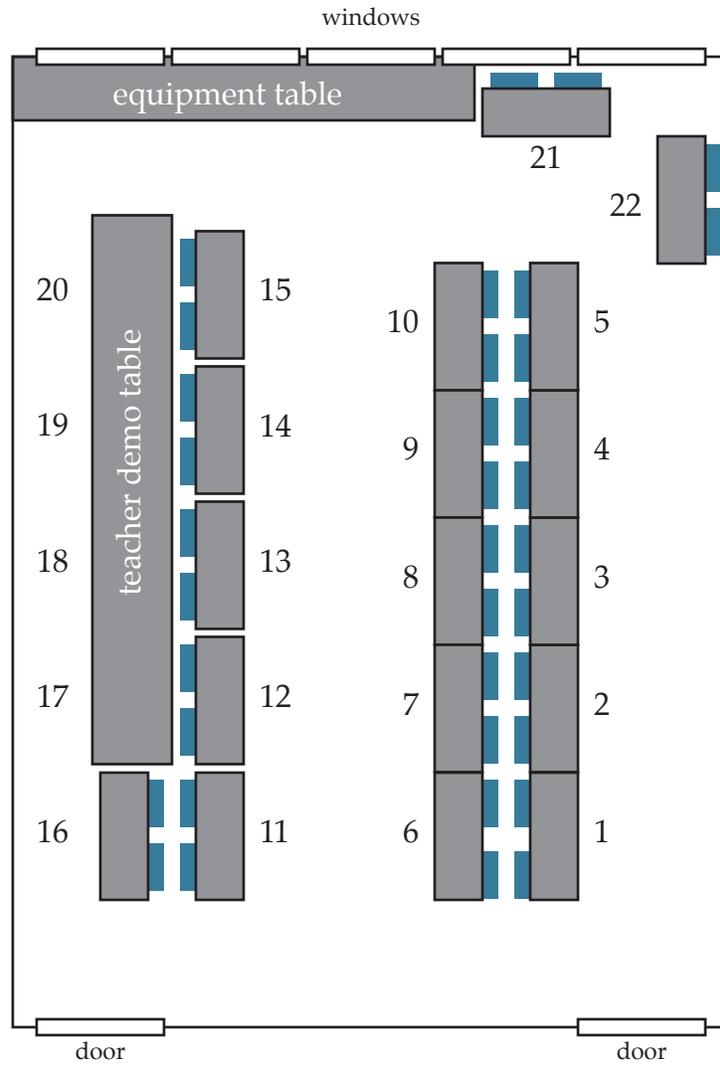


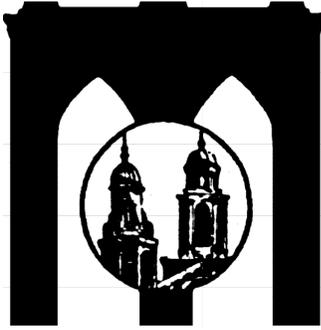
Midwood High School  
Research Program  
Science Fair 2017



# Room Arrangements

A314, A316, A318, A320





# 2017 Midwood High School Science Fair

24 May 2017 — 3:30 to 5:30 PM

Michael McDonnell — Principal  
Tovia Rosenfeld — Assistant Principal  
Glenn Elert — Research Coordinator  
Stacy Goldstein — 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

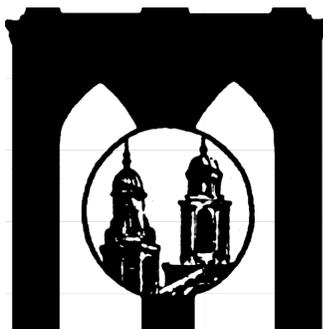
Sophomore teachers provide students with color-coded food tickets

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



# 2017 Midwood High School Science Fair

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## Judges

### Alumni

Yusra Abdurrob, Mie Abouelkheir, Nadia Brijmohan, Leutrim Cahani, Farhan Chowdhury, Sammi Chung, Michelle Do, Tasnim Halim, Mohammed Hasan, Jane Hu, Zainab Iqbal, Yao Jiang, Aviva Laurenti, Wendy Lee, Stephanie Leung, Andrew Li, Nga Ying Lo, Cynthia Ly, Max Miloslavsky, Whitney Nimitpattana, Josh Pilipovsky, Monique Powell, Ifrah Saleem, Patrice Sanderson, Almas Shafiq, Christine Truong, Kate Wong

### Teachers

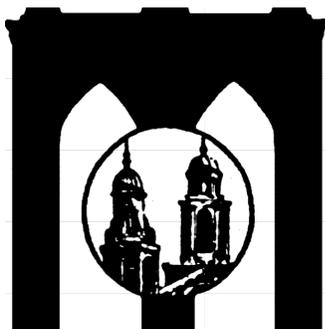
Wing Tong Lung, Stefan Riemersma, Jessica Ross, Howard Spergel, Trevor Stokes, Sandra Distasio (admin intern)

### Seniors

Mahmoud Abouelkheir, Noor Asif, Angela Baraker, Rachel Chen, Vivian Luu, Nomon Mohammad, Allan Nosov, Marco Ramirez, Wensi Wu, Minna Zeldin, Amna Aslam, Zenab Jamil, Jasleen Kaur, Sophia Khoja, Pauletta Lazarevskiy, Erica Levin, Lilin Liu, Jennifer Phu, Marzana Rafa, Elizabeth Skapley, Hufsa Tasnim, Whitney Wong, Yang Fan (Angel) Zou

### Juniors

Noran Abo Donia, Aysheh Barqawi, Fern Bromley, Rafaella Bruzual, Dan Hong Chen, Linda Chen, Joyce Chow, Yiming Dai, Jennifer Duong, Sarah Elmosbah, Hafsa Fatima, Jose Guzman, Ellen Gyulbudaghyan, Md Hoque, Judy Huang, Calvin Huynh, Saba Iqbal, Shakila Islam, Hebah Jihad, Elizabeth Joseph, Shanjida Kamal, Charles Kambourakis, Sabina Kubayeva, Albina Kukic, Ivy Li, Beien Lin, Wendy Lliguichuzhca, Shawal Malik, Giuseppina Mammoliti, Kathy Mania, Evelyn Martinez, Gabrielle Milman, Naila Mirza, Alice Mo, Christina Ng, Benjamin Nguyen, Katie Nikishina, Emily Orman, Olexandr Pustovoyt, Savlatjon Rahmatulloev, Soanne Saint Victor, Aushna Saleem, Alma Samarxhiu, Allan Shikh, David Shikh, Leah Shteinberg, Iryna Svezhenets, Vincent Wang, Mei Mei Weng, Eddie Xu, Joanna Yan, Andrew Zhang, Jessie Zheng, Michelle Zinger



