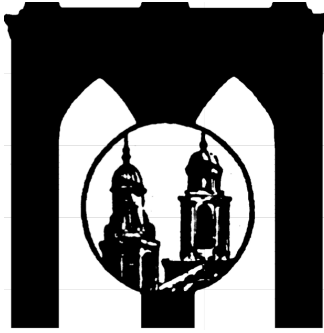


A student in a white lab coat is using a pipette to transfer liquid into a large beaker filled with white foam. The student is wearing a dark blue t-shirt and brown pants. The background is a blurred laboratory setting with wooden lab benches and other equipment.

Midwood High School

Research Program Science Fair 2016



2016 Midwood High School Science Fair

26 May 2016 — 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

5:00~5:15 PM

Judges return to A214 (Research Room) with completed packets (calculators available)

Judges given color-coded food tickets

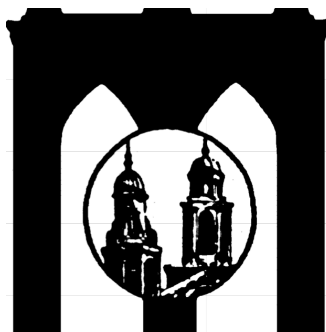
Sophomore teachers provide students with color-coded food tickets

Sophomores return boards to A214 (Research Room)

5:00~5:15 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

Eniola Abdul, Muhammad Abdulla, Cindy Chee, Vivian Cheng, Irissa Cisternino, Tasnim Halim, Mohammed Hasan, Janae Headly, Jane Hu, Xiao Yan Hu, Shanna Huang, Zainab Iqbal, Tasnin Kabir, Jessica Khaimova, Aviva Laurenti, Clarice Lee, Wendy Lee, Shirley Li, Winnie Li, Dao Quan Lin, Lucy Lin, Tiffany Loi, Wenona Lok, Cynthia Ly, Tiffany Mai, Vlad Moraru, Nicole Ng, Demetrios Papazaharias, Farhana Pinki, Ziva Rubinstein, Ifrah Saleem, Patrice Sanderson, Crystal Soo, Samar Syeda, Christine Truong, Klaudia Wojciechowska, Yukie Wong, Arlene Zhou

Teachers

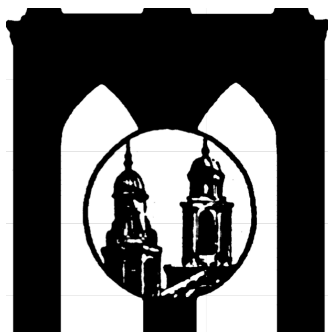
Mary Bomba (retired), Elizabeth Fenamore, Joel Gumbiner (retired), W Tong Lung, Angela Mazza, Howard Spergel, Kin Tsoi (student teacher)

Seniors

Yusra AbdurRob, Mie Abouelkheir, Laila Akallal, Urooj Ansari, Raja Bilal Azhar, Kieran Bissessar, Nadia Brijmohan, Leutrim Cahani, Xiaojun (Gloria) Cao, Roshan Chudhry, Matthew Chung, Quetourah Dalencourt, Michelle Do, Q.Q. (Venus) Fu, Daniel Guobadia, Jinyan Huang, Xiao Ying Huang, Emily Hui, Sana Ilyas, Rumsha Javed, Moomitu Kashem, Jessica Lauv, Asia Le, Shang (Chris) Lee, Victor Lee, Nga Ying Lo, Ricky Lovell, Christine Ly, Nikolas Magloire, Maya Miller, Max Miloslavsky, Zaw Win Naing, Osarhuwense Otasowie, Joseph Parziale, Joshua Pilipovsky, Diana Polonska, Daniel Rebibo, Shanayah Renois, Kai Saunders, Colleen Simon, Xiu Ling Weng, William Xie

Juniors

Mahmoud Abouelkheir, Ilham Ahmed, Aruba Areej, Noor Asif, Angela Baraker, Ruthbernick Bastien, Rachel Chen, Michelle Fogel, Michael Grandel, Danielle Itshaik, Zenab Jamil, Bitan Kar, Jasleen Kaur, Sophia Khoja, Brianna Ku, Pauletta Lazarevskiy, Erica Levin, Lilin Liu, Danielle LoPresti, Vivian Luu, Nomon Mohammad, Abeer Naeem, Hui Yi Fiona Ng He, Jennifer Phu, Marzana Rafa, Marco Ramirez, Zainab Salahudin, Elizabeth Skapley, Hufsa Tasnim, Whitney Wong, Wensi Wu, Minna Zeldin, Yang Fan (Angel) Zou



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Participants

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Is your cereal genetically modified?
- 316-16 Nadine Adham & Melissa Wadler
Iodine Clock Reaction with Hydrogen Peroxide
- 316-17 Alexandra Angert
Measuring Solubility of Saturated Solutions
- 316-12 Abby Beginyazova
Acid Corrosion and Methods of Prevention
- 314-06 Fern Bromley & Alexis Carpio
Determining the Presence of the 35S Promoter in Kellogg's Corn Flakes
- 316-08 Rafaella Bruzual
Osmosis: Why Do Our Fingers Prune When Immersed in Water ?
- 318-08 Henri Bulku
The Effect of Sugar on Reaction Time
- 316-09 Anthony Chen
The Effect of Font Type on Reading Speed
- 314-18 Linda Chen & Sarah Bain
Testing Tostitos and Organic Tortillas for GMOs
- 314-02 Sherry Chen
What is the best material to block out sound?
- 314-05 Tennyson Cheng & Andrew Zhang
How does age affect hearing range?
- 318-02 Joyce Chow
The Effect of pH on the Evaporation of Distilled Water and Ethanol
- 316-03 Tahiyat Chowdhury
Which Orange Juice Has the Most Vitamin C?
- 314-13 Yiming Dai
Which Ingredient in Lotions Work The Best?
- 314-01 Ramy Fata & Eddie Xu
Does mass affect the rate at which an object falls?
- 320-05 Hafsa Fatima & Naila Mirza
The Verification of a Non-Genetically Modified Protein Bar
- 318-07 Lazar Fuchs
Proving the Validity of the Monty Hall Problem
- 316-07 Agata Grzyb
How does tea affect the growth of lettuce?
- 314-16 Jose Guzman & Oran Chak
Linearity of Bouncing Balls
- 318-17 Ellen Gyulbudaghyan
pH on Enzymes
- 320-06 Milena Gyulbudaghyan & Giuseppina Mammoliti
DIY Fireproof Clothes
- 314-09 Russell Hong
Does talking and texting affect reaction time?
- 314-12 Calvin Huynh
Effect of Calcium on Hatch Rates of Brine Shrimp
- 318-13 Shakila Islam
The effect of citrus fruits on henna stain and how long it lasted
- 320-09 Hebah Jihad
What's in a Face? Are Composite Faces More Attractive than Real Faces?
- 316-11 Elizabeth Joseph & Sarah Elmosbah
To Be or Tu-Nah To Be

