the "testimonies" would be unreliable. The purpose of the study was to test this idea and see how much "eyewitnesses" could remember after watching a video of a crime. There were 2 subject groups, students and adults between ages of 25-50. The initial results were compared to how much they could recall after 4 days. After completing a t-test for the student results, the findings were that the amount of time between trials makes a difference in the reliability of their testimonies. However, after completing a t-test for adult results, it was found that the amount of time between trials doesn't make a difference in their reliability.

316-13 Which bottled water brand is the best for you?

Elizabeth Bozo

(Ms. Mosley – Product Testing)

This experiment was conducted to determine the difference in levels of ten substances that include: total alkalinity, pH, hardness, iron, copper, lead, nitrate, nitrite, residual chlorine, and fluoride between five water bottle brands: Poland Spring, Dasani, Fiji, Evian, and Smartwater. The experiment was predicted to show little difference between the bottled water brands. In order to test these ten substances in the bottled water, a drinking water testing kit was used which included a strip of paper that tested for these ten things when submerged in water. The major finding from this experiment were some water bottle brands contained more alkalinity and hardness than others which is beneficial to different parts of the body, but overall they were all extremely close. From the evidence it can be concluded that there should be no preference when deciding which brand to get as they all are extremely similar in component levels of drinking water.

320-02 Blocking Sound with Different Materials

Abraham Brown & Shehan Hussain

(Ms. Katzoff – Physics & Space Science)

In big cities like New York, noise is a huge part of life. Sleeping and concentrating can be difficult, due to everyday noise nuisances. The ability of different materials to lower emitted decibel values was tested by playing different sounds. Wood, cardboard and plastic were placed around a speaker and using Google's Science Journal app, the emitted decibels were measured for each sound played. The sounds selected were used to mimic

everyday situations such as traffic, construction, and playground noise. Although there was not a statistically significant difference between the materials used, cardboard blocked the most sound on average, and plastic the least. However, all the materials successfully lowered sounds by at least 13 decibel values with a maximum decrease of 23 decibels. The results suggest that future experimentation should be done for an even greater variety of materials and thickness to understand which type of material most effectively blocks sound.

316-02 Amount of Electrolytes in Orange Juice vs. Gatorade

Abide Bunjaku & Jonathan Shulman

(Ms. Goldstein – Chemistry)

Sports drinks are made to give energy to athletes, and rehydrate them quickly and sufficiently. Electrolytes are minerals in our body that impact the pH level in our circulatory system. Muscle work is additionally constrained by the measure of electrolytes in our body. The most widely recognized kinds of electrolytes are calcium, chloride, magnesium, phosphorous, potassium, and sodium. Many advertisements promote the surplus of electrolytes in these drinks, which your body loses as you sweat. In this experiment, we will compare the amount of electrolytes in a sports drink with those in orange juice since orange juice has calcium, potassium, etc. This is to find out which has more electrolytes to renew the ones you lose as you work out or play sports. Our results show that orange juice has more electrolytes than Gatorade.

320-07 The Effect of Special Characters on a Brute Force Attack

Jason Calangi

(Ms. Katzoff – Computer Science)

The world has been seeing an increase in the number of cyber attacks and data breaches as more people are gaining easy access to the internet. This makes it harder for government agencies to regulate data and potential threats that may target critical infrastructure such as hospitals, power grids, and telecommunication services throughout the world. The purpose of this project is to find the effect of special characters on a brute-force password guessing algorithm as strong passwords are the first line of defense against hacker intrusions. The brute-force program, acquired from science buddies, was run and modified on the coding language Python 3.7 and the special characters that were included in the algorithm include !@#\$%^&*(){}[]<>.:. It is expected that a 5 character password with more special characters will take longer to decode than a 5 character password with no special characters.

318-02 Clean Water through Flocculation

Abeni Chen

(Ms. Mosley – Earth & Environmental Science)

The purpose of this experiment is to find the best amount of flocculant concentrations needed to clean up dirty water. This was done by using the method of flocculation and building a turbidimeter that measured the amount of suspended solid concentrations in the water. Flocculation is a process where alum ($\text{Al}_2(\text{SO}_4)_3$) are used to help weigh down suspended solid, as a result of reacting to it, so that they can be later removed. In this particular project, the same amount of soil was added to each of the six cups containing 100 mL of water. To test which cup has the least amount of contamination, each cup will then be treated with a different amount of alum. From the results obtained, it can be concluded that the sample of dirty water with the largest amount of alum added, which is 4.5 mL, was the cleanest. Flocculation is a commonly used technique in water treatment center and developing countries since it is easy and effective way to turn dirty water to safe and consumable water.

318-13 Desalination vs. Salt Water

Ivy Chen & Emily Chen

(Ms. Katzoff – Earth & Environmental Science)

As 97% of Earth consists of salt water found in oceans, 2% found in glaciers and ice caps, that leaves only 1–3% of freshwater from Earth being potable. The scarcity of freshwater poses a challenge with an increasing population, as water demand will increase up to 56% by 2025. Therefore, the experiment explores the process of desalination by removing contaminants from saline water using sunlight. By observing the effect of sunlight on the two different salinity mixtures, it can be concluded that the mixture with lower salinity collected the largest amount of fresh water compared to the mixture with higher salinity. Due to the fact that saline water has both salt and water molecules on its surface area, the salt prevents water molecules from evaporating faster in the high salinity mixture compared to the low-salinity mixture. For survival purposes, desalination helps decrease the rate of dehydration in regions where freshwater is limited.

318-12 Gender and the Value of Life

Tinnie Chen

(Ms. Mosley – Behavior & Social Science)

This study was conducted to determine whether there was a difference between the ethics between genders, more specifically, what characteristics make a person's life more valuable. Based on a thorough analysis of previous studies, it is probable that there is a variation in ethics. Thirty participants were given a test that would determine what characteristics they consider make a person's life more valuable when compared to other lives, such as age. The formula $P(A | B) = P(A)$ can be used to determine whether two factors affect each other. It was done several times, for example, it was used to determine whether the gender of the participant affected whether they value the life of people who are physically fit over those who are not. Generally, the gender of the participant proved to have an effect on the value of life, however, the differences were very modest. Overall, though there is a difference between the ethics between genders, it is very insignificant.