# 2017 Midwood High School Science Fair

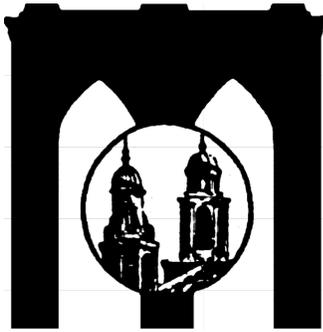
24 May 2017 — 3:30 to 5:30 PM

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## Participants

- 316-15 Bareera Abid  
Eggcellent Whitening Toothpaste
- 318-15 Natalie Aquino & Kamille Shivwkumar  
Cloning vs. Planting
- 320-06 Arafath Ashik  
Chewing Gum and Reaction Time
- 320-02 Summer Boone  
What is the Woolly Mammoth's Closest Living Relative?
- 318-11 Allen Borshch & Andrew Kobrin  
Electrolyte Concentration of Liquids
- 320-11 Larissa Brijmohan  
The Electrolytes in Drinks People Consume Daily
- 314-04 Jessica Chan  
Keeping It Fresh: Brands of Plastic Wrap and Oxidation Rates
- 316-01 Mun Hei Chan  
How does temperature affect rubber band elasticity?
- 318-14 Rubhiyah Chaudhry  
Using RNAi to Silence the Progeria Associated Gene LMNA in *C. elegans*
- 318-05 Ashley Chen & Amy Chen  
The effect of different colored solutions on the absorption of light
- 314-15 Kevin Chen & Camelot Pham  
Game Addiction
- 318-12 Yin Yin Chen  
Peppermint and Reaction Time
- 314-14 Maggie Chin  
Don't Read This!
- 314-03 Ahmad Choudhry & Daniel Gaft  
Squirm of the Worm
- 318-07 Christine Cotiere & Miao Yan Chen  
Acid Corrosion
- 320-03 Nicole Demetrashvili & Elizabeth Bronnik  
Where do lizards go for lunch?
- 318-02 Jia Ci Deng  
Chemicals on Plastic
- 314-16 Jason Goldblum  
Which Team Batting Statistic Predicts Run Production Best?
- 314-01 Nick Guo & Dougeny Francois  
Comparison of Electrolytes in Sports Drinks and Citrus Fruit Juice
- 320-12 Sarah Gur  
The Personality of Politics
- 316-03 Muhammad Hamza  
Chemicals on Wheatgrass
- 320-16 Dara Harris  
Which substance causes the most damage to tooth enamel after consumption for a long period of time?
- 316-09 Basirie Hoxha  
The Impact of Soil pH on Wheatgrass Plant Growth
- 316-02 Emily Huang & Zuzana Simonova  
The World of Luminescence
- 318-08 Yenny Huang  
Devising an Algorithm to Solve a Rubik's Cube
- 318-17 Tiffany Huynh & Fiona Lin  
Do Seeds Need H<sub>2</sub>O<sub>2</sub>?
- 316-11 Esrat Islam  
Ethanol Combustion Pressure vs. Velocity
- 314-09 Nursat Jahan & Sara Khasib  
Going Green as You Clean
- 318-03 Nusrat Jahan & Khrystyna Mysyuk  
Are High-end Foundation Worth the High Price Tag?

- 316-08 Christal Jean-Soverall  
The Lenz's Effect
- 320-17 Humayara Karim & Zuha Ahmed  
The Search for Bacteria
- 318-01 Ifra Khan  
Birth Order and Personality
- 314-07 Eva Lai & Angela Win  
Chemical VS. Natural Remedies on  
Daphnia Magna
- 314-08 Cong Wing Li  
Udderly Beautiful Skin
- 314-11 Rui Ting (Toby) Li & Maggie Chen  
C for Yourself
- 316-04 Junyu Liang  
The Effect of Magnetic Force on  
Magnetic Train
- 320-09 Katie Liang & Purnota Hasan  
Deflection Refraction
- 320-13 Angie Lin & Lin Lin Ni  
Workings of the Brain
- 320-10 Shien Lin  
How clean is the water you're drinking?
- 314-12 Tina Lin  
pH of Soil
- 320-07 Sevara Mallaboeva & Basimah Zahid  
Plant Transpiration
- 316-14 Emily Movsumova  
Testing the Efficiency of Acids on the  
Rate of Milk Curdling by Using  
Spectrophotometry Analysis
- 316-16 Zara Nadeem  
The Vitamin C Concentration In  
Homemade Orange Juice Versus Brand  
Name
- 318-06 Nimrah Naseer  
Rust Busters
- 318-04 Jason Nisanov  
Solubility of different solutions
- 316-06 Kimberly Nunez  
Beach Pollution: How Does It Affect  
Ocean Water Quality?
- 316-12 Helen Ogunleye & Tiffany Umstead  
The Break Down
- 320-18 Eduardo Pena  
Antacid Effectiveness
- 320-04 Kenny Pierre Louis  
Comparing Seed Germination Methods
- 320-05 Nathan Reder & Abdullah Hafeez  
The Stroop Effect and Warped Words
- 314-06 Elizabeth Redmond  
Racial Bias and How It Can Be Tested  
With an IAT
- 318-16 Miguel Rendon  
Different Forms of Energy
- 314-18 Zoe Robertson  
Buffers for Acid Rain
- 314-02 Sonel Rubinstein  
A Taste of Bacteria
- 314-17 Maqadus Sakhi & Fizza Nayab  
What the fizz
- 314-05 Shamima Sharmin & Maryam Hafeez  
Mass on Different Sized Base Isolation  
System
- 316-05 Rina Sheynin & Winnie Tang  
Aquaponics: Different Fish and Plant  
Growth
- 316-17 Kelvin Shi & Karen Wong  
Different Conditions on the Ripening  
Rate of Fruit
- 320-15 Waleed Sittar & Bilal Javed  
Exciting pH Levels
- 316-10 Yvette Somersel & Michelle Koshelyuk  
Calculating Vitamin C Using Titration
- 318-10 Vladislav Svidruk  
Effect of Temperature on Neurons
- 316-13 Jie Tang  
Kill the Plastic Bottles!
- 320-01 Tiffany Tang & Adamaris Vaquero  
From Type One to Type None - JDRF
- 314-13 Susana Tzunun & Alina Arshad  
Kool Aid Chemistry
- 318-09 Annabel Xie & Yong Wu  
Light Up The Luminol
- 318-18 Christopher Yau  
Shape Your Hair
- 320-14 Amy Zheng  
Yeast Reproduction in Sugar Substitutes
- 318-13 Yifeng Zheng & Patryk Rozborski  
DUI: Daphnia Under Influence
- 316-07 Justin Zhu & Cristofer Hernandez  
Soil Erosion



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## Abstracts

### 316-15 Eggcellent Whitening Toothpaste

Bareera Abid

(Ms. Mosley – Medicine & Health Science)

The purpose of this experiment is to determine which brand of toothpaste has the best whitening properties. In this experiment, hard boiled eggs represented a person's teeth, since tooth enamel has similar properties to an eggshell. By soaking hard boiled eggs in coffee and then brushing the stained eggs with three different brands of whitening toothpaste (Colgate, Crest, and Sensodyne), the eggs were able to become lighter, which clearly depicted which brand was most effective. The eggs were then scaled according to the coffee stain scale. Before the experiment was conducted, it was hypothesized that Colgate would whiten the stained eggs the best, since the brand claims to fight cavities, plaque, tartar and helps remove stains. However, numerous dental websites claim that Crest is the best, since it can remove tough stains especially from tea and coffee. Ultimately, due to the preliminary results and studies, it can be concluded that Crest contains the best whitening properties.

### 318-15 Cloning vs. Planting

Natalie Aquino & Kamille Shivwkumar (Ms. Mosley – Earth & Environmental Science)

The purpose of this experiment is to compare cloning and regular methods of planting to see which one will grow faster at a successful rate. By conducting this experiment it could be used globally to help farmers mass produce crops faster and meet the needs of people. Research conducted on cloning, it stated it will have faster rate of growth compared to planting, but will not have a successful rate since it is not guaranteed it will grow. Using lettuce, basil, and mint seeds to use for cloning and planting under all similar conditions of room temperature and enough light. Through observations done no growth has been seen through regular planting, however in cloning it shows signs of roots growing due to the changes occurring with the pigmentation and texture. This brought the conclusion that cloning will have a faster growth rate compared to regular methods since there is no visible sign of growth or future growth for pot plants.

### 320-06 Chewing Gum and Reaction Time

Arafath Ashik

(Ms. Goldstein – Behavior & Social Science)

In this experiment, data is collected from various people to find out how chewing gum affects reaction time of a person. In the controlled group, each person is given a computer to take a reaction- time test without having anything in their mouth, for 15 times. Another group of people is given each a piece of Orbit Sweet Mint gum. This group of people performs the same reaction- time test on a computer while chewing their gum. Results illustrate that the people who chew gum have a faster reaction time overall.

## 320-02 What is the Woolly Mammoth's Closest Living Relative?

Summer Boone

(Ms. Goldstein – Animal Science)

Around 6 million years ago, elephants and mammoths shared a common ancestor; the reason for their similar features and genetic material. The National Center for Biotechnology Information has a database called the Basic Local Alignment Search Tool (BLAST) to find where these similarities lie. With the input of the species (Woolly Mammoth), this database was able to compile the animals with the most alike nucleotide sequences. Certain limits and restrictions were put on the database, like limiting it to only elephants and extinct relatives. Once this information was put into the database, 27 of the closest relatives were shown, along with their complete nucleotide sequence. The Asian Elephant (*Elephas maximus*), African Forest Elephant (*Loxodonta cyclones*) and African Bush Elephant (*Loxodonta africana*) were found to be the closest living relatives of the Woolly Mammoth with a 98% similarity in the nucleotide sequence.