- 318-04 Halima Kahramonova
The Effectiveness of an Artificial Pancreas
- 318-15 Shanjida Kamal & Sabina Kubayeva
To Be or Tu-Nah To Be
- 320-10 Charles Kambourakis & Nick Coluccio
Which catalyst provides the fastest reaction time?
- 320-15 Albina Kukic & Orlando Rios
GMOs in Taco Bell?
- 320-02 Amy Leong
The Effect of Magnetic Fields on Water Flow
- 316-14 Ivy Li
How Does the Intake of Different Substances Affect How Iron is Dissolved in an Empty Stomach?
- 316-15 Tina Lin & Kexin Wang
Are Dark Green, Leafy Veggies Higher in Vitamin C Content Than Their Lighter Colored Veggies?
- 320-07 Anastasia Lipatova
The Possibility of Having GMOs in Foods that Generally Do Not Have Them
- 318-01 Amy Liu & Dan Hong Chen
pH of Different Types of Vinegars
- 316-02 Wendy Lliguichuzhca
Common Pain Relievers' Ability To Take Effect The Quickest
- 318-10 Lisa Lu & Beien Lin
Phantom Sensations
- 318-05 Ellen Lui & Evelyn Martinez
Harmonic Motion
- 314-03 Lois Luo
Dirtiest Place in a House
- 320-03 Shawal Malik
Vitamin C Concentration in Orange Juices
- 316-13 Kathy Mania
Yeast Busters
- 320-01 Timothy Mei & Vincent Wang
Affects of Exercise on Memory
- 318-18 Danny Mejia
The Bouba-Kiki Effect
- 314-11 Alice Mo & Md Hoque
The Buzz about Honey: Testing the reliability of honey labels from DNA
- 318-14 Christina Ng
The Fizzy Chemistry of Bath Bombs
- 320-12 Steven Ng
Is There Such a Thing as Too Much Gaming?
- 318-12 Mario Ng Zheng
The effect of gum on reaction time
- 320-13 Benjamin Nguyen
The Effect of Temperature and Direct vs. Refracted Light on a Solar Cell's Ability to Absorb Voltage
- 314-17 Katie Nikishina
The Truth Behind the Vitamin C Concentration in Homemade and Brand Name Juices
- 320-08 Emily Orman
Determining Vitamin C Amounts in Cooked Potatoes
- 314-07 Savlatjon Rahmatulloev
Aloe Vera Preservation
- 316-06 Jessica Rakhamim & Iryna Svezhenets
Are people who are musically trained better than non-musicians at distinguishing sounds?
- 314-08 Anthony Rodriguez
Does Caffeine in Energy Drinks Improve Athletic Performance?
- 318-09 Soanne Saint Victor
Reaction Rate versus Cell Phone Usage
- 314-04 Renata Sakaeva
Testing the Effectiveness of Natural Antifungal Agents vs. Drugstore Antifungal Agents
- 320-16 Aushna Saleem
pH and Plants
- 314-14 Alma Samarxhiu
Effect colors have on memory
- 320-14 Francis Saw
Do high school males or female smile more?
- 320-18 Guinevere Seaver
The Stroop Effect: Monolingual Vs. Bilingual
- 320-11 Rianna Segal & Gabrielle Milman
Are your eyes playing tricks on you?
- 320-17 Allan Shikh & Olexandr Pustovoyt
The Effect of Exercise on the Reaction Time of Teenage Students
- 314-15 David Shikh & Daniel Ladovsky
The Effect of Vinegar on Oxidation Rate
- 316-10 Leah Shteinberg & Aysheh Barqawi
The Effect of Peppermint on Reaction Time

314-10 Haishan Tan & Maggie Chen
Comparing GMOs in Corn Flakes

316-04 Winnie Wan
How Much Fat Is In Your Food?

318-16 Meimei Weng & Judy Huang
The Effect of Brine Shrimp Water on
Scallion Regrowth

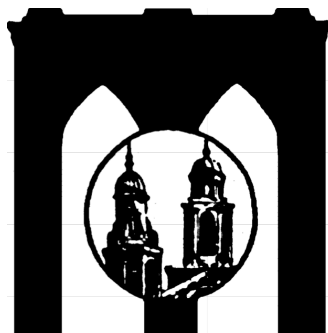
316-05 Cassie Wu & Jessie Lin
GMO Corn Chips

320-04 Joanna Yan
Electrolyte Challenge: Gatorade vs. Red
Bull vs. Orange Juice vs. Water

316-01 Jessie Zheng & Jennifer Duong
The Buzz about Honey: Determining the
Botanical Origins of Honey Using DNA
Barcode

318-11 Melissa Zhong & Britney Perez
The Surprising Strength of Egg Shells

318-03 Michelle Zinger
Sunspot Cycles



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Abstracts

318-06 Is your cereal genetically modified?

Noran Abo-Donia & Saba Iqbal (Ms. Goldstein – Cellular & Molecular Biology)

In this experiment, we decided to determine whether or not the popular American cereal brand Cheerios, contains genetically modified corn compared to the generic brand cereal, Honey Nut Scooters. The experimental results did not support our hypothesis that both cereal brands would contain genetically modified ingredients. At the end of the experiment, we were able to conclude that both cereals were not genetically modified, based on the results we obtained. The faint presence of the 35S F (Honey Nut Scooters) band means that the sample contained very minimal foreign DNA. The lacking presence of this GM band for the generic sample means that it isn't genetically modified. However, the TF band (mixture of generic brand DNA with tubulin primer), is nearly invisible, concluding that our data may be inaccurate due to lack of a strong band for the tubulin primer. Cheerios are most likely genetically modified due to the strong visible band of 35S R.

316-16 Iodine Clock Reaction with Hydrogen Peroxide

Nadine Adham & Melissa Wadler (Ms. Goldstein – Chemistry)

Certain chemicals go through reactions based on the reactivity of that certain chemical. Within a chemical reaction, it can go through a specific change, such as color change. In this project, hydrogen peroxide is the chemical used to activate the reaction within the mixture. The mixture consists of potassium iodide, hydrochloric acid, sodium thiosulfate, starch solution, and water (excluding the peroxide). Throughout this experiment, we decreased the amount of peroxide added in the mixture; instead, we added one more drop of water for every less drop of hydrogen peroxide. That way, the mixture was "balanced". The overall objective was to see how long it took for the mixture to change into a dark yellow color. As we did more trials, it took longer for the mixture to change into a different color. As a result, as we decrease the amount of hydrogen peroxide that is being added, it takes longer for the mixture to change color.

316-17 Measuring Solubility of Saturated Solutions

Alexandra Angert (Ms. Goldstein – Cellular & Molecular Biology)

Countless chemical reactions and chemical processes occur in liquid solutions. This is where the understanding of the chemical properties of liquid solutions comes into question. My project tests the simple question ; How much of a substance can dissolve in water? However to take a twist on the conventional way of conducting this experiment, I decided to test three different substances being non iodized salt, Epsom salts, and sugar.

316-12 Acid Corrosion and Methods of Prevention

Abby Beginyazova

(Ms. Mosley – Chemistry)

The purpose of this experiment was to determine how acid rain affects various metals and if corrosion can be prevented using household items. The experiment tested the corrosion rates of aluminum, copper and zinc in Part A of the procedure using 0.1 M nitric acid. Part B included zinc electrodes being coated in clear nail polish and whiteout while the 3rd electrode served as a control. The prediction that zinc will corrode the most in Part A came true, however, whiteout prevented corrosion the most while clear nail polish was predicted to be stronger. The major findings in this laboratory experiment were that zinc is the most susceptible to acid rain corrosion. Moreover, whiteout helps prevent metal corrosion the most when compared with clear nail polish.

314-06 Determining the Presence of the 35S Promoter in Kellogg's Corn Flakes

Fern Bromley & Alexis Carpio

(Ms. Goldstein – Cellular & Molecular Biology)

Many companies use genetically modified organisms in their food products to make them more nutritional, easier to grow, and less expensive for the customer. GMO usage has been extremely controversial, as there are concerns surrounding adverse health effects and the integrity of non-GMO food product labels. It is important that foods are accurately marked so that consumers can be aware of what they are eating. This experiment, consisting of DNA extraction, DNA reproduction, and gel electrophoresis, was done to see if Corn Flakes contain the 35S promoter. This genetic sequence is found in nearly all GM products as it is used to introduce foreign genes. The results show that Corn Flakes DNA does not contain the 35S promoter and is most likely not genetically modified.

316-08 Osmosis: Why Do Our Fingers Prune When Immersed in Water ?

Rafaella Bruzual

(Ms. Goldstein – Cellular & Molecular Biology)

In this experiment I will determine why human fingers tend to prune when subjected to water. In order to do this, I will create 4 different cells containing the same amount of different concentrations of salt (NaCl); 1%, 10%, 10% and 50%. After I put each cell into a beaker containing a different salt concentration. For example the cell containing 1% salt solution was put into the 1% concentration, the two cells containing 10% salt concentration was put into a beaker with 1% and 50% cell concentration. I weighed the cells before placing them into the beakers and then left them there for approximately 20 minutes. The results of my experiment support my conclusion as it shows the process of equilibrium taking place. Since water flows from high to low concentration, when placed into a surrounding environment with a higher concentration of salt the cell absorbs and expands therefore showing the increased in weight.

318-08 The Effect of Sugar on Reaction Time

Henri Bulku

(Ms. Goldstein – Product Testing)

Sugar can be found in many foods people eat in their daily lives. It is known that it may affect a person's mood and memory, but overall not very set to its positive or negative effects on a physical level, and more specifically in this case, human reflexes or reaction time. This project focuses on human reaction time with no sugar as the control group, and sugar intake with the same test and waiting in between as the experimental group. Sugar substitute is also added as another experimental factor to see how close the results are to that of normal, real sugar. The overall results did not support my hypothesis, which was that sugar would lower reaction time, because the intake of sugar seemed to generally slightly increase reaction time by around 20 milliseconds for the majority that caused the people being tested to perform better.

