Midwood High School Research Program Science Fair 2012

2012 Midwood High School Science Fair
24 May 2012 — 3:30 to 5:30 PM

David Cohen — Principal
Michael McDonnell — Assistant Principal
Tovia Rosenfeld — Assistant Principal
Glenn Elert — Research Coordinator
Jennifer Sullivan — Research Teacher
Jessica Ross — Research Teacher
Jesse Roehrich — Research Teacher

Timeline

Period 3–9
- Sophomores park boards in A214 (Research Room)
- Sophomores deliver snacks, drinks, plates, etc. to A300 (AP's Office)

1:40 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)

2:30 PM (Period 10)
- Scheduled classes on 3rd floor annex moved to main building
- Junior and Senior judges perform assigned tasks
- Judges use assignment packet as ticket for food in A313 (Physics Lab)

3:20 PM (Period 11)
- Teacher and alumni judges meet in A317 (Prep Room) for judging packets
- Sophomores move to assigned rooms, boards already in position
- Sophomores given time to make adjustments to boards and self
- Judging begins sometime between 3:30 and 4:00

5:00–6:00 PM
- Judges return to A214 (Research Room) with completed packets (calculators available)
- Juniors and Seniors assist with clean up
- Sophomores return boards to A214 (Research Room)
- Sophomore teachers provide students with color-coded food tickets
- Sophomores allowed in A313 (Physics Lab) in groups of ~25 by ticket color
- Last call for food

Ongoing
- Symposium for SUNY Albany students held on 2nd floor annex (room TBA)

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Judges

Teachers

Mary Bomba, Elizabeth Fenamore, W Tong Lung, Barry Saines, Howard Spergel, Frank Seipp (Reed Elsevier)

Alumni

Aleksandr Afanasyev, Anika Ahmed, Sania Ahmed, Rabia Ahsin, Natasha Babar, Santina Bonsignore, Stephen Braverman, David Chen, John Goulas, Jack Green, Kirill Grinberg, Amy Guan, Regina Gurevich, Ting Yu Huang, Rabia Iqbal, Stanley Krasner, Clarice Lee, Lisa Lin, Wenona Lok, Nicholas Macaluso, Humera Mohammad, Nicole Ng, Annie Nguyen, Lima Nusrat, Ifrah Saleem, Kurnvir Singh, Marina Stasenko, Leon Telis, Christine Truong, Lawrence Tse, Zhao Na Wang, Benny Wong, Cynthia Xue, Jane Yee

Seniors

Mohamed Adnan, Choi (Jeannette) Chao, Amy Chen, Matthew Chin, Tianna Chin, Dalia Fabius, Irene He, Tayyaba Jabeen, Tammy Jiang, Farjana Kabir, Sachini Kahanda, Mert Keceli, Jessica Khaimova, Michelle Li, Vivian Ng, Faryal Razzaq, Sandy Tam, Jia Wen (Joanne) Tan, Mark Trosman, Sophia Tse, Joshua Wadler, Megan Wong, Elizabeth Xochimitl, Emilee Yang, Amanda Ye, Jacinda Zhou, Ya Qun (Arlene) Zhou

Juniors

Aiysha Ashfaq, Mahmud Ashik, Ron Baazov, Onycha Banton, Roxana Bravo, Danielle Caño Garraway, Rabije Cekovic, Samantha Cham, Solomon Chan, Anna Chen, Earvin Chen, Yu Tong (Tommy) Chen, Diego Delgado, Ramsha Farooq, Ryan Fraser, Jasline Garcia, Kayla Gittens, Anna Guo, Janae Headly, Fabliha Hoque, Israt Hossain, Yao Jiang, Leshaun Jones, Sarah Khoja, Michael Kotlyar, Diana Koval, Jasmine Lam, Nicholas Lee, Judy Li, Qiao Xian (Sophia) Li, Winnie (2) Li, Winnie (1) Li, Vanessa Liang, Jian Cong (Leo) Liao, Tiffany Liao, Dao Quan Lin, Pamela Liu, Tiffany Loi, Tiffany Lui, Gabrielle Lynch, Zoe Ma, Rui Chang (Lily) Mei, Vlad Moraru, Jenny Ng, Linda Ngo, Nekema Noel, Mehmet Ozturk, Syeda Rasool, Isabella Regine, Xiao Wen (Jessica) Ren, Ziva Rubinstein, Sara Saad, Zainab Saleem, Kelly Shi, Crystal Soo, Jia Er (Kelly) Tan, Daniel Thornton, Evelyn Veliz, Nadege Willis, Klaudia Wojciechowska, Kate Wong, Sandy Wu, Prianka Zaman, Angela Zhang, Catherine Zhang

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Participants

314-09 Chris Ayala
Let The Sparks Fly!