320-12 Banana Ripeness and Sugar Content

Sarah Chesser & Amanda Zhou

(Ms. Goldstein – Mathematical Science)

The purpose of this experiment is to measure the sugar content of bananas at different ripeness levels using the angle of refraction. When using fruit in desserts, it is beneficial to know the sugar content of fruits to bake a delicious dessert. In this case, how the ripeness of a banana affects sugar content. Research and personal experience showed that the riper banana will be sweetest. Nutrient content changes slightly as fruit ripens. As bananas ripen, the starch is broken down into sugar. To begin, bananas at three different ripeness levels were diluted with water to make a transparent solution. Using a laser to find the index of refraction of each solution, sugar content was able to be determined. The process was repeated 10 more times. The higher the index of refraction, or the 'n' value, the more sugar the banana contains. Results show that the very ripe banana has a higher 'n' value. The hypothesis was proven to be correct.

314-13 Bacteria vs. Water

Mason Chin & Aliyah Gordon

(Ms. Mosley – Earth & Environmental Science)

The purpose of this experiment is to test the cleanliness of tap vs bottled water and to determine the effect boiling has on the bacteria in water. Before the experiment started we thought that there would be less bacteria in bottled water because it is advertised to be cleaner than tap water. This prediction was not based on any law or anything scientific, however we came to this conclusion through societal ideas. We tested this by growing bacteria on agar in a bacteria incubator. After waiting for the bacteria to grow, we found that our hypothesis was not supported by our data because we saw more growth of

bacteria in bottled water than tap water. Also we concluded that boiling water does decrease the amount of bacteria, however only by a small amount. Overall, while society might portray bottled water as cleaner than tap water, it is not cleaner than the water we tested and can assume this is all water.

316-12 The Comparison of Pop Music and No Music on the Students' Ability to Complete Cognitive Tasks

Winnie Chu & Sonya Liang (Ms. Goldstein – Behavior & Social Science)

Listening to music has shown to relax students as it can lower levels of stress and anxiety when performing difficult academic tasks. There are studies that have shown that listening to music while performing cognitive tasks may improve performance. However, there are also studies that have proved that performing cognitive tasks while listening to background music can negatively influence performance. Specifically, this study focuses on the impact of pop music on the cognitive abilities of high school students completing academic tasks such as tests. In this given experiment, two groups of people, twelve students each, are separated. One group takes a test without listening to any music while the other takes the same test while listening to pop music. After all students take the test, the tests are graded and the results are organized and recorded. Results based on various subjects such as math, chemistry, and grammar have shown that music positively influences cognitive performance.

316-17 Does Studying = Good Scores?

Treazure DaBreo (Ms. Katzoff – Behavior & Social Science)

It is widely assumed by students and parents that when a student prepares and reviews for a test that the score is higher, but is this true? Is it possible that scores actually don't reflect how much the students studied? In this experiment 16 students were asked to complete a the same short online IQ test in a classroom setting within a time frame of 45 minutes. The students were then placed into to one of two groups randomly. Students who were placed in group 1 were asked to practice one IQ question every day, while the students in group 2 were asked to live their lives exactly as before with no particular changes. Two weeks later the same students were asked to retake the IQ test and the results would solve this perplexing puzzle of a question.

320-06 The Effect of Oxidation on Rusting Rate of Metals

Hui Lian Deng & Shao Hua Cai (Ms. Goldstein – Chemistry)

Copper, iron, and steel are used to construct water pipes since the 20th century. Water pipes transport consumable water for people, however, the quality of water was affected by the chemicals that have been implemented by the rusting pipes. Rust is a result of oxidation, the reaction between oxygen and metals. This phenomenon can create safety hazards towards human lives. Therefore, the purpose of this experiment is to determine which type of metals will be more suitable to be use for constructing water pipes in other words rust the slowest. Copper, iron, and steel will be place in a beaker with a mixture of both bleach and water. In every beaker, there will be 200 mL of water and 100 mL of sodium hydrochlorite which serves as an catalyst to speed up the reaction. There are 3 trials for each metal, the amount of time that each metal takes to rust for each trial will be recorded in units of seconds. In conclusion, oxidation affects iron the most, meaning the fastest rusting rate.

320-11 Chemiluminescence of Luminol

Briana Domingue

(Ms. Katzoff – Chemistry)

Chemiluminescence is the process of chemical energy being used to produce light. When enough energy is released, electrons move from a ground state to an excited state, and light is emitted. Luminol is a substance that has the property of emitting a blue light when it reacts with oxidizing chemicals like hydrogen peroxide, and sodium perborate. The purpose of this study was to test whether varying temperature has an effect on the blue glow given off by luminol. Results showed that temperature does have an effect on the glow of luminol, as the glow lasted longer in colder temperatures than in warmer temperatures. This is an important process, as it is not only used in forensics, but it can be seen through bioluminescence, a form of chemiluminescence where living organisms emit light.

320-13 The effect stereotypes have on perception of others

Talia Eman

(Ms. Goldstein – Behavior & Social Science)

Stereotypes exist everywhere within society. People assume how one may act based on the stereotypes linked towards their race. When criminal offenses become consistent, bias can be involved for witnesses. Based off of certain crimes, some races may be targeted more. This led to the question: How do stereotypes impact a person's perspective towards others? If people are shown pictures of suspects given certain scenarios, then they will pick the suspects that are assumed to do the crime because of the stereotypes linked to their race. In order to get to a solution, a survey was used. Within the survey five pictures were provided of people of different races. Along with this, three scenarios were given in which the people had to rate how likely each suspect was to do the crime. The data obtained showed that the null hypothesis should be rejected. This shows that stereotypes do tend to impact the way people perceive others. In the future, the pictures should have the same neutral faces.