316-09 The Effect of Font Type on Reading Speed

Anthony Chen

(Ms. Mosley – Behavior & Social Science)

The purpose of this experiment was to compare the effectiveness of the fonts Times New Roman, Arial, Comic Sans, and Georgia. The hypothesis was that Times New Roman would allow people to read the fastest as it was the most commonly used so people are used to reading it. This was tested by giving participants one of four packets, which had four different articles printed in four different fonts. For each student, the order of the readings was the same, but the fonts were varied. Once the subject had finished reading each article, the time was recorded in seconds and this was repeated until the packet is done. After testing 16 people, the average times were 76.74 seconds for Comic Sans, 74.54 seconds for Georgia, 62.92 seconds for Times New Roman, and 71.96 seconds for Arial. After performing an ANOVA test on the data, there was a p-value of 0.6 which indicated that there was no significant difference between the fonts. Thus the hypothesis was not supported by the data.

314-18 Testing Tostitos and Organic Tortillas for GMOs

Linda Chen & Sarah Bain

(Ms. Goldstein – Microbiology)

What we decided to do for this experiment is to test out if corn-made products actually contain GMOs in it. The two products tested in this experiment is Tostitos which does not say if it contains organic substances and Simply Organic Tortillas which is certified as GMO free. To do this, we isolated the DNA from the sample with the help of the centrifuge and then amplify the DNA by PCR. Lastly we analyze the products through gel electrophoresis to see if the samples contained the DNA for genetically modified organisms. The results turned out to be that the Tostitos did not contain GMO in them which was surprising to us. In addition, the Simply Balanced Tortillas which are organic remains a question as to if they are non-GMOs since the results turned out to be invalid.

314-02 What is the best material to block out sound?

Sherry Chen

(Ms. Mosley – Product Testing)

The purpose of this lab is to find the best household or everyday product that can block out the most sound. The materials tested were sponges, Styrofoam, metal, plastic, and aluminum foil. The hypothesis was that sponges will be the best material to block out sound because it can absorb all the sounds and block it out. In order to test this, an app was used to test the number of decibels per second. The major findings from this laboratory was that plastic was the best at blocking out sound. From the evidence, it can be concluded that plastic does a really good job at absorbing the sound waves and preventing some of them from passing. Sponges were the worst at absorbing sound due to the tiny holes in the sponges. Even though the plastic container blocked out the most noises, it only blocked a tiny bit of it. Household products may not be the best at blocking sound out, but it can help with the low noises.

314-05 How does age affect hearing range?

Tennyson Cheng & Andrew Zhang

(Ms. Goldstein – Animal Science)

For this project, we are testing how the age of an individual affects their hearing range. Hearing range is the range from the lowest frequency to the highest frequency that an individual can hear. We believe that as you grow older, you will start to lose the ability to hear higher frequencies compared to when you were younger. We conducted this experiment by playing 10 second periods of certain frequencies (13 kHz, 14 kHz, 15 kHz,... 22 kHz) through headphones capable of producing frequencies up to 38.5 kHz accurately. The audio files are in .wav format, sampled at 48,000 Hz in order to ensure

that the frequency being played is lossless. We attempted to get as many people as we could for each age group to ensure the consistency of the data.

318-02 The Effect of pH on the Evaporation of Distilled Water and Ethanol

Joyce Chow

(Ms. Mosley – Chemistry)

The purpose of this experiment is to determine whether or not pH affects the evaporation rates of distilled water and ethanol with 40% alcohol. This is important because evaporation is important to the water cycle, so if pH does affect evaporation rate, it would either benefit or harm the cycle. The predicted outcome of the experiment was that liquids with a higher pH would evaporate faster. In this experiment, a heat plate was used to aid the evaporation of the water and ethanol, and to change the pH of the liquids, 0.1 M hydrochloric acid was added into them. The major findings from this laboratory were that there was no significant difference between the evaporation rate of distilled water with different amounts of HCl (p-value = 0.73) and between the evaporation rate of ethanol with different amounts of HCl (p-value = 0.22). From the evidence, it can be concluded that the predicted outcome was not supported and that pH has no effect on evaporation rate.

316-03 Which Orange Juice Has the Most Vitamin C?

Tahiyat Chowdhury

(Ms. Goldstein – Chemistry)

In this science project, I compared the amount of vitamin C in popular brands of orange juice: Tropicana, Florida's Natural, and Minute Maid. To do this, I used titration to measure the amount of vitamin C. The titrant is a solution of soluble starch and orange juice while the titrating solution is a solution of iodine and water. When iodine reacts with soluble starch, it turns the solution into a blue-black color. If vitamin C is in the solution, iodine will react with it instead of the soluble starch, so there will be no color change. As the iodine solution is added into the titrant, all of the vitamin C will oxidize. After this, the added iodine will be free to react with the starch, producing a color change. Using this method, I found out that Florida's Natural had the most vitamin C while Tropicana had the least amount of vitamin C. This experiment illustrated the ludicrous claims made by food companies since these orange juice brands had less vitamin C compared to actual oranges.

314-13 Which Ingredient in Lotions Work The Best?

Yiming Dai

(Ms. Mosley – Product Testing)

Dry skin is a problem faced by many people. Different companies would often come up with products that can help relieve this problem, but do they really work? If they really work, which ingredient made it work? The purpose of this experiment is to compare the ingredients: mineral oil, petroleum and glycerin to see which one works the best in locking in moisture. These ingredients have long been used in lotions that we use everyday and have claimed to be effective in keeping skin moist. It is predicted that the lotion that contains glycerin will be the most effective in locking in moisture due its common use in multiple lotions. This experiment is done using Jell-O as a substitute for human skin with the lotion being tested placed on top. By obtaining the mass of the Jell-O for a total of one week, the ending results showed that the lotion that contains mineral oil is more effective in keeping moisture as the mass of the Jell-O did not change significantly after one week.

314-01 Does mass affect the rate at which an object falls?

Ramy Fata & Eddie Xu

(Ms. Goldstein – Physics & Space Science)

A heavy steel beam will fall faster than a light soccer ball. This statement is a commonly made assumption however, it is invalid. As stated in Newton's second law, when the mass of an object increases, the force that the Earth exerts on the object increases proportionally. According to the equation, Force = Mass*Acceleration, as the mass and force of gravity on an object increase at a direct proportional rate the acceleration due to gravity will remain the same no matter the mass of the object. ($F/m=a$, if f and m increase proportionally then a will stay constant).

320-05 The Verification of a Non-Genetically Modified Protein Bar

Hafsa Fatima & Naila Mirza

(Ms. Goldstein – Product Testing)

Genetically modified organisms have been known to humankind for several decades. However, only recently have labels started to appear to notify the consumer on the nutritional value of food products. The experiment was done to test whether a Builder's Protein Bar that claims to be organic, contains genetically modified soy. Doubts were expressed concerning the veracity of this product because 93% of soy is genetically engineered. This holds significant value because it verifies that customers are receiving the actual nutritional value for the food that they eat. It was hypothesized that the bar would contain evidence that the soy was genetically modified. The DNA was extracted from the protein and PCR was utilized to amplify the product. The results concluded that the protein bar in fact didn't contain the 35S gene which is found in all GM products. The experimental results did not support my hypothesis by showing that not all soy products are GMO.

318-07 Proving the Validity of the Monty Hall Problem

Lazar Fuchs

(Ms. Goldstein – Mathematical Science)

The Monty Hall Problem is a scenario that originates from the show Let's Make a Deal hosted by Monty Hall in the 60's. The game show involves three doors. The host selects a random audience member from the studio to the stage. The contender only knows that one door contains a prize (a car) and the other two doors contain a trap (a zonk). The host tells them to select a door they presume contains the prize. After their selection, Monty, who knows all the locations, then removes one door containing the zonk. The contestant then gets a choice to either stick with their initial choice or swap with the other remaining door. The Monty Hall Theory reveals the best decision to make that will increase the chance of winning the car. The theory is to always swap your choice to the other remaining door. I will provide an iPad that presents the Monty Hall Game which automatically shows the results by selecting a desired amount of trials. My project involves proving the validity of this theory.

316-07 How does tea affect the growth of lettuce?