316-02 Onur Ayaz
Effects of music on memory

320-14 Shahodat Azimova
Should you eat microwaved food?

319-13 Sabrina Banfi
Staying Healthy

314-14 Allen Barbarovich
Cellam Electrica

314-15 Micheca Benjamin Iyana Jones
Hygiene vs. Beauty

318-01 Anastasiya Biloblotska
Going Above the Surface: Factors affecting Catalases

320-05 Katherine Bogari Kemba Hall
Hot wheels

318-16 Amy Cao Ying Tong Guo
Juiceity to the Rescue

320-11 Bryan Chan
Acid Soda

319-07 Xin Yi Chen
Laundry Detergent vs. Stains

320-15 Sammi Chung Shirley Li
Cleaning Agents

319-10 Dalon Douglas
Getting a Bang out of Breath Spray

316-20 Dina Elfaham Jannatul Mewa
We have the Perfect Acne Solution for You

314-01 Amanda Engelshteyn
The Effect of Different Substances on the Melting Point of Ice

318-06 John Falce Daniel Lebedinsky
Most Effective Temperature For Urea Based Ice Packs

320-02 Walter Farez
The Colorful Perspective to Ameliorate Human Memory Recall

318-02 Robert Feldman
Effect of Lighting and Noise on Reaction Time

319-16 Kharene Gittens
Fun in the Sun

316-07 Julia Gorecki
Yeast Reproduction Using Various Sugar Substitutes

319-01 Chelsea Green
Acid Rain Killer of Plants

319-11 Tasnim Halim
The Effect of Music on Heartbeat

319-04 Marisa Harford
How Dirty Is Midwood's Annex?

316-15 Anum Hassan Maqadus Khan
I See Vitamin C

316-18 Remi Henry
Dissolving Pain

316-11 Stefanie Henry Jessica Liang
Just keep swimming, just keep swimming...

320-10 Bilal Hussain Tuzong Yang
How does Force of Friction affect the speed of an Object?

319-14 Iqra Hussain
Acids and Bases

314-18 Edward Isakov Brandon Eng
The Magic of Miracle Gro

319-08 Navish Javed
All Wrapped Up

316-01 Joel Jose
How do beverages affect teeth?

316-03 M. Tasnin Kabir
Dirty Hands

316-08 Anna Kapitman
Electrical Conductivity

316-04 Liya Katz
How Does Soil Acidity Affect Water Acidity?

316-13 Hassan Khan
Plant Transpiration

314-06 Jasmin Kim Hanna Kim
Vitamin C in Peaches and Carrots? I Thought Only Citruses!

318-07 Eliot Kontorovich
Insulation Exploration

320-04 Natalya Krilyuk
How do food preservatives affect the growth of micro-organisms?

316-16 Karen Kwong Kelly Kwong
Titrate and Indicate: pH Level and Vitamin C Content Over Time

319-20 Jennifer Lauv
Electroculture: Does It Work?

314-03 Aidan Lee
The Antimicrobial Effects of Spices and Herbs

319-12 Tommy Lee
Stain Stain Go Away

320-06 Stephanie Leung Jocelyn Chiu
Variations of the Stroop Effect: Males vs. Females

318-13 Shaunté Lewis
Let The Boiling Begin!

318-14 Cindy Li
Relations between vitamin C and pH levels in citrus fruits

318-03 Catherine Liang
My Study Sheet

318-15 Jessica Lin Noor Hasne
The effectiveness of hand soaps against S. epidermis and E. coli

319-18 Ting Lin
Corrosiveness of Soda on Eggs

316-14 Andy Liu
Magnetic Temper

314-10 Michael Lu Jacqueline Gringauz
Salt and Fertilizer: Benefit or Loss?

314-08 Ada Ma
Do shape words interfere with the task of naming shapes?

319-17 Ellysa Magloire
The Affects of Acidic Water on Plant Growth

319-02 Rabia Mahmood
Memory Within Reading And Writing

318-10 Tiffany Mai Selena Huang
How Clean Does it Seem?

320-13 Danielle Medvinsky
Colorful Vision

314-11 Sumreen Meer
The Truth About Toothpaste

318-09 Valerie Nemcheninova
Effectiveness of Popular Hand Sanitizers

320-07 Alma Nesimi
Grow Plants Grow!

320-20 Kiara Nuñez Shadika Jahan
Music vs. Concentration

318-04 Chukwunonso Nwasike
The Affects of Acid on Crystallization

318-20 Dami Oniga Angela Ubanwa
Have You Dyed Your Hair Lately?