314-07 Constructing an Artificial Pancreas

Nitu Farhin & Malayka Mudassar

(Ms. Katzoff – Medicine & Health Science)

The concept of regulating blood sugar levels has recently become pertinent as diabetes has progressed as a widespread epidemic within the global population. Engineering an artificial pancreas via circuits will allow for an increased balancing of the glucose levels in an individual's system. In order to imitate insulin from the pancreas, the vinegar solution is pumped into the baking soda substance that acts as the glucose. Therefore, the influx of the acidic vinegar solution works to neutralize the basic baking soda solution. With this, it is expected that the basic and acidic solutions should have decreased by half in amount. With showing the effectiveness of the neutralized substances, this is quite important to bring awareness and add to the understanding of the function of the pancreas, and the prevalent disease. Future research needs to be conducted in the development of an artificial pancreas as it needs to be continuously monitored to ensure proper reactions are taking place. Future work will be elucidated.

314-05 Voltage vs. Rate of Electroplating

Darryl Francois & Hongbin Pan

(Ms. Katzoff – Chemistry)

Electroplating is the process through which electrical energy is used to coat a thin layer of an anode onto a cathode, given that the metal being used as a coat cannot spontaneously attach itself to the surface of the metal to be coated in a molten state. In jewelry, electroplating is used to coat thin layers of expensive metals onto cheaper metals in hopes of selling them. Electroplating is also used to coat dead metals onto reactive metals to prevent corroding in things such as water pipes and vehicles. Another one of

its uses is to boost the electrical/heat conductivity of a metal by plating a more conductive metal onto the surface of less conductive metal. In this project, we explore whether or not voltage affects the rate of electroplating in a non-spontaneous reaction between two different metals. We can utilize the results to quickly electroplate metals and distribute them to the public at a quicker pace, thus boosting production and ultimately our economy.

314-09 Bacteria Resistance vs. Cleaning Products

Victoria Garcia & Sena Akturk

(Ms. Katzoff – Microbiology)

The purpose of this experiment was to investigate which common household cleaners are better equipped to minimize the amount of bacteria on common objects that are frequently used, such as mobile phones. Being that these devices are so portable, people bring them everywhere, from public restrooms, to counters, to germ-infested hands, and etc. This has presented a problem in modern technology in where we carry bacteria infested phones everywhere we go. Common household cleaners such as chlorine bleach, hydrogen peroxide, ammonia and Isopropyl alcohol were tested in order to discover the quantity of colonies on an uncleaned phone compared to a phone cleaned with each household cleaner. It is predicted that ammonia may have the strongest effect on reducing the bacteria colonies on surfaces/devices. Further testing will be continued in order to observe the full extent of the bacteria's resistance to the cleaning products on mobile devices.

314-12 The Effectiveness of Hand Sanitizer

Maham Ghori

(Ms. Goldstein – Product Testing)

This experiment is being done to see how much bacteria is left on one's hand after hand sanitizer use and using the data to validate the claims made by hand sanitizer manufacturers. Hand sanitizer bottles often say that they kill 99.9% of germs, where applied but, are the antibiotic-resistant germs also accounted for? Previous experiments done on this topic proved that hand sanitizer use did correlate to fewer bacteria growth on the hands of children; would this vary amongst teenagers, seeing that they have a better habit of staying clean? I swabbed the hands of 6 students after telling them not to wash, or apply hand sanitizer to their hands throughout the day. The process of testing two different sanitizers, Purell and Walgreens, was then followed on these students. It was found that 99.9% of germs were not removed during the process. It can be seen that although not all 99.9% of germs were removed, the hand sanitizers were successful in reducing the size of the bacteria.

320-01 The Effect of pH on Lead Testing

Ilirjana Gocaj

(Ms. Mosley – Chemistry)

My project is the effect of pH on lead corrosion. Lead is an extremely dangerous element and can be hazardous if humans consume it. In order to test for lead in household products, you can use a lead tester which uses soluble sulfide to test the lead concentration. The purpose of this is to see if varying the pH of the testing solution impacts how the lead dissolves and how the lead is detected. It was predicted that pH would affect how much lead dissolves because acidity can react with the lead, affecting its corrosion. In order to test this out, a lead sinker was placed in solutions of water, vinegar, and water mixed with vinegar. Then, the amount of lead concentration in each solution was tested. The results showed that the p-value of water versus vinegar is less than 0.05, but the p-values of water versus the mixture and vinegar versus the mixture is greater than 0.05. This evidence concludes that solutions with varying pH would affect the lead testers ability to detect lead.

318-08 The Effect of Varying Magnetic Fields on Planarian Regeneration

Nichole Gutierrez

(Ms. Katzoff – Animal Science)

The purpose of this experiment is to elucidate the connection between varying magnetic field strengths and the extent of planarian regeneration. Preliminary research reveals that weaker magnetic fields with dispersed field lines have significant impacts upon planarian regeneration, for it, in prompting radical pair recombination that gives rise to reactive oxygen species, engenders greater growth. The planarian were either exposed to no magnetic field or the magnetic field of a ceramic or neodymium magnet. The sum growth of planarian worms before and after bisection were then compared to evaluate the effect of varying magnetic fields on regeneration. The planarian had the greatest growth in the control group, validating that magnetic fields have an impact upon regeneration. These results are relevant to stem cell research because improved regeneration can better address pluripotency issues and propel the medicine utilized to treat those with neurological damage and diseases.

318-17 Vitamin C Concentration vs. Temperature

Fion Hon & Anna Chen

(Ms. Katzoff – Chemistry)

The objective of this project was to determine how vitamin C concentration varies among different citrus fruits at different temperatures. Citrus fruits studied in this project includes oranges, lemons, limes, and grapefruits which were found to have high sources of vitamin C. It was expected for the citrus fruit juices to maintain a higher vitamin C concentration at lower temperatures than at higher temperatures. Obtaining the vitamin C concentration was done by using a simple titration technique along with the use of Lugol's iodine indicator. The results in this study indicated that citrus fruits at lower temperatures required more drops of iodine, demonstrating that it had a higher vitamin C concentration which was found to be in order of orange (1.806 drops/mg), lime (1.194 drops/mg), lemon (1.161 drops/mg), and then grapefruit (0.774 drops/mg). From the data, it can be concluded that higher concentration of vitamin C are found in fruits when stored at lower temperatures.