Agata Grzyb

(Ms. Mosley – Plant Science)

The experiment was performed to see what affect tea has on lettuce. It showed if watering seeds with more oxidized tea will make them grow better. The seeds with water were the control to show the lettuce growing normally. Sources show that the more oxidized tea will help the seeds grow. The experiment was done by planting seeds in three different pots and watering one with water, one with black tea, and one with green tea. The seeds were watered with about 15 mL everyday and measured everyday. At the end the seeds that were watered with green tea grew the longest. The seeds watered with black tea were a little longer than water. On the back of the seed pack it said that lettuce grew better if there was vitamin C (an antioxidant) present. Research showed that green tea has more

vitamin C since it is less oxidized. Black tea and water have almost no vitamin C. The evidence showed that lettuce seeds watered with less oxidized tea will grow longer.

314-16 Linearity of Bouncing Balls

Jose Guzman & Oran Chak (Ms. Goldstein – Physics & Space Science)

There is an actual similarity between springs and animals. This similarity is the storage of energy. Both living and non-living things store and transfer energy from one form to another. This experiment tests that concept using bouncy balls. This experiment will determine rebound heights of the bouncy balls. In addition, it will find the relationship between the dropped height and rebound height.

318-17 pH on Enzymes

Ellen Gyulbudaghyan (Ms. Mosley – Chemistry)

The purpose of the lab was to see the effect of pH on enzymes and to measure glucose concentrations to find the ideal pH for lactase. For yeast enzymes, the ability to break down hydrogen peroxide was tested. It was predicted that low acid and distilled water would produce the largest bubbles and a pH of 7 would have the highest glucose concentration. The methods used were dilution and mixture of solutions. The findings from this laboratory were that the low acid, low base, and distilled water had the most enzyme activity in yeast. They had the greatest bubble height which show that hydrogen peroxide was broken down more. The lactase solution with pH of 2-7 had differing glucose concentrations and the highest was around a pH of 7 meaning that is where the enzyme works the most. It can be concluded that enzymes work best around almost neutral pH levels or slightly acidic ones. If pH is too high or too low, the enzyme cannot function properly as shown in the glucose test and yeast.

320-06 DIY Fireproof Clothes

Milena Gyulbudaghyan & Giuseppina Mammoliti (Ms. Goldstein – Chemistry)

My partner and I tested the time for ignition of cotton cloth dipped in solutions with borax and differing concentrations of boric acid. Borax is a significant boron compound that is known to be used in chemistry as fire-retardant and to make buffer solutions. We added 10 grams of borax to six solution containers, each with 500 mL of warm water. Boric acid, or hydrogen borate, is known for being flame retardant, as well. Therefore, we added a different concentration of it to each of the six beakers, dipped the cloths into each solution, let them dry overnight, then lit them on fire. After conducting numerous t-tests and an ANOVA, the data showed strangely high variance, up to 1280. According to our data, we concluded that the concentration of boric acid does not have an effect on flammability.

314-09 Does talking and texting affect reaction time?

Russell Hong (Ms. Mosley – Behavior & Social Science)

The purpose of this experiment is to determine if distractions will affect reaction time. In the experiment people caught a falling ruler with their hand in different scenarios. The data gathered is meant to show how much of a time difference it can be for drivers to react when they need to suddenly step on the brakes to avoid a car accident. The first scenario is just catching a ruler/meter stick, the second scenario is catching a ruler/meter stick while having a conversation, and the last scenario is catching a ruler/meter stick while texting. The result from this experiment was that there is a significant difference in reaction time between no distraction and having a conversation and a highly significant difference in no distractions and texting. However, there is no significant difference between having a conversation and texting.

314-12 Effect of Calcium on Hatch Rates of Brine Shrimp

Calvin Huynh

(Ms. Mosley – Biochemistry)

The purpose of this lab experiment is to test whether or not the hatch rates of brine shrimp in a salinity level of 35 ppm are impacted by differing calcium concentrations. The experiment was based on a publication by William A Wurts, Ph.D. which essentially conveys the meaning of calcium water hardness and it's necessity to fish culture. My procedure began by forming different calcium concentrations between .004 mg of calcium per 100 ml of seawater and .094 mg of calcium per 100 ml of seawater in increasing .010 mg of calcium intervals. 10 brine shrimp were each added into the environments and their hatch rates were documented on an hourly basis. The major findings in the laboratory were that calcium concentrations did have a positive impact on the hatching rates of brine shrimp. The brine shrimp in the control or untampered seawater had 1 hatchlings in a 24 hour time frame while the brine shrimp in the .094 mg calcium / 100 ml seawater had 3 hatchlings. Calcium improved hatch rates.

318-13 The effect of citrus fruits on henna stain and how long it lasted

Shakila Islam

(Ms. Mosley – Product Testing)

The purpose of this experiment was to identify which citrus fruits would cause henna to stain the darkest and last the longest. From this experiment, it was predicted that the more acidic fruit, lemon would cause henna to stain the darkest and be longer lasting because of its acidic properties. Henna was made with henna powder, equal amounts of the juice of a fruit, essential oils, and sugar. The fruits that were used in the experiment were lemon, lime, orange, tangerine, and grapefruit. Water was used as the control. After letting the henna set with plastic wrap for 24 hours, the henna mixtures were coned. The most acidic fruits were drawn on the top and the lower on the bottom. Results showed that henna mixed lemon had the darkest stain and lasted the longest. While water mixed with henna powder stained the least and lasted only 2 days. In conclusion, the data showed the more acidic citrus fruits mixed with henna powder caused the darkest henna stain and lasted longer.

320-09 What's in a Face? Are Composite Faces More Attractive than Real Faces?

Hebah Jihad

(Ms. Goldstein – Behavior & Social Science)

Psychologists have long studied why humans find some faces more attractive than others. This human behavior science project would test whether people are actually attracted to faces that appear to be more symmetrical than to faces that are not. Three faces of the same sex will be taken and merged to form a composite face using an online tool. The composite face averages the input faces, so that small, non-symmetric features tend to get lost. The composite faces will be presented alongside the component faces and a survey will be done to determine how they compare to real faces in perceived attractiveness.

316-11 To Be or Tu-Nah To Be

Elizabeth Joseph & Sarah Elmosbah

(Ms. Goldstein – Product Testing)

In this project my team and I investigated fraudulence within the food industry by taking a closer look at the tuna sushi sold by various restaurants in Sheepshead Bay. We bought a roll of tuna sushi from five different restaurants and one pound of regular tuna fish as our control. We conducted our experiment at the Harlem DNA Center where we isolated and extracted DNA, amplified it by means of PCR and then ran gel electrophoresis. Gel electrophoresis was run two times using fish and bacteria primer but only one sample showed for the fish primer while four were detected for the bacteria primer. Subsequently, we sent these samples in for sequencing and then proceeded to analyze

the results. The results were astonishing as we found that our control contained *Ceratotherium Simum* (White Rhinoceros). However, the sample tested with fish primer turned out to be tuna. Although these results are intriguing, their validity is questionable because contamination could have altered our results.

318-04 The Effectiveness of an Artificial Pancreas

Halima Kahramonova

(Ms. Goldstein – Biochemistry)

Diabetes is the body's inability to produce insulin resulting in high levels of glucose in blood. Scientists are working on making an artificial pancreas which would mimic the function of that of a real one. I built a simplified model of an artificial pancreas, investigating the challenges of its function. I used acid/base chemistry, where an acidic solution (Vinegar) represents high blood glucose levels and a neutralized solution represents normal blood glucose levels. The conductivity sensor represents the glucose sensor that makes the electrical circuit run a pump when the solution is very acidic. The basic solution (Baking Soda), representing insulin will be moved by the pump, into the acidic solution to neutralize it. After it's neutralized, the sensor will make the circuit stop powering the pump representing high blood glucose levels being lowered by the addition of insulin. My results showed that the electrical circuit effectively regulates the "glucose" levels in the solutions.

318-15 To Be or Tu-Nah To Be

Shanjida Kamal & Sabina Kubayeva

(Ms. Goldstein – Product Testing)

Our team explored the authenticity of tuna sushi by investigating the ingredients of different brands provided by restaurants in Sheepshead Bay, Brooklyn. Despite our major setbacks and sources of errors, this project raised consumers' awareness. We carried out this project in the Harlem DNA Lab where we followed the DNA barcoding protocol in which we extracted & isolated DNA from the samples & proceeded to amplify it through PCR. Following this we began gel electrophoresis & then sent our samples in for sequencing. Lastly we analyzed our results using bioinformatics in hopes of differentiating the species of tuna. Our results indicated that the samples were most similar to *Ceratotherium simum* (rhinosaurus). These results are not accurate since there was contamination among teams' samples. We experienced many sources of errors, we obtained a negative result. We were able to expand our knowledge on DNA barcoding and can now learn from our mistakes.