316-06 Fionne Pham Ashley Yip
Homemade Glue vs. Brand Glue

316-05 Akeem Pinnock Stanley Wong
The Fibonacci Sequence: Solar Panels

314-02 Mary Qiu
Egg Shells vs. Coffee Grounds

319-09 Sangitaa Ragoonath
No Salt Please

319-15 Francesca Ramos
Hydroponics vs. Soil Plant Growth

318-12 Shubh Rana
Smile for the Camera

320-03 Saba Rao
Orangey Vitamins

314-07 Georgia Ross
Does Cooking Fruits and Vegetables Deplete Their Vitamin C Content?

320-01 Elzyata Sangadzhiev
Raw vs. Cooked Foods

320-08 Michael Scolavino
Antacids and HCl

314-04 Sade Seidu
Are Nutrition Facts Valid?

318-08 Almas Shafiq
Testing Which Acne Product Is Most Effective Against Bacteria

319-05 Devina Sharma
Mysterious Red Eye

314-16 Spencer Siu David Cham
Dirty Plants vs. Clean Plants

319-03 Deniss Sivohins
Stealthy Shapes: How to Make an Aircraft Invisible to Radar

314-13 Milo Sklar
Relationship Between Music Genre and Reaction Time

319-06 Adam Soliman
Nature is the best solution

314-20 Krzysztof Szermuszyn
What's your pre-game ritual?

320-12 Jia Tan
Saving the Wildlife One Feather!

316-12 Victoria Tanskaya
The Affect of Temperature on pH

314-12 Gardenia Taza
Which cleaning product is most effective in killing E. coli?

316-10 Lubin Toussaint Mark Goldman
Calcium & Protein in Milk

318-11 Jeffrey Tsui Yassine Kaouadji
Which Meat is Toxic to Planaria?

316-09 Jenny Wang
Do females have better peripheral vision than males?

319-19 Helen Wu
How does the increase of distractors distract people?

320-09 Junjie Wu
The Effect of Different Beverages on Tooth Decay

318-05 Kenne Yang Jennifer Wu
Kimchi Chemistry

314-05 Jonathan Yuen Matthew Piccione
Showdown: Runner vs. Distance from Base

320-16 Tian Hong Zhang Andy Xu
Ugly Teeth

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Abstracts

314-09 Let The Sparks Fly!

Chris Ayala (Ross – Engineering)

Have you ever been shocked when touched by a person? That is caused my static electricity. There is a way to store that electricity with a jar made from household materials. This project tests how much charge can be stored in cycles at a time with your Leyden jar. What has to be done first is to create the Leyden jar with a cylindrical object that is an electrical insulator, aluminum foil, and a nail. Then you create an electrophorus to allow transfer if electricity. Finally you would charge the electrophorus, transfer it to the Leyden jar, and find the jump distance of the spark to a piece of aluminum metal to calculate its voltage. This is how you would do the experiment but for me, there were no results because the Leyden jar didn't charge.

316-02 Effects of music on memory

Onur Ayaz (Roehrich – Behavior)

I've investigated the influence music has on the memorization and learning of high school students while studying vocabulary words. Eight students in total were tested individually; four males and four females. Each student was tested for a total of six times. The experimental group was being tested with the use of five genres of music including pop, screamo, classical, blues, and techno. The control group was being tested with no music. For each test, a list of ten vocabulary words was given. Every individual had been given five minutes to study with one of the given genres of music or with the absence of music. After the studying, each individual was tested on their memory and understanding of each word by taking a vocabulary matching test. No word bank was given during the testing to see how much the student could remember. The matching of words correctly followed by filling in of each question showed understanding of each word. The average means of the experimental music groups were significantly higher than the average of the control group; pop having the highest results. The effect of music had produced a positive result on the scores of each test.

320-14 Should you eat microwaved food?

Shahodat Azimova (Ross – Plants)

The purpose of this experiment was to test whether or not microwave radiation has an effect on the growth of organisms and also whether or not heating the food in plastic or glass material effects the organism. The hypothesis in this experiment was that if microwave radiation effects plants in a negative way then plants that received micro wave in plastic water should grow slower than others. In this experiment 5 different seeds were planted. Each seed was planted in 3 pots and each pot received different kind of water. There were 15 pots of plants in total. The five plants were turnip, lettuce, carrot, radish, and carrots. The 3 different waters were micro waved in glass water,

micro waved in plastic water, and regular tap water. Every 2 days the growth and condition of the plants were recorded. The results of the experiment supported the hypothesis. Plants that received tap water grew taller than those of micro waved in plastic and micro waved in glass. Also plants that received micro waved in plastic grew taller than those of micro waved in plastic. By day 6 carrots and lettuce both micro waved in glass and micro waved in plastic tried to escape the soil and by day 10 Carrot and Lettuce plants in both micro waved in glass and micro waved in plastic died. In conclusion microwave radiation damages organisms in a severe way. It was able to kill carrots and lettuce. Plants that received micro waved in plastic water and micro waved in glass did have a difference in height however both waters of those waters slowed down the growth of plants and they also killed the lettuce and carrot plants.