316-15 X-Ray Vision: Coloring the Universe

Suzayet Hoque

(Ms. Mosley – Product Testing)

The purpose was to replicate space images from the X-Ray Chandra Observatory website by using a software called GIMP. This was done by taking raw FITS files from Chandra and editing those files to create an image as a product test between a free program to an expensive tool, Chandra telescope. The predicted outcome was that the image made from GIMP couldn't overlap with Chandra's image in details and color. The results showed that 5 image scored of either a 3 or 4 which means that those images has certain similar details that overlap the original image. The other 5 created images scored a 2 or 1 which means that they fail to overlap the original image. Therefore, none of the created images almost overlapped the entire original image. From the data, it can be concluded that the Chandra observatory or other NASA telescopes are more efficient at false coloring pictures than free programs such as GIMP.

316-06 Phytoplankton Under Global Warming

Xinyi Huang & Marlen Mendieta-Camaron (Ms. Mosley – Earth & Environmental Science)

The purpose of the inquiry was to test the effect of high temperatures on the oxygen production of phytoplankton. High temperatures were used to mimic global warming to observe its impacts on phytoplankton, which make 50%–85% of the oxygen in the air. In the control group, phytoplankton was set in room temperature and two experimental groups had aquatic temperature controllers to heat the water of the tanks. With a

dissolved oxygen probe, the oxygen in the water was recorded. It was hypothesized that by rising the temperature the phytoplankton are exposed to, oxygen production would decline. The results reveal a decline in oxygen production in all three tanks, but the tank with the highest temperature decreased at the fastest rate of 0.5 mg/L per day in an interval. The major finding in the inquiry was the great drop of oxygen production in phytoplankton under high temperatures. From these findings, it can be observed that global warming is decreasing oxygen production.

314-11 The Effect of Differing Amounts of Electrolyte Salt on the Rate of Production of Hydrogen Gas

Aya Ibrahim & Afzalbek Fayzullaev

(Ms. Goldstein – Chemistry)

The purpose of this experiment is to see if differing concentrations of salt in water have an effect on the rate of production of hydrogen gas during the process of electrolysis. Using this to obtain hydrogen is efficient because it's a form of renewable energy. The current production of hydrogen comes from nonrenewable sources like coal, which harm the environment. Water electrolysis contributes to about 4% of global hydrogen production. Compared to other methods of hydrogen gas production, water electrolysis has the advantage of producing extremely pure hydrogen. This can provide better quality to products in the commercial industry. This experiment was set up to test 5 different concentrations of salt using a 9V battery. The results were that a greater concentration of electrolyte salt sped up the rate of the production of hydrogen gas. This means that the solution with 0.25 M of NaCl was a better conductor of electricity and thus had the fastest rate of producing hydrogen gas.

316-16 Best and Safest Paint Remover?

Zainab Ishfaq & Nicole Kravets

(Ms. Goldstein – Product Testing)

The purpose of our research was to find the safest and most effective alternative out of numerous alternatives to methylene chloride. Methylene chloride was officially banned as of March of 2019, thus creating a need for a new paint stripper. Paint strippers were tested by painting different pieces of wood and then removing the paint using a different stripper for each. After analyzing the results, we found that Citris Strip was the most effective and safest alternative. This research will help homeowners choose the best paint stripper with the least consequences on the market.

316-09 High-Speed Magnets: Exploring Faraday's Law and Lenz's Law

Dennis Kaplan

(Ms. Katzoff – Physics & Space Science)

It is about the basics of magnetic induction, or how moving magnets can be used to generate an electric current. The detailed physics of how a changing magnetic field can induce an electric current are described by Faraday's law and Lenz's law.

320-05 Test Start Times Effect on Student's Performance

Khushpreet Kaur

(Ms. Mosley – Behavior & Social Science)

Many state tests are given in the morning. Some students say the test start times are too early and can affect their performance. This experiment was conducted to determine whether test start times impact performance. The experiment was predicted to yield null results and prove that there is no difference in the performance of tests given in the morning vs evening. A pre-test was given to find students with similar knowledge. Another test was given to selected students in the morning and evening. Then test performances were compared. The major findings of this experiment were that there was no difference between the performance on tests given in the morning vs the evening since our p-value was below the level of significance, 0.05. The students that took the test in the morning vs evening had little variances, both scoring between 4 and 5 questions

correct. So, the hypothesis was accepted. From the evidence, it can be concluded that test start times do not affect test performance.

316-07 Impact of Gene Expression on Effectiveness of Transcription Factors

Aliyeh Khan

(Ms. Katzoff – Cellular & Molecular Biology)

Humans can be born without certain organs or may experience health issues in their life that cause them to lose functionality of certain organs. Direct reprogramming can help these individuals by turning cells that exist in the body into a target cell type using transcription factors. In this project, transcription factors of heart cells will be examined to determine their specificity relative to other cell types. The specificity of a transcription factor will help discern whether it will be effective in direct reprogramming for a heart cell. The GATA family of transcription factors has been proven to be responsible for expression of parts of the heart. GATA TFs and others will be analysed through a microarray transcriptome database to see whether GATA TFs are significantly specific to the heart. GATA TFs are expected to be significantly unique to heart cells since they are responsible for heart gene expression, and therefore will be effective in direct reprogramming for heart cells.

314-17 Efficiency of Aquaponics

Emily Kogan & Rafaele DiMaggio

(Ms. Mosley – Plant Science)

Aquaponics is a method of growing plants that is possibly more fruitful than soil. Aquaponics uses fish excrement to provide nutrients to plants instead of soil. The intended purpose is to see if growing plants through aquatic methods is practical for our common use. The problem at hand is to find the most effective form of nutrients for the plant. The hypothesis is that aquaponics is the most effective method of growing plants. In order to reach a conclusion, the experiment compared plants grown in soil and ones using nutrients from fish tank water, and saw which grew the plants the fastest. The results were that the plants in the soil grew at a significantly faster rate than by fish excrement. To test if the difference was significant, a T-test was conducted and it was proven that for all four plants, the soil was statistically and significantly more effective than aquaponics. With 95% certainty, aquaponics is impractical for our use in agriculture compared to traditional soil.