320-10 Which catalyst provides the fastest reaction time?

Charles Kambourakis & Nick Coluccio

(Ms. Goldstein – Chemistry)

We tested the reaction time of the decomposition reaction $2\text{H}_2\text{O}_2(\text{L}) \rightarrow 2\text{H}_2\text{O}(\text{L}) + \text{O}_2(\text{g})$. Normally this reaction takes a long time to occur at room temperature. The catalysts, yeast, potato and liver all contain the enzyme catalase. Catalase is a common enzyme found in the body as it breaks down toxic hydrogen peroxide in our cells into water and oxygen as shown by the above reaction. When the catalase is added to the hydrogen peroxide, it lowers the activation energy of the reaction thus causing the reaction to start at room temperature. We found out that liver is the best catalyst as it produced the most amount of bubbles in the shortest amount of time which means that it has the quickest reaction time when compared to the yeast or potato. The yeast was the second fastest and the potato was the slowest in terms of reaction time.

320-15 GMOs in Taco Bell?

Albina Kukic & Orlando Rios

(Ms. Goldstein – Product Testing)

Does your favorite fast food restaurant only use natural ingredients? You would like to believe so, but you probably wouldn't have a definite answer. Nonetheless, the rapid increase in availability of DNA barcoding methods has made this answer possible to find. The purpose of this experiment is to see if Taco Bell products are GMO-free, specifically their taco shells. DNA analysis in food items is extremely important because it helps ensure food safety, which is why this experiment is so useful. After collecting four samples of taco shells, their DNA was isolated with the centrifuge. Additionally, the wash buffer cleaned out any debris attached to the desired DNA. When the DNA was isolated, there was a clear and precise DNA sequence ready for analysis. This was analyzed by gel electrophoresis, which indicates for existing GMOs. Ultimately, the results showed that the taco shells did in fact contain GMOs contradicting Taco Bell's statement that their products are GMO-free.

320-02 The Effect of Magnetic Fields on Water Flow

Amy Leong

(Ms. Mosley – Physics & Space Science)

Diamagnetism is when the object produces a magnetic field that opposes the applied magnetic field. The purpose of this experiment is to determine whether water flow on different types of water differentiate with the presence of magnets. The flow of the distilled and salt water was measured through the burette by recording the time. It was predicted that the salt water with magnets will flow out of the burette the slowest because the presence of the magnets will oppose the created magnetic field of the ions from the sodium chloride. The laboratory results supported this hypothesis by showing that the average time the salt water with the magnetic field took to flow out was 8.508 seconds. The ANOVA test indicated that there is a very highly significant difference between the data.

316-14 How Does the Intake of Different Substances Affect How Iron is Dissolved in an Empty Stomach?

Ivy Li

(Ms. Mosley – Chemistry)

Stomach acids help in the process of iron absorption by dissolving the iron. There are many different circumstances that can affect the rate iron is dissolved. This experiment goes into depth on the effect substances, such as vitamin C and ethanol, have on the dissolving rate of iron in the stomach. In order to compare the rate of iron being dissolved, iron reagent was used. It was hypothesized that vitamin C would have a faster dissolving rate of iron. The outcome of this experiment was that there was a highly significant difference with a p-value of 0.000000525889704213104 between the vinegar and ethanol and between ethanol and vitamin C there was a p-value of 0.00182606754771641. However, there was no significant difference between the vinegar and vitamin C with a p-value of 0.442489578338198. It was concluded that different substances does play a role in the dissolving rate of iron and that alcohol dissolved iron the fastest.

316-15 Are Dark Green, Leafy Veggies Higher in Vitamin C Content Than Their Lighter Colored Veggies?

Tina Lin & Kexin Wang

(Ms. Mosley – Medicine & Health Science)

Vitamin C or Ascorbic acid helps to provide many health benefits such as strengthening the immune system. The purpose of this experiment is to identify whether or not Vitamin C levels differentiate based on the darkness of the color of different vegetables. This helps consumers to be knowledgeable of what type of veggies to consume more of. The hypothesis is that the greener veggies would have a higher Vitamin C content than the

lighter ones. This is because darker veggies have less water but more chlorophyll which means there's a higher level of Vitamin C. Titration was used in the experiment. By using an iodine indicator, veggie juices would be slowly added into the indicator and swirled to see if the color changes. The major findings from this experiment is that darker colored veggies contain more Vitamin C. From the data that was collected, the hypothesis was supported. The iodine solution used less amount of darker green veggie juices to make the dark blue color disappear.

320-07 The Possibility of Having GMOs in Foods that Generally Do Not Have Them

Anastasia Lipatova

(Ms. Goldstein – Chemistry)

In this experiment the objective was to find out whether or not foods that are not supposed to have GMOs, have them accidentally or even unknowingly. GMOs are Genetically Modified Foods that make the plant or food they are put into become "better." It was interesting to find out whether the food I eat everyday from the snack aisle, or just in general which I believed were harmless to me, had GMOs that I never knew about. Also with the experiment and research I will be able to find out if the food I tested (goldfish crackers) has GMOs and if GMOs are actually bad for a person or even a developing teen to eat. By using this experiment on typical foods kids and adults alike are certain to eat, my question is if there are GMOs in these foods and they are indeed harmful or somewhat harmful how do we stop this or label foods correctly? My guess is that these foods might have a trace of GMOs as corn, a product with GMOs, is used almost everywhere. Testing my product will help me answer that.

318-01 pH of Different Types of Vinegars

Amy Liu & Dan Hong Chen

(Ms. Goldstein – Chemistry)

Vinegar is a commonly used ingredient in our recipe to make our foods more palatable. There are many different types of vinegar. The chemical compound that gives vinegar its sour taste is acetic acid. However, do each type of vinegar have the same level of acidity? pH is the measurement of acidity and basicity. Following the performances of titration to determine the molarity of each vinegar, the results are as follows: the average concentration of distilled white vinegar is 0.8064 M; for white wine vinegar is 0.7812 M; for rice vinegar is 0.6972 M; for apple cider vinegar is 0.8064 M. The results show that the concentration of the acids are really close together. Using the average concentrations, we calculated the pH of each vinegar. The results are as follows: the pH of distilled white vinegar is 2.419; for white wine vinegar is 2.426; for rice vinegar is 2.451; for cider apple vinegar is 2.419. We reached the conclusion that most vinegars have similar pH levels.

316-02 Common Pain Relievers' Ability To Take Effect The Quickest

Wendy Lliguichuzhca

(Ms. Mosley – Medicine & Health Science)

The purpose of this experiment is to determine which NSAID would be the quickest in relieving pain. Out of the 4 pain relievers tested, Aleve, Aspirin, Advil, and Motrin, the predicted outcome was for Aspirin and Aleve to dissolve the quickest in the replica stomach acid. This prediction was based on prior experiments, rather than scientific theory. In order to determine which pain reliever would take action first, a replica stomach acid had to be made with HCl of .155 M. After the replica stomach acid was made, 25 mL of this acid was placed in a beaker where a pain reliever was then added. After completing this experiment, it was apparent that Advil would be the most effective in relieving pain. The outer coating of the Advil pill dissolved quicker than the Aleve and Aspirin pills. The outer coating of the latter dissolved in six and a half minutes, but the pill itself didn't begin to dissolve. Based on these observations, one can conclude that Advil would be the best pain reliever.

318-10 Phantom Sensations

Lisa Lu & Beien Lin

(Ms. Mosley – Behavior & Social Science)

The purpose is to test how what you see affects what you feel. The hypothesis is if the fake hand is touched by an object, the person would feel a sensation. The method was to separate a subject's real hand using a divider, and then replacing it with the fake hand. The participant was asked to measure their own pulse before, during and after the experiment. During the experiment, both hands were stroked. The results were that the majority of the people had a reaction. The p-value was 0.00015, so there is a very highly significant difference. Thus, a person with an increase in heart rate believed that the fake hand was theirs. Other studies done by scientists measured the amount of sweat the subject perspired along with a MRI scan. It can be inferred that the increase in perspiration results from the increase in heart rate. This was related back to the studies that found that those who perspired more had MRI scans that showed brain activity to feeling sensations on the fake hand.