## 318-11 Electrolyte Concentration of Liquids

Allen Borshch & Andrew Kobrin

(Ms. Goldstein – Chemistry)

Electrolytes are defined as any substance that dissociates into ions within a solvent. They are present in most liquids commonly used throughout daily life, ranging from water to drinks. Since the dissociated ions are mobile, they have the unique property of being able to conduct an electric current. The strength of this electric current will increase as the amount of dissociated ions increases, making it a good indicator towards the relative concentration of electrolytes in a variety of liquids. In this project, the voltage of electrical currents passing through numerous solutions will be tested, and the results will be compared in order to determine which common drink has a higher concentration of electrolytes.

## 320-11 The Electrolytes in Drinks People Consume Daily

Larissa Brijmohan

(Ms. Mosley – Chemistry)

The purpose for this experiment is to see how much electrolytes are in the daily drinks people consume. This is important because electrolytes provide energy for the body to function. The prediction was that Gatorade would have the most electrolytes because most athletes use it for getting an energy boost when exercising. To test the electrolytes, a multimeter was connected to a sensor that has copper wire and which was connected to a battery. As a result, Lemonade has the most electrolytes with 9.38 V while Gatorade has 9.12 V. The electrolytes in most of the juices consumed most likely have more electrolytes than a sports drink like Gatorade.

## 314-04 Keeping It Fresh: Brands of Plastic Wrap and Oxidation Rates

Jessica Chan

(Ms. Mosley – Product Testing)

The purpose of conducting this experiment was to determine if different brands of plastic wrap would have an effect on the oxidation rate of a slice of pear. Before conducting this experiment, the hypothesis was that different brands of plastic wrap will affect the rate at which pears oxidize. Three trials of this experiment were conducted. The independent variable were the brands of plastic wrap, the dependent variable was the rate of oxidation of the slice of pear, and the control group was a slice of pear without any plastic wrap. The p-value of this experiment was approximately 0.45 which is significantly greater than 0.05. The p-value indicates that there's no difference between the type of plastic wraps used and the oxidation rates of pears. From conducting this experiment, the conclusion that can be drawn is that different brands of plastic wrap do not have an effect on the oxidation rate of a slice of pear.

### 316-01 How does temperature affect rubber band elasticity?

Mun Hei Chan

(Ms. Goldstein – Physics & Space Science)

When a solid material heats up it will expand in size. The opposite is true for colder environments. The object will become more compact than its standard size. This is called thermal expansion. Rubber is different than most other materials in that their molecules are long chains called polymers. In the experiment, a test will be done in which a rubber band carrying a certain weight will be hung from a point, and the distance from the point to the weight will be recorded. This test will be done in room temperature water at first as a control. Next, the room temperature water will be replaced with hot water, and then cold water. The test will be repeated several more times to find the average lengths for each temperature. In conclusion, the rubber band expands when cooled and contracts when heated.

### 318-14 Using RNAi to Silence the Progeria Associated Gene LMNA in *C. elegans*

Rubhiyah Chaudhry

(Ms. Goldstein – Microbiology)

Progeria is a rare disease caused by a mutation in the LMNA gene that results in short stature, awkward movements, and premature aging in children. In the study, *C. elegans*, a model organism that has a similar body system and genetic makeup to humans, was used to examine the underlying function of this gene. The worm version of the gene LMN-1 was silenced, using a technique called RNAi. To do so, an RNAi plasmid with a copy of LMN-1 was made and transformed into *E. coli*, bacteria that are usually used as food for *C. elegans*. After silencing the LMN-1 gene, the RNAi phenotypes in treated worms were similar to the symptoms seen in humans with Progeria. These features included worms being shorter, thinner, and uncoordinated. These results can help provide an understanding for the function of the LMN-1 gene in *C. elegans* and can provide a starting point for studies that aim to understand the role of LMNA in humans and Progeria.

### 318-05 The effect of different colored solutions on the absorption of light

Ashley Chen & Amy Chen

(Ms. Goldstein – Physics & Space Science)

The experiment performed challenges the idea of the absorption of light through colored solutions. The different colored solutions were placed in front of a white light, in which a spectrum was observed through the diffraction gradient. The spectrum observed was analyzed through a software program and was able to indicate the greatest intensities of absorption throughout the spectrum. From observing the data that was curated, one is able to see that the darker colored solutions absorbed more light, which supports the hypothesis formed earlier in the experiment. The blue solution had the greatest absorbance, a measurement of 0.38 as demonstrated by the graph, and an explanation behind the outcome of this experiment is that darker colors reflect less light than lighter colors.

### 314-15 Game Addiction

Kevin Chen & Camelot Pham

(Ms. Goldstein – Behavior & Social Science)

This experiment consists of questions in which the severity of their addiction to video games is measured from 1 (not affected) to 5 (affected greatly). The sample size of our experiment includes students aging from 15 to 17. Their accumulative score will show how addicted they are to gaming and how it affects their lives. After looking at the data, it can be seen that the t-test value for their cumulative score was about -98.78, and since this is lower than the critical value for 48 degrees of freedom (65.171), we accept the null hypothesis that gaming addiction doesn't affect people's lives.

### 318-12 Peppermint and Reaction Time

Yin Yin Chen

(Ms. Goldstein – Behavior & Social Science)

Peppermint has been recognized by more people in the late seventeenth century. Since then, people are using this herb for medicinal purposes to cure nausea, vomiting, indigestion. The reason why people use peppermint for these cures is because of its properties (calming muscle, containing vitamins, etc.). But is it possible for peppermint to improve a person's reaction time when they are mentally fatigued? To test this out, find at least 20 volunteers and peppermint candies. Make sure the peppermint candies aren't made up of entirely sugar. Have the volunteers test out their reaction time through a website. At first, a red screen will show. When the screen turns green, tell the volunteers to click the screen one time as quickly as possible. Record the average for ten trials. Next tell the volunteers to eat the peppermint while doing the test. Record the average for ten trials. Compare the two sets of data by doing the t-test to see if the peppermint improves a person's reaction time.

### 314-14 Don't Read This!

Maggie Chin

(Ms. Goldstein – Behavior & Social Science)

The Stroop effect, discovered by John Ridley Stroop, is a psychological test in which participants must say the color of a word rather than reading it. In this study, reaction times were compared between 20 tenth graders after 3 trials. In each trial, students were presented with two separate sets of cards, one with written words that matched the ink colors and the other with words that did not match the ink colors. The colors red, blue, green, brown, and purple were used in this experiment to test how significant of a difference the Stroop effect would have on reaction times. The results disproved the hypothesis that there would only be a 5 second delay. Instead, data showed that both genders would have a 12 to 13 second delay when transitioning from the set of matching words to non-matching words, which still demonstrated the Stroop effect. This task not only assessed each individual's responsiveness, but also explored the brain's natural tendency to read.

### 314-03 Squirm of the Worm

Ahmad Choudhry & Daniel Gaft (Ms. Goldstein – Cellular & Molecular Biology)

The scientific study conducted measured the effect of temperature on the MGN and LGN nerves of an Annelida. The project uses the astonishing device known as the SpikerBox. The SpikerBox device can be used in experiments to amplify and listen to the electrical activity of neurons. This breathtaking experiment required the use of Faraday Cage, Laser Printers, and even a 3-D Printer. The results of this experiment were in correlation with the conducted hypothesis. Ultimately temperature does affect the conduction velocity levels of the MGN and LGN nerves of an Annelida. When measuring the neuron spikes in High, Low, and Moderate temperatures, the results could clearly discern the differences in nerve conduction velocity. Overall in the setting of High temperatures, the Annelida had higher conduction velocity. In the setting of low temperatures, the Annelida had lower conduction velocity. In the setting of room temperature, the Annelida had moderate conduction velocity.

### 318-07 Acid Corrosion

Christine Cotiere & Miao Yan Chen

(Ms. Goldstein – Chemistry)

This project consists of an experiment which examines the correlation between the different household acids, reaction temperature, and rate of corrosion. In this experiment, 5 different forms of household acids are being tested on steel wool. The different acids are vinegar, lemon juice, orange juice, tomato juice, and black coffee drink. Each acid has

a different rate of corrosion based on their pH scale. The lemon has the lowest pH level of 2, which creates the fastest rusting reaction and also the greatest temperature rise due to its acidity. The vinegar has the second fastest reaction time and temperature rise as it has the second lowest pH level of 3. Next, the orange juice is the third fastest reaction, tomato juice is the fourth, and black coffee is the least reactive acid. Based on the result of this experiment, the increase in pH level contributes to a lower rate of corrosion and temperature increase. Therefore, acids with low pH values have a faster rate of corrosion.