318-14 Which drink has the most electrolytes?

Ilana Kolomiyets

(Ms. Katzoff – Product Testing)

Electrolytes are ionized particles that are needed to maintain proper functioning of the human body. The most common ones found in the body are sodium, potassium, chloride, calcium, and magnesium. Electrolytes are commonly found in food and drinks, and an experiment was conducted to determine which commonly consumed beverage has the highest concentration of electrolytes by measuring electrical conductivity using a circuit. The six beverages tested were distilled water, mineral (sports) water, Gatorade, Powerade, apple juice and orange juice. It was found that orange juice had the highest conductivity and greatest concentration of electrolytes with Gatorade coming in a close second place. Therefore, based on the results of the experiment, orange juice is a good beverage choice to replenish electrolytes.

314-03 Homemade Antiseptic Soap and its Effectiveness on Killing Bacteria

Tamari Kvaratskhelia & Helen Pan

(Ms. Mosley – Biochemistry)

This experiment was performed to find out which household disinfectant can be added to soap in order to kill more bacteria on human hands. The aim is to discover alternative ways to help people effectively clean their hands for those who are concerned to use

antiseptic soaps that contain antibiotics. We experimented with regular household disinfectants such as vinegar, baking soda, and sea salt to see if antiseptic soap can be made. Other studies have performed similar experiments with chemicals, this one differs by testing cheap household disinfectants. In conclusion, after performing the experiment and interpreting the findings, it was statistically proven that adding sea salt and baking soda to a soap base is an effective alternative, and a cheap way to killing more bacteria.

316-04 The Effect of Subliminals on our Decisions

Karen Lam & Kirsten Shyu (Ms. Mosley – Behavior & Social Science)

To delve deeper into subliminal messages and its impact on our brains, an experiment was done to test the decisions of participants. When phrases are directed at the subconscious while the conscious is numbed, our unconscious tends to obey these commands. The predicted outcome is that our decisions will be influenced by subliminal imbedded audio. The method implemented was through the use of a questionnaire. The major findings were that the target number from the experimental audio, 128, was most common in the control group, or 40%. As opposed to the experimental group with only 30% choosing 128. Additionally, red was not chosen once in the experimental group, but was chosen twice from the control. From the evidence, it can be concluded that the subliminal messages found in the audio had no effect on the decisions of the test subjects.

320-16 Filthy Phones

Christina Lamar & Ellen Mokhevishvili (Ms. Mosley – Microbiology)

This experiment was formulated in order to see if phones carry more bacteria than phone screens, door handles, computer mice, and toilet seats. The null hypothesis, which stated that phones do not carry more bacteria than other daily used items, was formed. The four surfaces were swabbed and each of them had five trials. In order to test this, the use of agar and petri dishes were used to help count and determine the growth of bacteria colonies as they stayed in an incubator for a week. A major finding found was that phones do carry more bacteria. Despite the countless number of individuals in who open doors, use computer mice in libraries, or even use the bathroom where they dispose of bodily waste, this experiment proved that the phones that are taken everywhere today, carry massive amounts of bacteria. From this it can be concluded that cleanliness is needed to be more common in order to prevent the massive spread of bacteria. Therefore, individuals should clean their phone screens and wash their hands more often.

318-07 Purifying Contaminated Water

Jinnan Li & David Wu (Ms. Goldstein – Cellular & Molecular Biology)

Homeowners are always looking for new and more efficient ways to clean and clear away the bacteria that is growing in their homes, but what procedure is the most effective in killing bacteria within a certain time period? This science experiment will examine the viability of different methods on eliminating bacteria within contaminated water. Through the use of boiling, Clorox, and a potassium iodide solution on the water, we will be testing which of these methods will produce the smallest relative amounts of bacterial colonies in petri dishes within a span of 3 days. Our hypothesis was that boiling the contaminated water would be the most effective way of getting rid of bacteria. The experimental results did not support our hypothesis as the dishes with the potassium iodide solution mixed in showed the least amount of bacterial growth within a 3 day period whereas boiling it had the most.

314-15 Let's Get This Cheesy Experiment

Lucie Lim & Judy huang

(Ms. Goldstein – Microbiology)

The aim of this experiment is to determine the amount of bacteria that is grown from different fat percentages of milk and how the amount of bacteria and milk fat percentage affects the taste of the cheese. For this experiment we made our own cheese and decided on mozzarella as it was simple for beginners and did not require much time for the cheese to be made. We used one recipe to make multiple batches of mozzarella cheese with different milk fat percentages such as whole milk, 2 percent, and fat free and we swabbed each cheese onto a petri dish. What was observed was that whole milk produced the most bacteria than the other milk fat percentages and volunteers who tried out the cheese have said they preferred the cheese made with whole milk. Volunteers have stated how the texture was smooth, rich, and had more flavor compared to the other samples. This suggests a possible correlation between milk fat percentage, bacteria growth and the flavor profile of cheese.

316-11 The Effects of Gaming on Divided Attention

Declan Lin

(Ms. Mosley – Medicine & Health Science)

Video games are a prevailing byproduct of digital innovation in today's world. However, there are relatively few studies to suggest their significance in cognitive skill development. The purpose of this experiment was to determine the correlation between playing video games and divided attention skills. It was hypothesized that gaming would improve the development of this cognitive skill. Participants underwent a divided attention skills assessment, also retaking it after playing a video game. The major findings from this experiment were that on average, participants scored higher after playing a game, with a mean score of 37.36, as opposed to before playing, with an average score of 36. The determined t-value for the data was 0.10 and the p-value was 80%. From this evidence, it can be stated with an 80% level of confidence that there is a significant statistical difference in the divided attention skills of those who play games and those who do not.