318-05 Harmonic Motion

Ellen Lui & Evelyn Martinez

(Ms. Goldstein – Physics & Space Science)

Many objects in nature are periodic including a spring. In this project, we will be investigating the periodic motion of a metal spring. To do so, we would need to find the frequency of the spring since the frequency is the inverse of the period. We will also be calculating the spring constant (k) and the effective mass of the spring to bring us to the conclusion that as mass is added, the period increases.

314-03 Dirtiest Place in a House

Lois Luo

(Ms. Mosley – Biochemistry)

The purpose of this experiment is to test and determine the 'dirtiest' place in the house. The hypothesis was that if bread slices were used to test the microorganism growth of different areas in the house, then, the bread slice used on the toilet would have the most mold growth. Ten different bread slices were swiped across five different areas in the house; each area had two trials. The bread was then laid out for the mold to begin growing. After several days, mold grew on a majority of the bread slices. The slices used on the kitchen sink were bare while the rest of bread slices had mold across its surface but it was most significant on the two slices wiped across the toilet. Both slices were filled with dots of mold, this shows that the toilet holds more microbes than the other areas tested.

320-03 Vitamin C Concentration in Orange Juices

Shawal Malik

(Ms. Mosley – Chemistry)

The purpose of this experiment is to determine which type of orange juice has the most vitamin C. It was hypothesized that artificial orange juice (SunnyD) would have the most vitamin C due to added ingredients which help boost its vitamin C level. The process of titration was applied to test for vitamin C levels. An indicator solution was made by mixing cornstarch paste, water and iodine. The solution was mixed with drops of juice until the color turned clear. The hypothesis was not completely supported by the results because freshly squeezed orange juice required only an average of 9.2 drops to turn the indicator solution clear while the SunnyD required an average of 15.2 drops (the juice which requires the least amount of drops to turn the indicator clear is the one with the most vitamin C). From the evidence gathered, it can be concluded that freshly squeezed orange juice can be a good source to receiving the proper amount of vitamin C in a diet.

316-13 Yeast Busters

Kathy Mania

(Ms. Mosley – Medicine & Health Science)

This experiment was conducted to find out whether or not people infected with fungus should spend their money (or their insurance's) for a prescription medication prescribed by a dermatologist. In this experiment yeast is utilized to test the strength of the over-the-counter and prescription drugs, they each contain countless components. Retail medications commonly contain much lower doses than prescription drugs, but this is not true in all cases. Using only creams available in the house and stores, the two drugs' effect on the yeast growth was tested. The results show that the hypothesis was not supported; the prescription drug were able to prohibit the yeast from growing. According to the p-value there is no significant difference. Thus, with this data one is able to tell that even though there was a difference in the amount of water displaced, the gap between the two was not too great.

320-01 Affects of Exercise on Memory

Timothy Mei & Vincent Wang

(Ms. Goldstein – Behavior & Social Science)

In this experiment, we will test how an individual's memory is affected by exercise. This experiment was tested on a group of students, both male and female from ages 15-16. The control group will memorize a color wheel within 30 seconds and they will be allowed to rest for a minute. After, they will need to write down the names of the colors on a color wheel without the names as fast as possible. The experimental group will also memorize a color wheel within 30 seconds, but instead of resting, they will need to do jumping-jacks for a minute. They will also have to write down the names of the colors on a color wheel without the names as fast as they can. We will compare the data using t-stat to determine whether or not exercise has any effect on memory.

316-18 The Bouba-Kiki Effect

Danny Mejia

(Ms. Goldstein – Behavior & Social Science)

I showed 10 Midwood High School students 20 index cards, containing 10 pointy shapes and 10 bubbly shapes, one by one and asked them to identify each one as either bouba or kiki. My hypothesis was that the students would identify the pointy shape as "kiki" and the bubbly shape as "bouba" which could indicate a human predisposition to identify certain sounds with abstract shapes. My data has shown that all the students identified the pointy shape as "kiki" and the bubbly shape as "bouba" for the most part. Therefore, based on my findings I have concluded that there may be a human predisposition to associating certain sounds with figures which also supports the idea that language first developed when people linked representative sounds to specific concepts or objects.

314-11 The Buzz about Honey: Testing the reliability of honey labels from DNA

Alice Mo & Md Hoque

(Ms. Mosley – Product Testing)

Most of today's honey have gone through heavy purification, which means that DNA (pollen) is rarely found. Due to this, a modified extraction procedure was done. 5 brands of honey were purchased. In the lab, DNA was extracted to determine how processed the honey was. The DNA was amplified by PCR protocol and then gel electrophoresis was done to compare the DNA of the honey samples. RbcL primer- a plant gene was the control. However, only one sample gave readable sequence. A program called DNA Subway was used to determine the similarities between the flower on the label and what was found in the extraction. The readable sequence was extracted from the Orange Blossom sample. The actual flower on the label had a 90.35% similarity, while a different substance that was found- hazelnut, had a 98.32% similarity. This showed that hazelnut

was used more than orange flower, which was not advertised on their label. Overall, the honey label didn't correspond 100% to what was found in the honey.

318-14 The Fizzy Chemistry of Bath Bombs

Christina Ng

(Ms. Goldstein – Chemistry)

A bath bomb consists of multiple ingredients that are mixed and molded into a specific shape such as a heart (in this experiment), shellfish, or a Christmas ornament. Once it is dropped in water, it turns bubbly due to an acid-base reaction occurring between some ingredients such as citric acid (acid) and baking soda (base). This experiment measures how changing the amount of cornstarch in two different recipes affects how fast the bath bombs dissolve in cool water. Based on my experiment, I found that the bath bombs with more cornstarch dissolved slower compared to the normal recipe. This experiment shows you how to make your own bath bombs that can be used for a refreshing, cooling bath or even as a gift for your friends and family!

320-12 Is There Such a Thing as Too Much Gaming?

Steven Ng

(Ms. Goldstein – Behavior & Social Science)

I conducted a survey of 250 people. I told them statements that were scaled from 1 to 5. Choosing 4 or 5 would mean that the person agrees/strongly agrees with the statement; while choosing 2 or 1 would mean that the person disagrees/strongly disagrees with the statement and 3 if the person feels neutral about the statement. I add up the number of people who chose a specific answer, such as an x amount of people answered with strongly agreeing with a statement. With each participant, I add up their response numbers and I calculate if each individual would be qualified as an addict. With these numbers, I have to conclude if video game addicts exist or not.

318-12 The effect of gum on reaction time

Mario Ng Zheng

(Ms. Goldstein – Product Testing)

My project is about testing if gum can make one's reaction time faster. I did an online reaction test on 10 participants in class. They had to press the green light when the light turned from red to green. Each participant did out of 5 tries and then I took the average. Then with the same 10 people, I gave them gum and make them repeat the test and took the average out of 5 tries for each person. Then I did another test about sheep with same procedures with another 10 participants. The participants had to tranquilize the sheep when they tried to leave the flock out of 5 tries and then I took the average of the 5 tries for each person. Just like the 1st experiment, the first time they had to do the sheep test without gum and then they did it with gum after.

320-13 The Effect of Temperature and Direct vs. Refracted Light on a Solar Cell's Ability to Absorb Voltage

Benjamin Nguyen

(Ms. Mosley – Engineering)

The purpose of this experiment is to analyze under what temperature, and whether or not by using refracted or direct light, does a solar cell obtain the most voltage. The predicted outcome is that the solar cell would obtain the most voltage under direct light and high temperatures, due to these conditions producing the most intensity of light and heat. To conduct this experiment, the solar cell was left at room temperature and the voltage was measured after being subjected to direct/refracted light. The same procedure was conducted for a hot and cold solar cell. The major findings for this lab was that the cold solar cell obtained more voltage than the room temperature and hot solar cell. Another major finding, was that the refracted light performed better than the direct light, thus validating that the exact opposite of my predicted outcome was true. From this

evidence, it was found that a solar cell obtains the most voltage under cool temperatures and refracted light.

314-17 The Truth Behind the Vitamin C Concentration in Homemade and Brand Name Juices

Katie Nikishina

(Ms. Mosley – Chemistry)

Many believe that homemade juice is healthier and compacted with more vitamins rather than bottled juices, so this experiment was conducted using titration to show if this personal knowledge is accurate. An iodine and cornstarch indicator was used to test a juice's vitamin C content, thus turning from a dark blue color, to a lighter color when vitamin C is present. After the experiment, a t-test was conducted comparing homemade and brand name orange, apple, and grapefruit juice. The data showed that there is a significant difference for all three juices when comparing homemade juice and brand name juice. Overall, the data collected showed that homemade juice isn't necessarily more nutritious or filled with more vitamin C. Two out of three of the brand name juices tested had a higher concentration of vitamin C. This can be due to an awareness that certain fruits have less vitamin C, thus some manufacturers, such as Tropicana add supplements of ascorbic acid to benefit the consumer.