### 320-03 Where do lizards go for lunch?

Nicole Demetrashvili & Elizabeth Bronnik (Ms. Goldstein – Animal Science)

There is a large body of evidence indicating that, in most people, the two halves of the human brain are specialized for different functions. In other words, there is evidence for lateralization (sidedness) of brain function. The goal of this project is to look for evidence of lateralization in another animal, the lizard. By studying the behavior of animals besides humans, we can hope to gain an understanding of when and how lateralization of brain function evolved. This broad approach is called comparative neuroscience, because comparisons are made between the brains and behavior of different species.

### 318-02 Chemicals on Plastic

Jia Ci Deng (Ms. Mosley – Chemistry)

This experiment was conducted to identify a solution to recycle plastic bags by using household products. There were multiple household products being tested to see if plastics would dissolve in a certain type of solution. The plastics were cut into strips and placed in a 50mL solution for 15 minutes. Before the experiment was administered, it was predicted that acetone would result in a better chemical to disintegrate the plastic. However, as the procedure was carried out, the chemicals did not dissolve the plastic. Ultimately, the chemicals presented in the household products were not strong enough and a more concentrated solution would be needed.

### 314-16 Which Team Batting Statistic Predicts Run Production Best?

Jason Goldblum (Ms. Goldstein – Mathematical Science)

The experiment tested the question which baseball team batting statistic predicts run production best? The hypothesis is that, if there is a stronger correlation between batting average and runs scored than there is between walks and runs scored, on base percentage and runs scored and slugging percentage and runs scored then batting average is the better statistic for predicting run production.

### 314-01 Comparison of Electrolytes in Sports Drinks and Citrus Fruit Juice

Nick Guo & Dougeny Francois (Ms. Goldstein – Product Testing)

The makers of sports drinks spend tens to hundreds of millions of dollars advertising their products each year. Among the benefits often featured in these ads are the beverages' high level of electrolytes, which the body loses as it sweats. Electrolytes are present in citrus fruits, various sports drinks, and some other foods as well. Some examples of fruits containing electrolytes, are lemons and oranges, and some examples of sports drinks that contain electrolytes are Gatorade and Powerade. In this science project, there will be the comparison of electrolytes between sports drinks, lemon juice, orange juice, and homemade versions of each drink. Each drink will be tested of their electrolytes through a multi-meter and wire connections. At the end, electrolytes of each drink will be recorded and it will show whether or not sports drinks are worth it over citrus fruit juice, or even homemade citrus fruit juice/sports drinks.

### 320-12 The Personality of Politics

Sarah Gur

(Ms. Goldstein – Behavior & Social Science)

With the recent controversial election, people have begun associating certain political ideologies with having certain personality traits. This experiment attempts to test whether or not these assumptions of people are true, primarily amongst high school students who find themselves politically active. It was hypothesized that there was indeed a correlation between these students' personality types and political ideologies. In order to identify if this hypothesis was correct, a number of students underwent a political spectrum test alongside a Myers Briggs personality type test, and the data was recorded, separating the results into 3 political categories and 16 different personality types. The results depicted that indeed, certain aspects of students' personality types correlate with their politics.

### 316-03 Chemicals on Wheatgrass

Muhammad Hamza

(Ms. Mosley – Plant Science)

Today more than ever there has been a higher global demand for food because of population being increased drastically each year. Furthermore today farmers are looking for faster ways to fulfill demands. In this research different liquid including ethanol, and weak and strong electrolytes and the control group water, will be tested on wheat grass seeds and then determine which substance works the best in plant growth. Based on background research, it can be stated that the hydroelectric acid would work the best. In this research 8 cups were used because there were two trials conducted for the four substances and 20 mL of the liquids were given to the plants every day. Then data was recorded after every two days, until the 10th day, in mm. During the research, it was seen that water was dominating over the other liquids, while plants irrigated by the water grew, the non-water plants hadn't grown a mm. Thus the hypothesis was not supported by the data collected.

### 320-16 Which substance causes the most damage to tooth enamel after consumption for a long period of time?

Dara Harris

(Ms. Mosley – Medicine & Health Science)

The purpose of this experiment is to see which substance causes the most damage to the tooth's enamel after consumption for a long period of time. The predicted outcome of the experiment was that the white vinegar would cause the most damage to the enamel of the teeth after consumption for a long period of time. In order to conduct the experiment, 3 eggs were each placed in 3 different substances. After one day, the erosion of the egg's shell was recorded and weighed on a food scale to see how much the egg shell had been eroded. The major finding from this laboratory was that white vinegar caused the most damage to the tooth's enamel after consumption for a long period of time. The white vinegar was able to erode the eggshell completely due to its high level of acidity. From the evidence, it can be concluded that the higher the acidity level of a substance, the more it will erode the enamel of teeth. Therefore, it is important to limit the amount of acidic substances consumed.

### 316-09 The Impact of Soil pH on Wheatgrass Plant Growth

Basirie Hoxha

(Ms. Mosley – Plant Science)

The purpose of this experiment was to see how the acidity of soil impacts the growth of wheatgrass and the nutrient consumption. It was predicted that neutral soil would make the wheatgrass grow quicker because there are more nutrients available in the neutral soil. This experiment required three sets of soil from different parks and wheatgrass seeds would be grown from each park. The acidity of the soil impacts the growth of the

wheatgrass seeds. The neutral soil had the wheatgrass grow quicker than the acidic soils because it absorbed more nutrients in that soil, given the same conditions. Although the growth was minor, it still accounted that pH does make a difference in growth.

### 316-02 The World of Luminescence

Emily Huang & Zuzana Simonova

(Ms. Goldstein – Chemistry)

Many police investigators during a crime scene on TV spray a liquid that will glow blue if there is any blood present. The chemical that glows in the liquid is called luminol. The null hypothesis of this experiment is the temperature of the solution, will not affect the glow of the luminol. After conducting our experiment, we concluded that the warmer the temperature of the solution, the brightness of the glow of luminol increases. Therefore, the null hypothesis was rejected and the alternate hypothesis was accepted. For example, in our experiment, when the temperature of warmest solution, which was 122 °F, the brightness of the glow was considered a 5. On the other hand, the colder solution, which was 42 degrees fahrenheit, the brightness of the glow was considered a 2.

### 318-08 Devising an Algorithm to Solve a Rubik's Cube

Yenny Huang

(Ms. Goldstein – Mathematical Science)

Devising an algorithm to solve a Rubik's cube with 3 or more sequences and comparing to the most popular method, CFOP Method. The CFOP is more time consuming but it solves the cube easily if the sequences are memorized. For Set#1 it solves the edge pieces that solves the bottom, front, top, and back edge pieces. Set#2 solves corner pieces, it requires around 15 times to completely resolve the cube from its original state. Step#3 solves opposite color edges, doing this sequence over 3 times solves the cube. Using these sequences it is possible to solve a Rubik's cube. It is also possible to solve the cube by adding several more steps to completely finish it if it wasn't already done so.

### 318-17 Do Seeds Need H<sub>2</sub>O<sub>2</sub>?

Tiffany Huynh & Fiona Lin

(Ms. Goldstein – Plant Science)

Hydrogen peroxide is an oxidizing substance that can be beneficial to the seed germination process because it plays multiple roles in plant physiological and developmental processes. The purpose of this experiment was to determine if hydrogen peroxide affected the germination process of radish seeds. The experimental setup consisted of four groups: control, low, medium, and high amounts of hydrogen peroxide. The seeds are germinated in four different ZipLoc bags with five seeds in each. The amount of days it took for the seeds to germinate in each category was recorded. The results were that hydrogen peroxide had no effect on the amount of time it took the seeds to germinate.

### 316-11 Ethanol Combustion Pressure vs. Velocity

Esrat Islam

(Ms. Goldstein – Chemistry)

The objective of this lab is to shoot the film canisters up in the air by igniting the ethanol trapped within the canister. The energy derived from the combustion of ethanol increases the pressure resided in the canister, which then speeds up the explosion and the velocity will be measured. The result of this project will answer how much of ethanol is used in each beauty sprays and breath spray by the measurement of their velocity.