319-13 Staying Healthy

Sabrina Banfi (Ross – Chemistry)

This project has been completed to see which of the daily food products and drinks can provide the most vitamin C. The hypothesis was that orange juice will have the highest concentration of vitamin C. For the procedure, 100 mL of water, 8 drops of iodine, 1 tsp. of cornstarch are placed into one of the beakers and stirred. 25 mL of the food products were placed into one of the beakers and also for the third beaker. 25 mL of iodine was measured and then poured it into an beaker. Time how long it took to dissolve and the color change on a white paper. In the analysis, the tomato juice had a watery light red color. The orange juice turned back to its original color, but it took a much longer time to dissolve. The apple juice was a cloudy brown color. The Ketchup was the same color. The water was a dark purple. The pomegranate juice, vinegar, egg yolk turned a medium purple. Therefore, the less amount of time was used to find the greatest vitamin C. The average of the vinegar was 1.10. The average of egg yolk was 1.25. The average of the pomegranate juice was 1.55. Concluding this experiment, the tomato juice has the most concentration of vitamin C with its watery red color. Sources of error could have been the different expiration dates on the juices. Improvements would be regulating when I took out each food product from the fridge.

314-14 Cellam Electrica

Allen Barbarovich (Ross – Physics)

A voltaic pile is an array of voltaic cells connected in series. The copper end is generally positive and the zinc is negative. The experiment involved testing three different compounds dissociated in deionized water to determine how the number of ions affects the electromotive force across the resistor, in this case the voltmeter. At the conclusion of this experiment, nothing definitive had been discovered, since constant data was received that was very much different from what research predicted. While the 3-ion mgCl2 produced more EMF than the 2-ion KCl, the 4-ion NaBr + NaI produced significantly less voltage than both other compounds.

314-15 Hygiene vs. Beauty

Micheca Benjamin & Iyana Jones (Roehrich – Products)

Mouthwash advertisements claim that they are able to equally whiten teeth and kill oral bacteria. These advertisements were tested to see if what is written in ads and stated on television is true. The project is testing three different brands of mouthwash, Scope, Listerine, and Lucky, to see if they are more effective at whitening teeth or killing oral bacteria. For the first half of the project, these mouthwashes were tested on bacteria. Listerine has 27% of alcohol, Scope has 15% and Lucky had 10%. The oral bacteria that was used was Escherichia coli (E. coli). Discs were soaked in each of the mouthwashes and then placed in agar plates containing the bacteria. They were incubated overnight in 25 degrees Celsius and the next day the zone of inhibition was measured. The other

part of the project was to test the different brands of mouthwash against stained eggs. Three hard boiled eggs were put to soak in black coffee for 24 hrs. The next day, the directions on the bottle for using mouthwash on teeth was but applied to the eggs. For the oral bacteria part, alcohol concentration did have an effect on killing bacteria. It showed that the Listerine, which had the most alcohol in it, killed more bacteria than the Scope and Lucky. For the whitening of the teeth, none of the mouthwashes were effective.

318-01 Going Above the Surface: Factors affecting Catalases

Anastasiya Biloblotska (Ross – Microbiology)

This project is about finding out which factors have affect on catalase. The factors which were tested are pH, temperature, enzyme concentration, and hydrogen peroxide concentration. Experiment consisted of four parts, different concentrations of H2O2 were prepared, and a 1.0 cm disc was put into the enzyme solution and into the test tube with the H2O2. After the time it takes for the paper to reach the surface was measured. Second, different concentrations of enzyme solution were prepared, and dipped the disk into enzyme solution and into the 3% hydrogen peroxide, then repeated with the remaining concentrations and measured time. Third, solutions of pH 2, 3, 4, 5, 7, 9, 10 and 12 were prepared. 3% hydrogen peroxide was added to the pH solution. The paper disk was dipped into the enzyme solution and placed into the created pH solution with the hydrogen peroxide, the time was measured. Water of different temperatures was prepared and placed one test tube containing hydrogen peroxide and one containing enzyme solution in the water for 5 minutes. Then the test tubes were removed from the water and dipped one paper disc into the enzyme solution and into the hydrogen peroxide, after time was measured. The conclusion was catalase has an optimum temperature 25 degrees Celsius, the more hydrogen peroxide was added the reaction rate increased. Enzyme concentration increases the rate of reaction increased with average time. Finally, catalase has an optimum pH of 7.