320-08 Determining Vitamin C Amounts in Cooked Potatoes

Emily Orman

(Ms. Goldstein – Chemistry)

As you know, vegetables not only taste good, but they are good for you. Many vegetables are a great source of vitamin C. Vitamin C is a water-soluble antioxidant that plays an important role in protecting the body from infection and disease. Humans do not make vitamin C on their own, so we must get it from dietary sources. Potatoes are one good source of vitamin C. My goal of this project is to find out if cooking potatoes affects how much vitamin C they have. In other words, if you boil a potato, is some of the vitamin C lost to the water that the potato is boiled in? In this cooking and food science project, I will investigate this and determine whether boiling a potato for a longer amount of time makes it lose more vitamin C or not. To quantify the amount of vitamin C, I used a laboratory technique known as titration. My results showed that the longer a potato is boiled, the more vitamin C it releases into the water that it is being boiled in.

314-07 Aloe Vera Preservation

Savlatjon Rahmatulloev

(Ms. Mosley – Product Testing)

The experiment was designed to test whether aloe vera can replace artificial preservatives, and add nutrition to crops, which is not possible with artificial preservatives. It is expected that aloe vera will indeed preserve crops, and due to aloe vera containing multiple biologically active substances, the fruits and vegetables should increase in nutrition value. The experiment tested grapes on their concentration of nutrients by using a refractometer to test their brix level. The control group in the experiment were grapes with no aloe vera gel, while the experimental group of grapes was covered with the gel. Every two days, the brix level of both of the groups were measured. One of the major discoveries was that grapes with aloe vera were preserved, but surprisingly, their brix level decreased at a considerable level; which was from an average of 16.85 to 9.61. From the data collected, it can be concluded that aloe vera can replace artificial preservatives as a more natural product.

316-06 Are people who are musically trained better than non-musicians at distinguishing sounds?

Jessica Rakhamim & Iryna Svezhenets (Ms. Mosley – Behavior & Social Science)

This project was to question whether or not musicians had a better hearing than non-musicians. It was hypothesized for the musicians to have a better hearing because when

they practiced with their instruments, they practiced with sounds as well daily. For example, guitarists trained their hearing by learning how to perfect their sound using the different strings on the guitar. Pianists used this skill to perfect the sound of the keys. The method involved in the project was to first gather thirty musicians and thirty non-musicians. Then, the participants were tested in which frequencies from 8kHz to 22kHz they could have heard. The proportion of frequencies heard from musicians was higher than the proportion of frequencies heard from non-musicians. There was a p-value of 0.00011546735 in a 2-PropZTest, with a very significant difference, and a confidence level of 99.9%. This concluded that the hearing abilities of musicians were different and ultimately better than non-musicians.

314-08 Does Caffeine in Energy Drinks Improve Athletic Performance?

Anthony Rodriguez

(Ms. Mosley – Product Testing)

The purpose of this experiment was to determine if the consumption of an energy drink containing caffeine would significantly improve the athletic performance of an individual. Two types of tests were used to find out if the claims made by the energy drink were true, speed and strength. Speed was measured by seeing how fast one could run in 40 yards with/without drinking Redbull. Strength was measured by seeing how far one could throw a ball with/ without drinking Redbull. Fourteen participants were used throughout the entire experiment, keeping it consistent. After the data was analyzed, the conclusion that was reached was that when people drank Redbull, they were able to run faster from their "without Redbull" attempt but when people drank Redbull while doing the throwing test, their results did not differ significantly enough from their regular throwing attempt. Drinking Redbull increased the speed of an individual while not significantly increasing the strength of the individual.

318-09 Reaction Rate versus Cell Phone Usage

Soanne Saint Victor

(Ms. Goldstein – Behavior & Social Science)

Texting and talking on cell phones distract users and can lead to injuries while walking and driving. This experiment will evaluate how these two types of cell phone usage influence reaction time. Is texting more dangerous?

314-04 Testing the Effectiveness of Natural Antifungal Agents vs. Drugstore Antifungal Agents

Renata Sakaeva

(Ms. Mosley – Product Testing)

The objective of this experiment was to determine whether natural or drugstore antifungal agents are more effective at killing fungus. It was predicted that the drugstore antifungal medications will be more successful at slowing yeast production. To determine whether this was correct, multiple gas apparatus' were built using a bucket, tubing, and a graduated cylinder. Attached to the gas apparatus was a plastic bottle filled with a mixture containing yeast and an antifungal agent. After 30 minutes, the amount of CO₂ collected in the gas apparatus was observed, as active yeast releases it when it is growing. If the antifungals were successful, the water in the graduated cylinder would be displaced. After performing multiple trials, the hypothesis was supported by the evidence. The drugstore antifungals are more effective at killing fungus, with CO₂ averages of 12, 22, and 22.1 mL. The natural products, however, produced a significantly greater amount, with averages of 50, 71, and 82 mL.

320-16 pH and Plants

Aushna Saleem

(Ms. Mosley – Plant Science)

This experiment was conducted to see if solutions with differing pH values had effects on plant growth, and if the effects are reversible. To make low pH solutions, exact

amounts of vinegar, a household substance with a pH of 2.0, and drain cleaner (pH of 14.0) were diluted in equal amounts of water. Next, three of the same species plant were hydrated daily with a corresponding solution for 8 days, and one plant was hydrated with water as a control. After 8 days, when the plants faced visible damage from the solutions, the experiment was used to see if the effects were reversible. For 5 days, the plants were hydrated using only water to see if the plants could be rejuvenated. Heights of all plants were recorded every day of the experiment. It was determined that both very low and high pH solutions have fatal effects on plants, killing them efficiently, and low pH has faster effects, making it worse for bean plants. Also, once impacted, the bean plants are not able to be revived.

314-14 Effect colors have on memory

Alma Samarxhiu

(Ms. Goldstein – Behavior & Social Science)

This project investigated the relationship between colors and a person's memory. I asked 50 teenagers from the ages of 14-17 to recite back dates that they can recall from the flashcards that I had shown them, each date being in a different color. Majority of students could remember certain dates in certain colors like yellow but very few students couldn't remember the dates in certain colors like green showing that colors do have an effect on a person's memory, specifically teenagers.

320-14 Do high school males or female smile more?

Francis Saw

(Ms. Mosley – Behavior & Social Science)

The purpose of this experiment was to explore whether high school males or females tend to smile more. Based on numerous articles and papers, smiling is indeed contagious therefore, looking at other smiling people should lead to the viewers of the picture to smile as well. The experiment consisted of having people sit down and look at a picture of smiling people on my phone. All the students had to do was stare at the picture for approximately 20 seconds. Then I would see whether they smile or not within the next 5 seconds after or within the 20 seconds looking at the picture. The p value for the experiment was about .01421 which is less than .05 which allows the conclusion that there is a significant difference between the two sets of data of high school male and female students smiling since there is a greater than 95% confidence level. Based on the data, using the average, girls tend to smile much more since the average is much higher than the amount of times male students smiled.

320-18 The Stroop Effect: Monolingual Vs. Bilingual

Guinevere Seaver

(Ms. Goldstein – Cellular & Molecular Biology)

The Stroop Effect refers to the delay time in saying font colors with incongruent color names. An example would be the word "red" written in blue print (and the participant would have to say blue). My experiment tests selective attention abilities of both bilingual and monolingual subjects. I will be testing whether or not those who speak a second language have better selective abilities than their monolingual counterparts. If bilinguals performed slower, then cross-language interference would be to blame but if they performed faster it would demonstrate an ability to be able to "switch off" one of their languages.

320-11 Are your eyes playing tricks on you?

Rianna Segal

& Gabrielle Milman

(Ms. Goldstein – Cellular & Molecular Biology)

Cone cells are found in the retina, also known as the fovea. They are what help us to perceive colors like red, blue, and green. We investigated color perception by having three different people create afterimages, which are the images that are left on your retina

after you stare at an object and then look away. The goal of this experiment was to test the cone cell fatigue and recovery rates with afterimages. We also tested to see if there was any difference between using both eyes, the left eye, and the right eye.