### 314-09 Going Green as You Clean

Nursat Jahan & Sara Khasib (Ms. Goldstein – Earth & Environmental Science)

There is a strong interest in "going green," including using products that causes less environmental damage when they are disposed of. In this environmental sciences project, students will compare the toxicity of "green" and conventional liquid detergents using worms as test organisms. The data that will be collected in this experiment is the number of worms that died in the four different detergents. Each detergent had a control group with three worms and 5 mL of water added to a cup of soil. The other group contained three cups which was filled with 25% detergent, 50% detergent and 100% detergent. The students will then set up a total of 16 cups filled with soil for each trial. 5 mL of the diluted detergent will be added to the appropriate labeled cup. Students will then redo the experiment two more times, in order to get more accurate data. At the end of this experiment, students should be able to determine which type of detergent has a greater effect on organisms in the environment.

### 318-03 Are High-end Foundation Worth the High Price Tag?

Nusrat Jahan & Khrystyna Mysyuk (Ms. Mosley – Product Testing)

High-end makeup is expensive, specifically foundation, compared to the price of drugstore brands. The purpose of this experiment was to test whether the price correlates with the quality of the foundations. Initially, it was hypothesized that high-end foundations would be of better quality than the drugstore foundations. This hypothesis was tested by comparing the oil blots created on brown paper by five high-end foundations to the five drugstore foundations in three different trials over 12 hours. By doing so, results show that the high-end foundations tested had an average oil blot diameter of about 4.18 centimeters compared to about 3.36 centimeters created by the drugstore brands. Combining the results and research about the types of oils used in the foundations it will help determine if high end foundations are worth the high price tag.

### 316-08 The Lenz's Effect

Christal Jean-Soverall (Ms. Goldstein – Physics & Space Science)

This experiment demonstrates the Lenz's Law in physics. In brief description of what is going on, when a magnet is dropped through a copper pipe, it falls slower than a regular drop. What happens is that when the magnet is moving through the pipe it generates an electric current, (eddy currents,) that disrupts the magnetic field of the magnet, with its own. With this disruption it causes a resistance between the magnet and the pipe, which causes the magnet to fall/move slower (than it would in a free-fall). This is a strange concept considering copper is non-magnetic. Therefore I will also drop a magnet through an aluminum pipe, which is also non-magnetic, to see if it has the same effect. As a control I will drop and magnet through a PVC plastic pipe, magnetic steel pipe, and a free fall.

### 320-17 The Search for Bacteria

Humayara Karim & Zuha Ahmed (Ms. Mosley – Microbiology)

The purpose of this experiment is to determine the most bacteria contaminated area in Midwood in order to raise awareness because thousands of students come in contact with these areas on a daily basis. It is predicted that the school floor will consist of the most bacteria. Where, the methods include 2 sets of data with 5 trials each for the school floors and the staircase railings (IV). The control groups are time and temperature and the dependent variable is the bacterial growth. Furthermore, after the collected bacteria grew for 24 hours in an incubator at 37 °C, the results showcased a 97% confidence level that there is a difference. This was not by chance because our p-value of 0.03 was less than 0.05. With regards to these preliminary results, it can be concluded that the null

hypothesis is rejected and the research hypothesis is accepted because more bacteria was found on the school floors with an average area of  $2.7 \text{ cm}^2$  than on the school railings ( $0.08 \text{ cm}^2$ ).

### 318-01 Birth Order and Personality

Ifra Khan

(Ms. Mosley – Behavior & Social Science)

Familial life has a major impact on personality and the characteristics that a person embodies and portrays. The purpose of conducting this experiment was to test for a specific correlation between birth order and personality type and to determine what major impact birth order has on one's traits and personality. To test this long discussed theory, a type of Myers-Briggs personality test was given to test subjects and their birth order and personality type was recorded to determine what type of correlation there was between the two. The predicted outcome was that the oldest child would embody the overarching personality type of Analysts, which exemplifies boldness and leadership personalities; the predicted trend for middle children would be for them to fall under Diplomats, the idealistic personas; for the youngest born children, the predicted outcome was for them to fall under the Explorers category, which emphasizes imaginative characteristics.

### 314-07 Chemical VS. Natural Remedies on Daphnia Magna

Eva Lai & Angela Win

(Ms. Mosley – Product Testing)

Green tea is believed to promote health benefits?one being relaxation. The purpose was to see if natural remedies could be more relaxing than chemical substitutes. To test this theory, the heartbeat of Daphnia Magna crustaceans was examined using green tea and Simply Sleep (sleep medication). The hypothesis was that green tea would cause the greatest difference?deeming it to be more qualified as a method to relax. To do this, three different concentrations for Simply Sleep and green tea (50, 100, 150 mg) were used on four Daphnia per solution. By measuring the heartbeats before and after the testing to compare the differences of the two variables with their respective concentrations, the results did not support our hypothesis. There was no significant difference between Simply Sleep and green tea for 50mg and 100mg; there was a difference however, for the solutions of 150 mg. Thus, concluding that Simply Sleep is more effective in relaxing and lowering heartbeat than green tea.

### 314-08 Udderly Beautiful Skin

Cong Wing Li

(Ms. Mosley – Product Testing)

The purpose of this experiment is to determine how well different ingredients in skin moisturizing products work at keeping the human skin moist, in this case, JELL-O. The moisturizers that are being compared are Udderly Smooth and Beautiful Day. Beautiful Day's main ingredient consist of glycerin while Udderly Smooth's is propylene glycol. The predicted outcome is that Beautiful Day will provide more moisturization towards the 'skin' because it contains an abundant amount of glycerin. In order to perform this experiment, there must be 50 mL of JELL-O with 20 g of each moisturizer applied on top evenly (in each petri dish). From there, the dishes' height and weight will be observed for the following week. The major findings from this laboratory was that the predicted outcome was wrong; Udderly Smooth's weight and height was greater (than Beautiful Day's) -meaning more moisture and water were present to keep the skin hydrated. Thus, proving it to be a better moisturizer for dry skin.

### 314-11 C for Yourself

Rui Ting (Toby) Li & Maggie Chen

(Ms. Goldstein – Chemistry)

Vitamin C is an essential component to a healthy diet. For example, bell peppers contain a high density of Vitamin C. However, the different ripeness of bell peppers determines the amount of Vitamin C content within. Knowing the amount of Vitamin C in bell peppers is beneficial to people who have health problems that require them to consume great amounts of Vitamin C and holds valuable knowledge for gardeners in determining when to pick their bell peppers. Titration, a chemistry technique used to test the amount of an unknown concentration of a chemical in solution was utilized. De-seeded and destemmed bell peppers of different colors (red, yellow, orange, green) which represented their stage of ripeness, was mixed with distilled water. Starch Indicator Solution and Iodine Solution was then utilized in order to titrate the liquid from the bell peppers. Through the process of titration it concludes that the red bell pepper, ripest bell pepper, contains the greatest amount of Vitamin C.

### 316-04 The Effect of Magnetic Force on Magnetic Train

Junyu Liang

(Ms. Mosley – Physics & Space Science)

The purpose of the experiment was to test how magnetic force affected the movement of magnetic trains. This was tested to see how movement would be altered if friction was removed. It was predicted that if there was a greater difference in magnetic force between the magnetic cart and magnetic tracks, then there would be greater speed of the whole train. The methods that were applied to the experiment was construction of the magnetic cart and tracks. In order to do this, magnets were lined up with repelling forces against the cart. There were two carts involved; one attached with a ceramic magnet, and one that was attached to a neodymium magnet. Each cart would be pushed, and a timer would indicate the amount of time for the cart to go across the magnetic tracks through levitation. The results showed no difference between magnetic force and the the speed of magnetic trains. In other words, the experiment showed no relationship between magnetic levitation and speed of magnetic trains.

### 320-09 Deflection Refraction

Katie Liang & Purnota Hasan

(Ms. Goldstein – Physics & Space Science)

This project is about measuring the sugar content present in a certain amount of water without using orthodox methods. Normally, to determine the amount of sugar in a liquid solution, one would taste it. However, there is another way to determine this. This involves using a prism with a hole in it which will be filled with an unknown concentration of sugar solution. The method involves using a red laser pointer. By using the equation from physics to measure the index of refraction, the sugar quantity in a water solution through a laser pointer can be determined. A hypothesis that can be drawn from this is the amount of sugar solution affects the refraction in that the higher the amount, the higher the index refraction.