320-05 Hot wheels

Katherine Bogari & Kemba Hall (Ross – Engineering)

A mousetrap car is a contraption that is powered by a mousetrap's spring. The purpose of this experiment is to determine how varying the height of the lever on a mousetrap car affects its velocity. To do this, first, a mousetrap car using CDs, electric tape, a block of wood, eyehooks, a mousetrap, a hanger, and other materials must be assembled. It is hypothesized that the optimum length for the car to travel at its fastest velocity will be 23 centimeters, the medium height of the lever. To test the car, three distances that the car will travel are measured. Using the three distances, five separate trials for three different heights of the lever, for the three individual distances are performed. For each distance under each lever adjustment the average time and velocity of the five trials performed is calculated. The results based on all forty-five trials show that the tallest lever was the best height for the car to travel at its fastest velocity. The results refute the hypothesis.

318-16 Juiceity to the Rescue

Amy Cao & Ying Tong Guo (Roehrich – Chemistry)

What happens when home electricity has completely ceased? The only aid that seems to come to mind is by producing it yourself. Hence our project provides the "superman" to this problem by identifying what kind of juice-based battery can produce the highest voltage and simultaneously emit the most stable glow in a red LED light. Since fruits and vegetables can be obtained naturally, this way of producing energy or electricity is like a second-hand knowledge that people can acquire and use in unpredictable events, such as blackouts. In this project we used fruit and vegetable juice to create our

batteries. Zinc and copper metals were used to act as the positive and negative end of a regular battery. These positive and negative electrodes (metals) are immersed in various kinds of electrolytes (liquid or juices that contain mobile ions for conducting electricity) that primarily construct the circuit. If more energy or voltage is needed, a series of circuits can be interlinked to form one complete circuit as a whole. In comparison, if we need more energy to start something, we would need more batteries. We then hypothesized that if we measure the voltage of all the fruit and vegetable juice then the Tropicana Lemon juice would have the highest voltage and would conduct the most stable and luminous glow. Through our experimental results, our hypothesis was reinforced by showing that Tropicana Lemon Juice contained the highest voltage of 2.82 volts. Therefore, we believed that lemon juice is the best electricity conductor.

320-11 Acid Soda

Bryan Chan (Roehrich – Chemistry)

Do you know what you are actually drinking when you take a sip of soda? Soda is known to contain significant amounts of acid that are bad for your teeth. Consuming soda is like consuming acid which is why there is a burning taste when you swallow soda. But, how much acid are in these drinks anyways? For my science fair, I determined the concentration of acid in different sodas and other beverages such as Sprite, Fanta, Arizona Ice Tea and others. To do so, I performed multiple titrations. A titration is a laboratory process used to determine an unknown concentration of an acid or a base. Using a strong base, NaOH, I titrated multiple sodas until the indicator, phenolphthalein, turned pinkish-purple. This indicates that the titration is now over. Using the measurement of how much NaOH was used, I found the concentration of acid through a series of calculations. As a result, I determined the different concentrations of acids in popular sodas and compare to see which drink would be more acidic. The drink with the highest concentration of acid was Fanta at a concentration of 0.1022 M and the beverage with the lowest concentration of acid was Arizona Ice Tea at a concentration of 0.0102 M. while the other drinks varied with different concentrations. This shows that Arizona Ice Tea would be a 'better' and 'healthier' choice when choosing the drink better for your teeth since it has a significantly lower concentration of acid.

319-07 Laundry Detergent vs. Stains

Xin Yi Chen (Ross – Products)

It is always frustrating when coffee or any type of beverage that leaves stain is spilled on a white shirt, and no matter how much force is applied on while washing the shirt there's always this yellowish spot that is left behind. While watching television different brands of laundry detergent commercial constantly emphasizes how efficient the product is at removing stain, so the purpose of this experiment is to test the ability of different brands of laundry detergent at removing stains. In this experiment four brands of laundry detergent will be tested, these includes Tide, All, Purex, and Ultra. The hypothesis is that Tide would be the most efficient on removing stain base on the fact that it is the most expensive. To start the experiment stains were created for the cloths to be soaked in. The stain consisted of coffee and soy sauce and ketchup. The cloths were separated into five containers, different brand of detergent were poured on top of each cloth. Then the containers were filled with water and left alone for a day. Before taking out the cloth the container were shook 3 times, after the cloth is taken out it was rinsed 3 times. The hypothesis was supported Tide was definitely the most efficient detergent. All the other cloth looked brownish and with ketchup stains on the top with the exception of the cloth that Tide was applied to. Even though it still has some ketchup on but the difference of the colors can be spotted right away.