320-17 The Effect of Exercise on the Reaction Time of Teenage Students

Allan Shikh & Olexandr Pustovoyt (Ms. Goldstein – Medicine & Health Science)

Reaction time is the amount of time it takes to respond to a stimulus. Reaction time depends on a number of outside factors. These factors include but are not limited to: body weight, health, sobriety. The purpose of the project was to see how increased blood flow, caused by exercise, affects reaction time. We had subjects perform the human benchmark test before exercise, then have them do five push-ups and thirty seconds of jumping jacks. We then had them retake the test. We found that a majority of subjects times improved after the exercise, albeit for a few outliers.

314-15 The Effect of Vinegar on Oxidation Rate

David Shikh & Daniel Ladovsky (Ms. Goldstein – Chemistry)

Oxidation is the process by which a substance gains oxygen and loses electrons in a chemical reaction. In our experiment, we wanted to prove that rusting is an oxidation reaction and that the one-liter bottle with the most vinegar would see the greatest increase in the rate of oxidation. Therefore, we performed three trials on three different one-liter bottles with a balloon attached to the top and the same amount of iron wool, but different amounts of vinegar mixed in. Then, we allowed the bottles to sit untouched for three hours, measuring how far the balloons sunk in each hour (in centimeters). We proved that rusting was an oxidation process once we observed that the balloons had sunken into the bottles. In addition, when we observed and averaged out the data from all three trials, the bottle with the greatest amount of vinegar (three tablespoons) had the greatest average distance in terms of the attached balloon sinking into the bottle, which supported our hypothesis.

316-10 The Effect of Peppermint on Reaction Time

Leah Shteinberg & Aysheh Barqawi (Ms. Goldstein – Behavior & Social Science)

Reaction time is the interval time between the presentation of a stimulus and the initiation of the muscular response to that stimulus. Before conducting the experiment, we hypothesized that eating a peppermint candy would ultimately increase a person's reaction time. In this experiment, 30 volunteers were told to take an online reaction test twice. The first time the test was taken was without the peppermint candy. Then, it was taken a second time with a peppermint candy. In the end, the results of all the volunteers were compared in order to see if the peppermint had increased their reaction time. After constructing a t-Test and analyzing the results, it was concluded that there was no difference seen when the volunteers had taken the test with and without the peppermint candy. According to the t-Test, the t-Stat value was 0.6852 with 57 degrees of freedom. Since this value is less than 2.02, the null hypothesis was accepted, thus our hypothesis was proven to be incorrect.

314-10 Comparing GMOs in Corn Flakes

Haishan Tan & Maggie Chen (Ms. Goldstein – Chemistry)

Scientists have discovered how to utilize genes in order to make improvements to everyday food. This experiment was done to see if certain corn flakes contained any genetically modified organisms (GMOs). We decided to use Kellogg's' corn flakes and Trader Joe's Organic corn flakes because we suspected that Kellogg's would contain GMOs, while Trader Joe's would have no GMOs. In order to see if these corn flakes

contained GMOs, we had to isolate the DNA from the corn flakes separately. Next, we obtained PCR tubes containing PCR beads. We then added the 35s primer and tubulin primer, along with the DNA, into these tubes. These primers are needed to show whether the food product is genetically modified or not. Lastly, we analyzed the PCR products by gel electrophoresis. However, in our results, we couldn't see any prominent bands for the DNA. Overall, this experiment wasn't successful since there was no DNA detected from our samples.

316-04 How Much Fat Is In Your Food?

Winnie Wan

(Ms. Goldstein – Medicine & Health Science)

Have you ever question the food that you eat every day? Whether it was your breakfast or dinner, don't you ever wonder how much fat are in your food? Fat is an essential nutrient for our diet because it helps absorb vitamins A, D, E, and K, the so-called fat soluble vitamins. In addition, fat also fills your fat cells and insulates your body to help keep you warm. However, too much fat can cause serious problems for your body. Are you wondering about the fat content that you are consuming? Grab some food and experiment it yourself!

318-16 The Effect of Brine Shrimp Water on Scallion Regrowth

Meimei Weng & Judy Huang

(Ms. Mosley – Plant Science)

Many people regrow vegetables to save money, but, some say that regrowing them is not worth their time. The purpose of this experiment was to determine if brine shrimps can aid in the regrowing process of scallions by helping them grow faster and more efficiently. The hypothesis is that if scallions are regrown in brine shrimp water, then they will grow faster compared to the scallions in regular water. Fifteen scallions were grown in regular water and another set of fifteen were grown in brine shrimp water. The scallions were observed under a light source everyday and their final heights were measured on the fourth day to see their growth. The scallions in regular water grew longer and faster than the ones in brine shrimp water. Scallions in brine shrimp water shrunk, which was probably done by the high salt content. In conclusion, brine shrimps do not aid in the process of regrowing scallions. Therefore, scallions should be grown in regular water instead of brine shrimp water.

316-05 GMO Corn Chips

Cassie Wu & Jessie Lin

(Ms. Goldstein – Product Testing)

Our project is titled "GMO Corn Chips". The purpose of our project is to test two different types of corn chips to see whether or not these corn chips were genetically modified. One brand that we tested was Tostitos Corn Chips and another was Organic Corn Chips. In order to test our hypothesis, we had to take a portion of the sample to extract their DNA. After a process of extracting the substance, we were able to determine it's DNA by using a process called gel electrophoresis. As a result, the gel electrophoresis identified which of the samples were genetically modified and which was GMO-free. In conclusion, we found out that the organic corn chips were true to their label, but the Tostitos were genetically modified.

320-04 Electrolyte Challenge: Gatorade vs. Red Bull vs. Orange Juice vs. Water

Joanna Yan

(Ms. Goldstein – Chemistry)

Electrolytes are minerals in the body such as sodium, potassium, and chloride. When an athlete sweats, they lose electrolytes. As a result, those lost need to be replaced by other electrolytes to maintain normal bodily functions, such as respiratory rate. For this project, I conducted an experiment to find how much electrolytes sports and energy drinks

contain, such as Red Bull and Gatorade. Additionally, I compared these drinks to regular liquids like orange juice, and tap water. I compared all of these drinks to distilled water, which was my constant to determine if sports/energy drinks actually had an advantage for the athlete; the greater the amount of electrolytes, the better. By utilizing a multimeter and constructing a conductance measuring circuit, I was able to find that Gatorade and Red Bull did not have an advantage due to a lower number of milliamps, though it was greater than tap water. Overall, orange juice had the greatest advantage.

316-01 The Buzz about Honey: Determining the Botanical Origins of Honey Using DNA Barcode

Jessie Zheng & Jennifer Duong (Ms. Goldstein – Cellular & Molecular Biology)

Honey has been valued as a natural sweetener that includes a mixture of sugar, trace enzymes, minerals, vitamins, and amino acids. The chemical composition of honey allowed it to have remarkable healing properties including the treatment of wound and burns. The physicochemical and biological attributes of honey are directly related to its floral origins. DNA-based methods are established today to be widely popular in the identification of botanical origin of honey due to their simplicity, quickness, and reliability. This research introduced a protocol for the DNA extraction from honey while also demonstrating how extracted DNA can be used for the botanical identification of honey. The quality of the extracted DNA will be assured through amplification by PCR, using specific plant primers. Through this research, the botanical identity of the honey is found and the relationship between the honey DNA and other floral species with a similar genetic makeup is also configured.

318-11 The Surprising Strength of Egg Shells

Melissa Zhong & Britney Perez (Ms. Goldstein – Engineering)

Although a majority of people believe that an egg shell is very weak, this project will prove this myth wrong. By placing various objects on top of three egg shells placed into an equilateral triangle, we put this myth to the test. After the egg shell(s) break or crack, we weighed all objects put on top of the egg shells. In addition, we will conduct this same procedure three more times to ensure accuracy. Lastly, we found the average mass of all four trials and found that on average an three egg shells can hold approximately 4,491 grams.

318-03 Sunspot Cycles

Michelle Zinger (Ms. Goldstein – Mathematical Science)

The historical data of sunspot cycles has been observed since about 1700. The data shows that sunspot activity rises and falls in a roughly 11-year cycle. Graphical and statistical analysis will be used to look for patterns in cyclical data. The goal is to find out if sunspot cycles consistently have a faster rise time and slower decay time using historical data and basic statistical analysis.

Room Arrangements

A314, A316, A318, A320