314-16 Determining the sugar concentration of solutions using laser pointers

Lanxi Lin

(Ms. Mosley – Physics & Space Science)

The point of this experiment is to measure the sugar concentration of a solution using a laser pointer and a triangular prism. This method is easy and affordable and it does not require any expensive or complex materials. This experiment guides the visitor to understand the concept of refraction, or bending of light. Refraction is the crucial reason why it's possible to measure the sugar concentration of liquids using laser pointers. As the sugar concentration of a solution increases, the index of refraction also increases. Since the relationship between sugar concentration and the index of refraction are directly proportional, it's possible to calculate the amount of sugar in a solution by computing an equation using a graph.

314-02 Hormone Ethylene

Nhu Lu

(Ms. Mosley – Plant Science)

The purpose of this experiment was to measure the ripening of unripe fruit induced by the plant hormone ethylene, by monitoring starch levels using an iodine stain solution. There were eight plastic bags in total, four were labeled "Control" which only had a pear in each bag, the other four plastic bags each had one pear and one banana and were labeled "Test." Ethylene is a plant's hormone and is released by rapidly growing tissues in roots, senescing flowers, and ripening fruit. Furthermore, the darkened spots on a ripe banana release great amounts of ethylene. Thus it was expected that the test bags' pears

would ripen faster compared to the control bags' pears. To measure the ripeness of the pears, an iodine stain solution was made to monitor starch levels as when the fruit is ripe, it converts stored starch into sugar. From the t-test, it's shown there is not a significant difference between the two averages of the control and test. As a result, the null hypothesis is accepted.

314-10 Science and Art of Cyanotype

Rachel Malinkovich

(Ms. Mosley – Chemistry)

The purpose of this project is to find out what is the best method for making a cyanotype print. Cyanotype is a process that uses the sun's UV rays and paper treated with a mix of ferric ammonium citrate and potassium ferricyanide to create an image. Objects are placed on the chemically treated paper and exposed to the sun. When a print is developed in water, the unexposed iron compounds are washed away from the print, while the newly formed, water-insoluble iron ferricyanide, with its blue color remains on the paper, creating a blue and white image. The experiment will test what makes a more beautiful print — commercially treated paper or paper treated with the chemicals at home. Prediction: the prints made with homemade paper will be the best. The findings from this experiment were that the prints made with homemade paper washed in water and hydrogen peroxide followed by water and vinegar, and exposed in full afternoon sun for 5 minutes came out the most beautiful.

314-06 Vitamin C in Homemade vs. Branded Orange Juice

Anna Mark

(Ms. Mosley – Chemistry)

The purpose of this laboratory experiment is to determine the amount of vitamin C in homemade orange juice vs. Tropicana orange juice. The predicted outcome of the experiment was the homemade orange juice would contain more vitamin C than Tropicana orange juice because there are no additives to homemade compared to Tropicana where they add sugar to it. To determine the amount of vitamin C in each orange juice I used the method of titration which is a way to measure the unknown amount of a chemical in a solution by adding a measured amount of a chemical with a known concentration. The major findings from this experiment were the homemade orange juice contained more milligrams of vitamin C than the Tropicana orange juice. From the data I collected, it can be concluded that there is more vitamin C in homemade orange juice than Tropicana orange juice, so it is better to consume homemade orange juice.

320-10 Effect of Potassium on Degradation of Gelatin

Zita Mimer & Lazizakhon Ibrakhimova

(Ms. Katzoff – Chemistry)

A research study was conducted to test if the amount of potassium in certain fruits enable the enzymes in them to speed up a chemical reaction. There are many factors that affect how well an enzyme works such as temperature and pH. In order to test this hypothesis, kiwi, pineapples, papaya, and figs were used which all have different levels of potassium, in order to monitor the degradation of gelatin in a controlled environment. If potassium speeds up the rate of reaction, then the fruit with the highest level of potassium will degrade the most gelatin. The results from this data imply that potassium does have a significant impact on increasing the rate of how well an enzyme works to degrade gelatin. Future experimentation can be done to test if other factors in the fruit can impact the rate of degradation, which would better food digestion.

318-06 Man vs. Nature: Comparing the Effectiveness of Different Antacids

Harmain Munir

(Ms. Mosley – Medicine & Health Science)

Antacids are a medication that neutralize the acidity level in the stomach to prevent health issues such as heartburn and acid indigestion that result from high acidity levels. The purpose of this experiment is to compare and find out if there are any differences between the effectiveness of antacids that are man-made in comparison to those that are found in nature. It is hypothesized that man-made antacids will be more effective in lowering acidity levels as they are designed solely for this purpose whereas those found in nature are not. The methods that were used involved neutralization and the use of the pH scale. The major findings from this experiment were that there was a significant difference in the effectiveness of the two types of antacids tested. Man-made antacids showed to be more effective however, antacids found in nature although less effective were shown to be safer.

316-08 Comparing Bacteria on Everyday Objects

Amanda Ng & Kimberly Nguyen

(Ms. Goldstein – Microbiology)

We all know that bacteria is everywhere, but do we ever think about how much bacteria we touch when we come in contact with everyday items? In fact, millions of people rely on public transportation everyday such as the train and bus. This project demonstrates the amount of bacteria that are on items that we touch on a daily which are the train railings, train poles, train seats, bus poles, bus seats, phone screens, school toilet seats, and the school bathroom stall lock. This project highlights the substantial amount of bacteria that lingers on the objects that we touch everyday. Each item was tested by using agar petri dishes to grow the bacteria and then we measured the amount of bacteria that grows overtime by observation. Our hypothesis was that trains would have the most bacteria, then the school toilets and then our phone screens. We proved that trains did in fact have the most bacteria, but phones are much dirtier than we think as it is even dirtier than the school toilets.