320-15 Cleaning Agents

Sammi Chung & Shirley Li (Ross – Products)

The bacteria, Serratia marcescens, is similar to the bacteria that is located in the bathrooms. It isn't pleasant to use the bathroom knowing that bacteria is everywhere even though our eyes are unable to see it. Bacteria can be able to get rid of by cleaning supplies. To buy the right and most effective cleaning supply to kill the bacteria. For this project, there will be a testing on nine cleaning products: Windex, Up and Up Toilet Cleanser, Bathroom Cleaner, Tilex, Clorox, Mr. Clean, Grease Lightening, Fantastik, and Kleen. Agar plates and Serratia marcescens were used to conduct this experiment. After all of the product testing, the conclusion was that Up and Up Bowl Cleanser was the most effective. Don't spend too much money on a product that won't get rid of the bacteria that grows in the bathroom!

319-10 Getting a Bang out of Breath Spray

Dalon Douglas (Roehrich – Chemistry)

My science fair project is about making a device that sends a film canister across the room with a small chemical explosion. The energy for the explosion is derived from the combustion of ethanol. The objective of this experiment is to shoot a film canister into the air by igniting trapped ethanol with a spark. Some of the materials used in this experiment was a film canister, a electric grill igniter, a pressure gauge, a block of wood and a balloon. I attached the canister to the wood and made holes in it for the pressure gauge and igniter. I then proceeded to fill the canister with breath spray (fuel). When the fuel is ignited, the combustion of the alcohol will create a sharp rise in the pressure inside of the canister. One goal of this science fair project is to measure the pressure in the canister. The situation inside the canister is far from ideal, so the estimates will be very rough. Another goal is to measure the volume change over the course of the explosion, using a balloon attached to the canister.

316-20 We have the Perfect Acne Solution for You

Dina Elfaham & Jannatul Mewa (Ross – Products)

This project consists of the effect of two different types of bacteria on a series of acne products. The two bacteria's used were E. coli and S. epidermidis. The six products used were Benzoyl Peroxide Gel, Persa Gel 10, Zapzyt, Neutrogena, Clearasil Gel, and Acne Gel. Since E. coli is a gram negative bacteria and S. epidermidis is a gram positive bacteria, there were two hypotheses made. The purpose was to determine which acne product was more effective towards the gram positive bacteria Proprionibacterium, which causes acne. These bacteria thrive in pores that are clogged with dirt, oil, and dead skin cells and therefore cause acne. In order to treat Propionibacteria acnes, it is recommended to use skin care products with Benzoyl Peroxide, because it releases oxygen which prevents these bacteria from growing. But instead of using the gram positive Propionibacterium, we used another gram positive bacteria, S. epidermidis and a gram negative bacteria, E. coli. The basic materials used were twenty agar plates, alcohol, the six products, the bacteria's, and plain discs. The first graph shows a larger zone of inhibition between the comparison of E. coli and S. epidermidis. The second and third graph shows how the six products affected each bacterium. These graphs prove the acne products were most effective towards S. epidermidis due to its larger zone of inhibitions rather than E. coli. In the six products used, Benozoyl Peroxide Gel was the most effective. All in all, the experiment showed which acne product was the one that is able to kill the gram positive Propionibacterium.

314-01 The Effect of Different Substances on the Melting Point of Ice

Amanda Engelshteyn (Ross – Chemistry)

This project deals with testing different substances to see which melts ice the quickest and this will be measured by the amount of liquid remaining after a certain period of time. For accuracy, five trials have been done during this time and an average has been calculated to see which melts ice the quickest. It was hypothesized that if you add different substances to the same amount of sample ice, the substance that will melt the ice the quickest is rock salt because when rock salt comes in contact with ice heat energy is released and it had greater surface contact than any of the other substances that had been used. The materials were 1,250 grams of ice, 10 containers, 10 stopwatches, sand, table alt, mineral and dead sea salt, iodized salt, sea salt, rock salt, vanilla flavoring, pepper, granulated sugar, a thermometer, a scale and a graduated cylinder. The methods were to gather all the materials, place 25 grams of ice into each container, place 20 grams of each substance onto the 25 grams of ice and begin the stop watch and record the data once a certain amount of time had passed. The results showed that rock salt had melted ice the quickest with the runner up being table salt and in conclusion, the hypothesis had been supported with this data.