### 320-13 Workings of the Brain

Angie Lin & Lin Lin Ni

(Ms. Goldstein – Behavior & Social Science)

In today's society, many companies different tools to commercialize their products. The tools used, most, if not all contain subliminal messages. One frequent question about the workings of subliminal messages is the effectiveness of these messages. This experiment will test whether or not subliminal messages have an effect on our behaviors and conditions. To do this, a song will be inserted with a subliminal message. By inferring an MP3 file into a music editing app, and then inputting messages that invoke sleepiness and drowsiness, the questions revolving the use of subliminal messages will be revealed.

The messages will be put to  $\approx 27.5$  dB (decibels), so the message and purpose won't be obvious to the subject that is listening. A survey will be given, before letting the subject listen to the edited MP3 file. The survey will give an idea of the subject's condition (such as hunger and stress levels). The subject will then be given the same survey again, after listening to the MP3 file.

#### 320-10 How clean is the water you're drinking?

Shien Lin

(Ms. Mosley – Product Testing)

The purpose of this experiment was to test the quality of the water in water bottles that people drink every day. The hypothesis was that the quality of the water sold by the Poland Spring brand will be better than the water sold by Nestle and Smart Water. During the experiment the HM Digital TDS-Ez water quality TDS tester was used to test the ppm containment in the water of the different water bottle brands. PPM is the measurement of how many chemical particles are in 1 milliliter of water. The result showed Poland Spring dominated the quality test, averaging 38 ppm compared to the averages of 56 and 61 ppm for Nestle and Smart Water respectively. The lower the ppm is, the better the quality of the water is. Since Poland Spring has an average ppm of 38, it can be inferred that Poland Spring has higher quality water. Thus, the results from the experiment supported the hypothesis which was that Poland Spring has better quality water when being compared to Nestle and Smart Water.

#### 314-12 pH of Soil

Tina Lin

(Ms. Mosley – Chemistry)

The purpose of this experiment was to determine the effects of different acidic solutions on the pH of soil. The prediction was that ferrous sulfate solution will lower the pH of the soil faster than ammonium sulfate solution since ammonium sulfate is weaker than ferrous sulfate. There were 20 trials throughout the experiment, and 10 trials for each compound to discover the differences in pH before and after adding the substances (solution of 1.0 M ferrous sulfate and 1.0 M ammonium sulfate) by using the pH color scale to estimate the pH of soil. The results contradicted the prediction because ferrous sulfate solution had increased pH instead of lowering the pH while ammonium sulfate solution had decreased the pH in soil. So, the experiment concluded that ammonium sulfate solution could lower the pH of soil while ferrous sulfate solution could not.

#### 320-07 Plant Transpiration

Sevara Mallaboeva & Basimah Zahid

(Ms. Goldstein – Plant Science)

Plant transpiration is the movement of water throughout a plant. How it is affected is the investigation being performed. Color is one of the many factors that contributes to the amount of water being transpired. The investigation uses red, blue, and green as its independent variable; white light is used as the control of the experiment. The plants' roots are sealed into a plastic bag and placed under a proper light condition. Four trials are conducted for accuracy. The mass and temperature is recorded every day. The mass lost describes the transpiration occurring. It was hypothesized that the green light plants will have the most drastic loss in weight. However, the white light had the greatest loss in weight. One can conclude that white light has a significant amount of effect on plant transpiration. This investigation is important to study to understand how plants perform their functions. Observing plants aids in the analysis of biodiversity.

### 316-14 Testing the Efficiency of Acids on the Rate of Milk Curdling by Using Spectrophotometry Analysis

Emily Movsumova

(Ms. Goldstein – Biochemistry)

In this experiment, the effect of different natural acids that creates curds in milk will be tested to see which are more efficient at making milk curds at a faster rate. The purpose of this experiment is to find the most efficient acid that can be used to make cheese curd in the least amount of time. The implications of this experiment would help the dairy industry since the manufacturing time of cheese may be shortened. Additionally, it will open up the option for companies to use all natural ingredients such as lemon, grapefruit, and pineapple juices. To test this, the juice from lemons, grapefruits, and pineapples would be added to milk samples. Then the milk samples are viewed with a spectrophotometer, which measures the amount of light that passes through the milk, and determines how long it takes for the sample to become less opaque (when the milk separates into curd and whey).

### 316-16 The Vitamin C Concentration In Homemade Orange Juice Versus Brand Name

Zara Nadeem

(Ms. Mosley – Chemistry)

The purpose of this experiment was to determine which type of orange juice contains a higher vitamin C concentration, which will be tested in homemade orange juice and brand name, Tropicana. The predicted outcome was Tropicana having a higher vitamin C concentration than homemade orange juice due to certain fruits having less vitamin C, and orange juice manufacturers add supplements of ascorbic acid to benefit the consumer. The method used was titration through 5 trials for each type of juice. The use of iodine, a starch indicator solution, and a Vitamin C standard solution was implemented to determine a juice's Vitamin C content. The major findings from this experiment were that Tropicana orange juice had an average of 11.28 mg of Vitamin C in a 20 mL glass of orange juice, while homemade orange juice had approximately 5.66 mg, thus with a 99.99% confidence level, it was concluded that brand name orange juice does have a much higher Vitamin C concentration compared to homemade.

### 318-06 Rust Busters

Nimrah Naseer

(Ms. Mosley – Chemistry)

The purpose of this experiment is to determine preventive methods against the rusting or corrosion of metals. By coating steel wool in three different household items - Vaseline, Windex, and lotion - and then leaving them submerged in vinegar, the oxidation process was able to occur while also displaying whether the rusting was limited or not due to our independent variables; one sample of steel wool had been coated in nothing to serve as the control. It was assumed that the Vaseline would be the best at preventing rust due to its thickness and oil composition. However, the results of this experiment show that the Windex led to the least amount of rust on the steel wool. From this, it can be concluded that Windex was the best at preventing rust and that this was due to specific components in its ingredients that will also indicate other products with the same effectiveness.

### 318-04 Solubility of different solutions

Jason Nisanov

(Ms. Goldstein – Chemistry)

This project is used to test the solubility of common substances in a home, and ask the question; How much of a substance can dissolve in water? The three substances that were used are Epsom salts, table salts, and sugar. After the solutions were saturated, more solute was added to see if the solubility would change. To further understand the solubility of these substances, the solution is heated and observed to see how the solubility of the solution is affected.

### 316-06 Beach Pollution: How Does It Affect Ocean Water Quality?

Kimberly Nunez

(Ms. Goldstein – Earth & Environmental Science)

The experiment tested the question how does beach pollution affect water quality? The hypothesis was if higher amounts of beach pollution are found, then ocean water quality will be worse. After collecting sand from the same areas of Brighton Beach and Coney Island Beach, and also collecting water from the ocean that bordered these two beaches, eight ounces of sand were separated from the non-organic materials found in the sand. These non-organic items were considered to be beach pollution. Then, the pollution was weighed as well to see what percentage of pollution of the sand. Multiple trials were conducted. After conducting an ANOVA test, it was found that there was no correlation between beach pollution or ocean water quality.

### 316-12 The Break Down

Helen Ogunleye & Tiffany Umstead

(Ms. Goldstein – Biochemistry)

Proteins are held in a natural shape due to the interaction of side groups on the amino acids from one part of the molecule to the next area of the molecule. Proteins can be denatured by disturbing the H-bonds that are within the structure. When this happens one will notice new properties. In this project 4 different substances (NaCl, NaHCO<sub>3</sub>, rubbing alcohol, lemon juice) were used to denature the protein albumin found in egg whites. When each substance was added to the egg white, placed in boiling water, an stirred the protein denatured at different times. The results showed the protein denatured fastest when NaHCO<sub>3</sub> was added to the egg white.

### 320-18 Antacid Effectiveness

Eduardo Pena

(Ms. Mosley – Chemistry)

The purpose of this experiment is to determine the effectiveness of two different brands of stomach antacid tablets, Roloids and Tums. The purpose of this experiment is to test whether or not there is a significant difference between the two brands. Antacids are a type of medication to cure heartburn and works by neutralizing the acid in your stomach and increasing pH levels. When we eat food, our stomach may produce too much acid and the pH levels may drop below 2, causing heartburn. The antacids helps bring pH levels back to normal. The recommended dosages of the antacids are mixed together with water in a beaker. With a burette with HCl, adding drop by drop into the beaker. With every drop, read the pH using a pH meter, until it reaches 7.0. The more amount of HCl used the more basic the tablet is and thus the more effective. According to the results Tums were found to be more effective, thus showing that Tums is a more effective antacid than Roloids.