316-10 The Viability of Ferrofluids on Oil Spills

Tiffany Ng & Jacklyn Vu

(Ms. Mosley – Chemistry)

The effectiveness of ferrofluids on cleaning oil spillages was tested to observe if ferrofluids can be a viable solution for this environmental issue. For this experiment three ferrofluids with different compositions were tested. Three scenarios were set up for each ferrofluid to mimic the event of an oil spill at a smaller scale. Also, within each scenario three concentration levels were tested to see if a higher concentration of ferrofluid used would be more effective. It was predicted that Ferrofluid B, comprised of iron filings and vegetable oil, would be the most effective because of its composition. Through the observation of the results and t-test it was determined that Ferrofluid B was the most effective and that there is no significant statistical difference between the concentration of ferrofluid used to clean up an oil spillage. The difference in effectiveness was found within the data between Ferrofluids A vs. C and B vs. C.

314-04 The Electrolyte Challenge

Alina Ongeyberg

(Ms. Mosley – Physics & Space Science)

In today's society sports drinks are widely advertised among athletes and fitness moguls to have high levels of electrolytes, which ones body loses in sweat. This experiment was carried out to determine the electrolyte levels of commonly used sports drinks and fruit juice in order to find another alternative besides water to stay hydrated. A conductance sensor was attached to a multimeter and a 9-volt battery by 2 copper wires. When the conductance sensor is placed in a solution containing electrolytes, the electric current will

pass through the multimeter, which measures the current using the ammeter portion of the multimeter. The major findings from this experiment were that orange juice had the highest conductance of 5.98 millisiemens. Therefore, orange juice could be used instead of the sports drinks to replenish electrolytes lost in sweat.

320-08 Vitamin C: Processed vs. Organic orange Juice

Hannah Ramasami & Winnie Li

(Ms. Katzoff – Chemistry)

The purpose of this experiment is to find which type of orange juice (processed or organic) provides the highest concentration of vitamin C. This is important as vitamin C is not produced by the human body and it is recommended to incorporate it in one's daily diet rather than taking the supplement itself. This vitamin helps boost the immune system, detoxifies the body, reduces inflammation, and much more. In this experiment, titration was used with an iodine solution and starch indicator to find the amount of vitamin C present in the sample solutions. Titrations were run on processed orange juice, organic orange juice and a vitamin C standard solution. The results indicated that processed orange juice has more vitamin C (154 mg) than organic orange juice (105 mg). This result proves that the hypothesis is wrong as it anticipated the opposite result, which means that preservatives may play a role in the rate of Vitamin C degradation.

318-11 The Effect of Varying Temperatures on Voltage Produced

Hassan Rizwan & Oscar Rojas

(Ms. Katzoff – Engineering)

The Seebeck Effect was utilized to create a thermocouple to measure the effect of increasing the temperature difference between two junctions along the thermocouple on the electric potential difference (voltage) created. One junction was placed in a hot bath and the other was submerged in a cold bath and the temperatures were varied. It was hypothesized that as the temperature between the two junctions increased, the voltage would rise. Though the data followed such a trend, an ANOVA test suggested a statistical difference between increasing the temperature difference and voltage produced among two out of the three temperature differences tested. These findings could be used in fossil fuel power plants, where excess heat is often released and this excess heat can in turn be harnessed to produce more electricity.

314-08 The effect of various metals on electrical conductivity

Walter Rosales

(Ms. Mosley – Physics & Space Science)

The wire used in houses to get electricity to flow from the circuit breaker to outlets in the household are usually copper. The purpose of this experiment is to find if copper really is the best conductor of electricity for houses. The predicted outcome was stainless steel would have higher conductivity because it is made of multiple metals so the electrons should be able to move more freely compared to copper. The methods used were Ohm's Law, Resistivity formula and conductivity formula using voltage and amps collected by the multimeter to find the conductivity of the wires. The major findings from this experiment were that copper was the better conductor of electricity gauge wise and length wise. In other words, changing the length and gauge of the copper and stainless steel wires still resulted in copper being the better conductor of electricity. From the evidence, it can be concluded that copper is the better metal for electrical conductivity compared to stainless steel.

316-03 Gel Electrophoresis on Food Coloring Dyes

Evelyn Schwartzman

(Ms. Katzoff – Chemistry)

Separation of DNA is a process that is very commonly used at the scene of a crime. Scientists generally use the process of gel electrophoresis to distinguish between

macromolecules in the DNA to be able to differentiate between possible suspects. Along with this, gel electrophoresis is commonly used to identify distant relatives, as well as similar species of animals. This experiment will be differentiating between different macromolecules in food coloring to identify which ones cause the difference in colors. It will be testing the different colors in the chamber and will be using a self-made gel electrophoresis chamber with an agarose gel. Results of this experiment show that there is a significant difference between the macromolecules in the green food coloring dyes and the others, since the green is a homogeneous mix of blue and yellow macromolecules.

318-04 Seeing Eye to Eye

Abigail Seales

(Ms. Mosley – Medicine & Health Science)

The experiment was done in order to figure out whether or not there is a significant difference to if people with glasses could stare longer than people without glasses. After finding whether or not this is true, one can conclude that having glasses can lead to more headache issues since optometrists have said that staring is one of the main causes of headaches. The methods to prove this were to make people stare at an object for as long as they could without blinking and time them. Then, do this with 40 total participants to get enough data. The major findings of this experiment were that, after doing a t-test to compare the data, there was a significant difference. The results showed that there was a 99% confidence level since the p-value was 0.0002, which meant the null hypothesis had to be rejected. This concluded that wearing glasses does affect how long one is able to stare without blinking and that those who wear glasses are more prone to headaches.

320-03 Environmental Pollutants and Their Effect on Ivy Plant Transpiration Rates

Jessica Serheyeva

(Ms. Katzoff – Plant Science)

With temperatures on the rise, global regions are becoming notably drier resulting in the flora of these regions working harder to maintain their water supply. These territories range from desert, tropical, and even urban settings. Flora growing in these regions have adapted to pollutants to try to efficiently maintain their water supply. Through this experiment, recreating pollutants such as sand, ash, and coal could help scientists decipher whether or not a plant can intake adequate water amounts to ensure they thrive in a certain environment. Using a self-made apparatus functioning as a potometer to measure water intake, pollutants were placed on stems of the same species of ivy plants and results were recorded based on how much water was drawn. Since the stem exposed to ash retained the most water, it can be deemed that ivy adapts best to urban environments. Overall, this study can help biologists determine which plants can adapt to a certain environment to fortify their survival.