318-06 Most Effective Temperature For Urea Based Ice Packs

John Falce & Daniel Lebedinsky (Ross – Products)

Our experiment took place over a 2 week period. Our supplies consisted of 6 100 mL graduated cylinders, a scale, water, ice, urea and a stop watch. We were testing the rate of reaction and the best reaction that urea has with 3 different temperatures. Room temperature, 0 °C and 32 °C were the three different temperatures. We hypothesized that the warmest temperature would give us the coldest reaction since urea mixed with water creates an endothermic reaction. After spending some time gathering the supplies and testing if the urea would react with the water, we started our experiment off with room temperature water. We measured the temperature every minute using a stopwatch when we mixed the urea and water. The next day we brought ice and cooled the water-filled graduated cylinders in the ice until they reached 0 °C. Then we mixed the urea with the water and measured the temperature drop and rise every minute. The last part was the warm water. We took about 100 mL of room temperature water and poured it into a pot. We then put the pot on an electric stove and heated the water to 32 °C. Then we repeated the process like the other two temperatures. In the end our hypothesis was right because the colder water had the lowest temperature. The warm water however did have the best reaction. We however wanted to perform this experiment to decide in what place to store and ice pack so that it would be the coldest, to help with injuries.

320-02 The Colorful Perspective to Ameliorate Human Memory Recall

Walter Farez (Roehrich – Behavior)

The goal is to determine if words in colors other than black are more likely to be remembered than words in the color black. I did this by conducting an experiment in which 30 high school students (15 males and 15 females) looked at seven sheets of paper each containing a mix of 30 commonly misspelled words and SAT words. Each sheet has words in one specific color. The different colors were black, red, orange, yellow, green, blue, and purple. The testing process was done throughout a week where one day my 30 test subjects looked at a sheet with words in black for three minutes. Then, they wrote as many words they could recall, where spelling mannered, for 30 seconds without looking at the sheet. The same was done the next day with the color red but with different words of the same difficulty as the previous words and so on with the other colors. After collecting my data I did six t-tests comparing the data from the trial with the color black and the data with all the other colors individually since one cannot

do a t-test using seven sets of data at once. Later, I used the results from the t-tests to see if there was a significant difference between the amount of words that my test subjects remembered in black and the amount of words that they remembered in the other colors. I hypothesized that the students would remember more words in colors other than black.

318-02 Effect of Lighting and Noise on Reaction Time

Robert Feldman (Roehrich – Behavior)

This experiment is meant to determine if and how the absence of good lighting or noise affects reaction time. Each participant had to catch a ruler using their index finger and thumb separated 5 cm apart for a constant five trials. How far the ruler fell was recorded. Absence of light was created by turning off the lights in the room and by also having the participants wear sunglasses. The windows and the smart board in the room provided some lighting. Some participants said that they had trouble seeing the ruler clearly. Noise was produced from a recording of me from my phone. It was held closely to each participant's ear. Most of the participants said that the noise was very loud and irritating. The average number of centimeters that the ruler fell for the control was 13.9 cm. This value increased for the lighting trials and the noise trials averaging out at 19.8 cm and 14.5 cm respectively. It is concluded that both noise and bad lighting will cause the ruler to fall a greater distance, increasing reaction time and that bad lighting will have a greater effect on reaction time.

319-16 Fun in the Sun

Kharene Gittens (Roehrich – Earth)

Sunspots are dark spots or patches on the Sun's surface. The analyzing of current and past sunspots can provide us with the knowledge of the effect that sunspots have on us here on Earth. Using a portable solar telescope and NASA's research through their technology, we can interpret the effects of sunspots. Through the use of a portable solar telescope, one is able to see the sunspots on the sun. With cooperative weather, the sun glares through the opening provided and visible dark spots are exposed. I analyzed NASA's research on previous effects of sun spots and what they represent. Sunspots undergo 11-year cycles of the number of sunspots that are shown. At the extreme peaks of their cycles, sunspots prove to have an effect on Earth, or at least prove to be a symbol of a decrease in solar irradiance. An increase in sunspots has shown to be directly proportional to the flow of matter coming from the Sun in the form of Solar Wind. Solar wind results in the interference of satellites and communication systems. Sunspots are not discussed often, but they make implications to incoming solar storms and, an increase to the Earth's concentration of radio-carbon as well as temperature. The sunspot(s) that I have seen within the past 5 sunny and cooperative days show that we are not going to go through a solar storm soon. This year is among the lighter years of the sun's 11-year cycle of sunspots.