### 320-04 Comparing Seed Germination Methods

Kenny Pierre Louis

(Ms. Mosley – Earth & Environmental Science)

The purpose of this experiment was to determine what germination process would produce the most robust seed sprouting. The importance of this experiment is that most individuals purchase their seeds as saplings and repeat this process in the next growing season; but collecting seeds from a previous harvest and germinating them is a more sustainable and cost efficient way of propagating seeds. The hypothesis was that the conventional soil based seed germination will cause the greatest root growth after a period of 5 days, which is the average germination period of radish seeds. 3 trials of each germination method commenced on the same day and were left undisturbed until the 5 day period was over, to ensure the seeds were not altered or contaminated. Preliminary results demonstrated slight sprouting from the water tray and ziplock germination, but

no noticeable change from the soil based germination method was seen within the same timeframe.

### 320-05 The Stroop Effect and Warped Words

Nathan Reder & Abdullah Hafeez (Ms. Goldstein – Behavior & Social Science)

When one tries to name the color of the ink which the color words are printed in, it takes longer when the color word (ex: red, blue, green, brown, and purple) differs from the ink color (ex: red, blue, green, brown, and purple ink) than when the color word is the same as the ink color. The goal of this experiment, is not only to test this phenomenon, called the Stroop Effect, but to also test its boundaries. Our results were as follows; When the ink color matched the word, each test subjects' time was faster than when the ink color was different from a color word. Furthermore, when we 'warped' the words that were different from the ink color, we found that the subjects were able to complete the assorted pile of cards a little bit quicker than the pile containing ink colored words that did not match the color word.

### 314-06 Racial Bias and How It Can Be Tested With an IAT

Elizabeth Redmond (Ms. Goldstein – Computer Science)

In this experiment, an IAT (Implicit Association Test) was programmed to test underlying racial bias. This was used to prove or disprove the hypothesis that most people would have a slight racial preference towards their own race. The IAT uses automatic word and picture association to test the strength of associations between a concept and a stereotype. Participants are asked to put different pictures of African Americans and Caucasians as well as positive words and negative words into corresponding groups per the trial. Once the data was collected, it was put through an ANOVA to see if the null hypothesis should be accepted or not.

### 318-16 Different Forms of Energy

Miguel Rendon (Ms. Goldstein – Engineering)

The experiment that has been tested demonstrates the differences between three types of energy forms, solar energy, hydro energy, and electrical energy. The tests were carried out for 5 days straight. Each form of energy was tested by using a voltmeter and by testing how long it'll take a phone to charge 5% and 10% more. The solar energy was carried out by using solar panels and testing it outdoors. In order to test hydro energy, the fuel cell kit was used. In order to test electrical energy 9V batteries were used. This experiment was carried out in order to test which form of energy is more efficient.

### 314-18 Buffers for Acid Rain

Zoe Robertson (Ms. Mosley – Chemistry)

The purpose of this experiment was to simulate and determine which substance can act as the best buffer to neutralize acid rain or make it basic. This information could be useful during efforts to preserve and protect natural environments and wildlife. It was predicted that the sand and limestone mixture would be able to raise the pH value of the hydrochloric acid and distilled water solution the most. However, the average difference between the original pH value (2.73) and the final pH value was the greatest for the soil and limestone mixture (5.17). The pH level of the solution was tested before and after each pass through the buffer material. Three trials were performed on each of the six different mixtures, which contained equal mass. Overall, the soil and limestone mixture was the best buffer substance to increase the pH level of the acidic solution.

### 314-02 A Taste of Bacteria

Sonel Rubinstein

(Ms. Goldstein – Microbiology)

Though not seen, many bacterial colonies are found in a human's mouth. While such colonies can be prevented by brushing one's teeth, people neglect to do this, allowing for bacteria to grow. This experiment tests which 5 foods, candy, apples, bread, chips, and yogurt, will produce the most bacteria. It was hypothesized that candy will produce the most bacteria. In order to determine if this hypothesis was correct, 6 petri dishes were prepared. The volunteer for the experiment began by brushing their teeth, rubbing a cotton swab in their mouth and spreading it on a petri dish as the control group. Next, they ate a small piece of the first food and took a cotton swab of their mouth and spread it on the dish. Then, they brushed their teeth and repeated the steps with the 4 foods left. Finally, the dishes were put in a sterile environment for 48 hours. After multiple trials, it was discovered that the hypothesis was incorrect and that the chips produced the most bacterial colonies.

### 314-17 What the fizz

Maqadus Sakhi & Fizza Nayab

(Ms. Goldstein – Chemistry)

This experiment consists of making homemade bath bomb with an altered recipe, to see if the amount of citric acid or baking soda affects how long the bath bomb fizzes. This will be done by comparing the original recipe (trial 1) for with each modified trial. In trial 2 the citric acid was increased by  $\frac{1}{4}$  of a cup, in trial 3 it was decreased by  $\frac{1}{4}$  of a cup, while for trial 4, the baking soda was increased by the same amount and in trial 5, it was decreased by that amount. The null hypothesis is that the amount of citric acid or the amount of baking soda doesn't affect how long the bath bomb fizzes. The null hypothesis was rejected for trials 2, 3 and 5, however in trials 4 the null hypothesis was accepted. This demonstrates that increasing or decreasing the concentration of baking soda and increasing the concentration of citric acid will extend the time it takes to completely dissolve. While a decrease of citric acid will not extend the time it takes to dissolve, but instead decreases the time.

### 314-05 Mass on Different Sized Base Isolation System

Shamima Sharmin & Maryam Hafeez

(Ms. Mosley – Engineering)

Regions prone to earthquakes like Chile understand that many deaths are due to falling buildings, so engineers came up with the solution of base isolation systems. Base isolation systems absorb earthquake shocks and prevent the building from moving too much or falling down. The question emerges on which base isolation is best to invest in. We will test whether a bigger base isolation system or a smaller base isolation with more quantity prevent the building from falling down for longest amount of time. The experiment includes marbles, ping pong balls and no system as control for our base isolation models. The model buildings was placed on top and in each variable five quarters was added as our mass. To mimic an earthquake we used a molecular motion model kit. The predicted outcome is that the ping pong ball base isolation system will have the longest time since it's bigger than the marbles. Statistically, it was shown that there is no difference in between them.

### 316-05 Aquaponics: Different Fish and Plant Growth

Rina Sheynin & Winnie Tang

(Ms. Mosley – Animal Science)

This experiment was conducted to test which fish (Goldfish, Molly, Platy or Betta) would result in better wheat grass growth over one week. This would help people who are considering to invest in aquaponic tanks. The predicted outcome was the Betta would cause the plants to grow the tallest. This experiment was done by having four aquaponics

tank. One fish and eight seeds was placed in each tank. After the plants would grow it will be measured and recorded. Based on the averages of the plants, the Molly had the highest (12.325) while the Betta had the least (7.4125). Afterwards, T-Testing was done it showed a difference between the Betta and the Goldfish having a p-value of 0.0152 and between the Betta and the Molly having a p-value of 0.00389. Therefore, the hypothesis was incorrect since the Molly had the highest plant height. However, based on statistical analysis there was almost no significant difference between the Molly fish and the other fish.

### 316-17 Different Conditions on the Ripening Rate of Fruit

Kelvin Shi & Karen Wong

(Ms. Mosley – Biochemistry)

In this experiment, we decided to determine which type of condition could cause the greatest rate of ripeness in bananas. The experimental results of our experiment did not support our hypothesis that the method of placing the bananas into a paper bag would prove to be the quickest way to ripen a banana. At the end of the experiment, it can be concluded that none of the methods show a significant difference in the rate of ripening. Most of the different conditions showed similar rates of ripening as they all began to spot during the fourth day of the ripening period. However, due to the budgeting, time limit, and lack of space, we were unable to perform more trials to further provide more accurate results.