318-15 The effect of electricity on pH

Victoria Tatarynova & Madelynn Yung

(Ms. Katzoff – Chemistry)

With industrialization on the rise, both water and soil pollution are becoming a greater issue. This can interfere with marine and plant life due to changes in pH. The purpose of this experiment was to find the effect of electricity on pH. When an electrical current is run through an aqueous magnesium sulfate solution, the solution connected with the cathode became basic, and the solution with the anode became acidic. This occurs as a result of the battery breaking apart water molecules, producing hydrogen gas and oxygen gas. The release of hydrogen gas leads to a decrease of hydrogen in the system, increasing the pH. When oxygen gas escapes, the ionized hydrogen molecules are left in the solution decreasing the pH. As a result, electricity does have an effect on pH. Further research would have to be done in order to test the potential of using a power source to reduce the effects of pollution by altering the pH of water and soil to a healthy level for a more sustainable future.

314-01 Beasts of the Meat

Michelle Tcherevatenko & Jeanine Jourdain (Ms. Mosley – Microbiology)

Meat is sold in all sorts of departments and restaurants globally, which people purchase on a daily basis for their consumption. Due to this, natural and chemical preservatives are often used to extend the shelf life of meat and make it safer for consumption. Typically, as meat rots, the bacterial and microbial growth increases. The purpose of this experiment is to discover which common preservative- sodium nitrite, citric acid, salt or vinegar- prevents bacterial growth most sufficiently on chicken breast. Based on results, our 4 preservative groups and control show great variation following an ANOVA with a p-value of 0.00057. A statistical significant difference is present amongst the data. Vinegar was furthermore the most effective out of all the preservatives, averaging to 20.5 colonies, with the smallest variance of 104.25. This supports that when it comes to preventing bacterial growth on chicken, vinegar serves as the strongest preservative.

318-09 Water Purification Using Solar Energy

Jaden Thomas & Tasnia Shadat (Ms. Katzoff – Chemistry)

The purpose of this experiment was to test if the absorbance of solar energy could be used to purify polluted water. Being able to identify which color absorbs the most light energy to convert into heat allows scientists to find a way to increase the rate of water condensation in order to purify polluted water. It is expected that the black color will absorb wavelengths of light more efficiently than the pink, blue and brown colors. Ideally, this will allow for the production of more heat, which in turn, condenses the polluted water and purifies it. It is expected that the amount of clean water measured would be most abundant in the container painted black. The findings of this experiment are important as many people around the world lack access to clean purified water. Future experimentation to improve the process of distillation on a larger scale can be used to efficiently streamline filtered water in both developing and developed countries.

320-09 The Effect of Fluorescence and temperature on the emission of chemiluminescence

Samaha Uddin (Ms. Goldstein – Chemistry)

Luminol, when come into contact with hemoglobin from blood emits a glow or chemiluminescence in the dark. The effect of different colored fluorescence and the different temperature was used to test the chemiluminescence of luminol in certain conditions. Yellow fluorescent had the most significant impact on the brightness level while adding no fluorescence emitted the chemiluminescence the longest under a temperature of 212-degree Fahrenheit. Another beaker with another temperature of 0-degree Celsius was used to test the effect of the emissions of chemiluminescence of different fluorescence under that condition. The luminol, although did not have the brightest glow, emitted the light for the longest time. The valence electron, when reaches an excited state, wants to regain stability and as it bounces back to a lower energy state, emits the glow. Having a lower temperature slows this process down and thus return of the valence electron takes more time.

318-16 Going Green as You Clean

Rachel Wong (Ms. Mosley – Earth & Environmental Science)

The purpose of this laboratory is to address the topic if green detergents are truly less toxic than conventional detergents. The predicted outcome was that green detergents are less toxic than standard detergents, particularly more environmentally-friendly than their conventional peers. According to ODEC, green detergents tend to contain mostly natural chemicals while customary detergents contain harsh chemicals. The methods and techniques used were to mix the detergents thoroughly into the soil for the worms to

thrive in. The major findings and results were that the average death toll of green detergents was less than the average death toll of the conventional detergents ($0.666 < 1.666$). The experiments concluded that green detergents do live up to its name: that it is eco-friendly. One can conclude that there is a difference between conventional detergents and green detergents. The laboratory findings indicate that green detergents' contents are much cleaner than customary detergents.

316-01 Personality Profile of Social Media Users

Christy Wu

(Ms. Mosley – Behavior & Social Science)

The overuse of social media within adolescents pose a threat to their individual traits, as one's surroundings contribute to their behavior. This experiment demonstrates the impact of social media usage on personality traits. It is predicted that frequent social media users would be more introverted compared to those who use social media rarely. Based on the Big Five personality traits theory (openness, conscientiousness, extraversion, agreeableness, and neuroticism) is used to identify one's personality. During the experiment, participants were required to take a Myers-Briggs personality test to identify their individual traits. The major findings from this experiment were that 9 out of 10 frequent social media users were introverted, while 8 out of 10 infrequent social media users were introverted. The evidence helps to conclude that there is not a significant difference between the personality traits and users of social media and would not support the hypothesis.

320-14 Salt on the Rate of Crystallization of Solutions

Nelly Zhang & Jenny He

(Ms. Goldstein – Chemistry)

Where is ice and salt often used in our community? Ice is often used to help maintain the coldness in solutions and drinks. Salt is often used outside on the roads on snowy days. When salt is added to water or ice, it lowers the freezing point causing the ice to melt as the temperature around it is no longer enough to keep the ice a solid. Lowering freezing points can help make homemade ice cream in just a short amount of time. The results of this experiment can be used to create ice cream. In this experiment, the effect of the different concentrations of salt in ice baths on the rate of crystallization of sugar solutions and water was explored. This experiment consists of using three different concentrations of salt. Sugar and pure water solutions were placed into salt ice baths to measure the rate of freezing. Freezing points of each liquid remained the same throughout each trial for each individual concentration of salt, yet the rate was different for each concentration.