### 320-15 Exciting pH Levels

Waleed Sittar & Bilal Javed

(Ms. Goldstein – Chemistry)

In this experiment, a 200 mL solution of water and magnesium sulfate was produced and divided into two bowls, each containing 75 mL. An external 9 V battery was used as an electrical source. A salt bridge was also created by a paper towel to connect these two solutions. One solution was linked with the positive side of the battery while the other was linked with the negative. Through this, it was possible to control the pH between the solutions, as the hydrogen in a water molecule aren't as strong as the hydrogen bonds formed between the oxygen, they tend to drift apart, and thus an imbalance in the number of hydrogen leads to a change in pH. The electrons that flow into the first solution will change the water molecules to hydroxide ions and hydrogen gas, thus the imbalance of pH occurs. The pH of both solutions were observed using universal indicator solution and pH strips. The values were recorded over time and eventually graphed to observe trends.

### 316-10 Calculating Vitamin C Using Titration

Yvette Somersel & Michelle Koshelyuk

(Ms. Goldstein – Chemistry)

This experiment is intended to determine which types of orange juices are most healthy and beneficial to one's health. By using the foundations of chemistry and the techniques of titration, the concentration of Vitamin C in each type of orange juice can be calculated. After experimenting, it has been shown that fresh-squeezed oranges indeed do have a higher Vitamin C concentration than store bought orange juices from, and not from concentrate. This project combines one's prior knowledge of chemistry with the connection of everyday lifestyle foods that humans consume. By having data from experiments like this one, humans can be more aware of how the foods they eat are closely related to science.

### 318-10 Effect of Temperature on Neurons

Vladislav Svidruk

(Ms. Goldstein – Animal Science)

The experiment that is presented today deals with cockroaches and their tolerance to temperature and the relationship with the nervous system. This experiment was done to see how different temperatures affect cockroaches and their reaction time and how fast the neurons travel. The environment where the insect lives depending on the temperature can slow one down. That's the reason some insects come out during specific times of the year and either at night or the day. The first step that was taken to do this experiment was to test the room temperature on neurons. The way this was tested was it was put in a room at about 60 degrees Fahrenheit. The cockroaches appeared normal and the spikes were high, meaning that neurons picked up the feeling touching with a cotton swab. After this was done, the insect was placed near a blow dryer that was running for 2 minutes to heat the environment near it and the cockroach itself. The results were the same as the spikes were the same.

### 316-13 Kill the Plastic Bottles!

Jie Tang

(Ms. Mosley – Chemistry)

The experiment was done to determine the fastest fabrication rate of alginate gel shell, when the different types of liquids are being captured within it. The predicted outcome was that the alginate shell would have a faster fabrication rate if drinking water was captured within the shell. The major method applied to this experiment was called direct spherification, a process that causes the alginate solution to form a membrane when settled inside of the calcium solution bath. The overall results supported the predicted outcome since the average time for the formation of the water gel shell was 380.8 seconds, which was much faster than the rest of the testing variables. All in all, the fabrication rate of shells will be the fastest when water is being mixed with the solution.

### 320-01 From Type One to Type None - JDRF

Tiffany Tang & Adamaris Vaquero (Ms. Goldstein – Medicine & Health Science)

The reasoning behind the selection to do this project is due to the overwhelming population affected by diabetes. The health risks can range from problems with the eyes, kidneys, heart, brain, feet, and nerves. Controlling the sugar levels in one's bloodstream is the best way to prevent or delay these problems from occurring. The problem being challenged is whether the reconstructed artificial pancreas will be able to accurately adjust the levels of sugar as well as overcome the challenges an actual artificial pancreas undergoes. The first step is to assemble the circuit on the breadboard by using alligator clips, jumper wires, resistors, a liquid pump, batteries, MOSFET, and potentiometers. The next step is to assemble the conductivity sensor. The sensor is made using bare copper wire, straws, scissors, and a piece of Styrofoam. After assembling the conductivity sensor to the circuit, the whole artificial pancreas model is completed. It is then tested using a neutralized solution, baking soda, and vinegar.

### 314-13 Kool Aid Chemistry

Susana Tzunun & Alina Arshad

(Ms. Goldstein – Chemistry)

This experiment had been executed in order to determine the most optimal dyeing process based on concentration of a dye. Specifically, the investigation measured different concentrations of Red 40 found in Kool-Aid and its impact in dyeing felt. A special device called a spectrophotometer was built that consisted of a resistor, LED, and photoresistor. These main components were essential to compute the resistance of diluted solutions which includes water, vinegar, and distinct amounts of Kool Aid mix. Using the resistance of a set of standard solutions, a calibration curve was constructed that was

used to analyze adsorption equilibrium during the dyeing process. The dyeing process was done by boiling the diluted solutions in jars that contained felt. Every hour, resistance was calculated for each solution revealing how much Red 40 the felt could hold. The significance of this project was to scientifically create a successful dyed product using a well-developed chemistry background.

### 318-09 Light Up The Luminol

Annabel Xie & Yong Wu

(Ms. Goldstein – Chemistry)

In the experiment relating to the brightness of luminol, the use of different substances (in replacement for perborate) mixed with luminol creates a bright blue light. This type of reaction is an example of chemiluminescence. Different substances create different luminescence of blue light. In this experiment, the objective is to determine which substance will produce a brighter blue light.

### 318-18 Shape Your Hair

Christopher Yau

(Ms. Mosley – Chemistry)

This experiment was performed for the purpose of examining the absence of VA/Crotonates/Vinyl Neodecanoate Copolymer in hairspray, and its effect on hair strength. The predicted outcome was that there would be a decrease in hair strength with the absence of the copolymer in hairspray. The major method utilized in this experiment was to obtain eight groups of hair from the same individual, and to use two different hairsprays of the same brand. Moreover, only one of the hairsprays would contain the copolymer and the other would not. The strength of hair is measured with a dual-range force sensor and a LabQuest in newton. The t-value calculated was 2.306, which was equal to the level of significance  $p=0.05$ . This indicates that there was a difference in hair strength between the two hairspray that was used. Based on the evidence, it can be concluded that the absence of VA/Crotonates/Vinyl Neodecanoate Copolymer in hairspray decreases the strength of hair.

### 320-14 Yeast Reproduction in Sugar Substitutes

Amy Zheng

(Ms. Mosley – Cellular & Molecular Biology)

The purpose of this experiment is to test whether yeast will reproduce by using sugar substitutes (Sweet'N Low, Splenda, and Equal). Yeasts are fungi and it feeds on sugar to produce carbon dioxide. It was predicted that the sugar substitutes will not produce as much carbon dioxide as granulated sugar, but the yeast will still reproduce using sugar substitutes. In order to test this, a plastic tube was used to connect the yeast dissolved in sugar and a graduated cylinder placed in a bucket with water. Afterward, the amount of water displaced from the graduated cylinder (or the amount of carbon dioxide produced) was measured. The findings of the experiment are that granulated sugar does, in fact, produce more carbon dioxide than any of the sugar substitutes tested. In addition, it was also found that yeast reproduces successfully in sugar substitutes.

### 318-13 DUI: Daphnia Under Influence

Yifeng Zheng & Patryk Rozborski

(Ms. Goldstein – Animal Science)

Various substances affect the way organisms function. Stimulants and depressants are such substances; they affect brain function, for example raising or slowing heart rate. Daphnia are small planktonic crustaceans commonly known as water fleas that are closely related to lobsters, crabs, and shrimp. Daphnia are good for heart rate experiments as the heart is easily seen on its back under a microscope. Daphnia are commonly used in heart rate studies but are also used to observe the effects of toxic substances on organisms. Daphnia are sometimes used to check for water purity as they are sensitive to

pollutants. In this experiment, we will be using stimulants and depressants in order to alter the heart rate of daphnia by measuring the average heart rate of Daphnia before and after the administration of the substances.

### 316-07 Soil Erosion

Justin Zhu & Cristofer Hernandez (Ms. Goldstein – Earth & Environmental Science)

Soil is one of the most commonly seen thing amongst humans. This is mainly due to its versatility, as seen in its use for plants, cement, etc. One of the many problems that come with the use of soil is soil erosion. Soil erosion is the wearing away of topsoil. It occurs when natural forces such as wind or water acts on the soil. This is a major problem as the washed up soil can clog and block drainage canals causing floods, thus, destroying environments. In this experiment, with the use of homegrown radishes, the question of whether or not plants can stop soil erosion is tested. Water is used to imitate rain and the mass of the dirt left behind would be measured and compared to see whether or not the radish plants can stop the soil from eroding. To compare the effects, a control is set up with regular soil with no seeds. This will be used as a comparison to the soil with radish seeds to determine whether or not plants can stop erosion by viewing the mass.