316-07 Yeast Reproduction Using Various Sugar Substitutes

Julia Gorecki (Ross – Products)

So what is yeast you might ask? Yeast is a type of single-celled fungus. Most commonly in order for yeast to survive, cells require a moist, lukewarm environment with accessibility to sugar. Most websites indicate that yeast reproduces best in sugar however the purpose of this experiment was to see if yeast would reproduce using various sugar substitutes. Yeast utilizes glucose in its environment o make energy. Aspartame (Equal), Saccharine (Sweet 'N' Low), Sucralose (Splenda), and Stevia (Sweet Leaf) are all man-made sugar substitutes. These substitutes aren't supposed to have any calories, so yeast reproduction shouldn't occur. However, if yeast is grown in Saccharine for example, then the yeast will grow faster; thus sugar or sugar substitutes

are the foods that yeast reproduces the fastest. Materials that were laid out in this experiment were: a bucket, a graduated cylinder, a large plastic water bottle, yeast, warm water, plastic tubing and the various sugar substitutes. One tablespoon of each sugar substitute was added to the plastic water bottle containing yeast and one cup of warm water. Air-tight sealed plastic tubing was then attached to the plastic bottles opening. The bottle was shaken. A bucket was filled of water, about two-third full. An inverted graduated cylinder was placed into the bucket, and held in place with packing tape. The other end of the plastic tubing was placed into the graduated cylinder. The volume (ml) of the mixture and the rate at which the sugar substitutes first reproduced yeast were measured after 5 minutes. Five trials were done with each substitute as well as the control (sugar). The rails using sugar started to reproduce yeast at a rate of 4:20 minutes. Trails using Splenda reproduced yeast at 5 minutes. Trials using Saccharine reproduced yeast at 1:15 minutes. The trials using Aspartame reproduced yeast at 6:30 minutes. Saccharine (Sweet 'N' Low) had reproduced yeast the best and the fastest, even faster than sugar. It contained some maltodextrin in it, which might have been the reason for any yeast reproduction to begin with.

319-01 Acid Rain Killer of Plants

Chelsea Green (Roehrich – Environment)

In this experiment I tested to see how acid rain effects the growth of kidney beans? The significance of this experiment is that acid rain is the leading cause in the deaths of plants because acid rain deprives the plan from the nutrients that it would need as well as the natural defenses that plants use to protect themselves from environmental stress. Acid rain has a pH of 4.6 and is a combination of sulfuric and nitric acid. The damage from acid rain can mostly be seen in forest populations. My hypothesis for the experiment was that if watered plants with nitric, sulfuric, or a combination of both acids then the height of the plants will decrease. For the experiment I planted for kidney beans and labeled each plant as either the control, which received only 20 mL of water, and I had three experimental groups. One plant would be given 20 mL of sulfuric acid, the next plant would receive 20 mL of nitric acid, and lastly the last plant would receive 10 mL of sulfuric acid and 10 mL of nitric acid. The plants were watered once a day and the heights were recorded. For the first week the plants were given only 20 mL of water until the sprouted. Then for the following week the plants were given the acids. The results were that the plants that were given a combination of the acids experience a decay in their growth faster than the plants that were given only an individual acid.

319-11 The Effect of Music on Heartbeat

Tasnim Halim (Roehrich – Behavior)

Throughout the years, music has been a great cultural aspect in society. It this experiment, the relationship between how music affects heartbeat is being tested. The purpose is to see what genres of music increase or decrease pulse rate and why, and what emotions listeners feel in the duration of the music. Emotions are highly influential while listening to a track because it sets off nerves in the brain that react, causing a person's heart rate to change. In this experiment, volunteer participants will have their pulse recorded for a minute before they listen to any music. This will also act as their resting rate. Afterwards, they will listen to five different genres of music, each for three minutes. After listening to a song for three minutes they will have their pulse rate recorded and be questioned on how much they enjoyed the song and what mood they felt while listening. Results of the experiment indicate that then songs for the rock and techno genres have shown the highest pulse rate. Classical and country were somewhat lower, and rap was in the middle, close to average heart rate of the rock genre. According to this experiment and previous research, music containing high tempos and fast paced beats have proven to increase one's pulse rate and music containing slow tempos and slow paced beats will decrease one's pulse rate. And both

types may help science in the future, it may help to discover cures for sicknesses and provide methods for treatment.

319-04 How Dirty Is Midwood's Annex?

Marisa Harford (Ross – Microbiology)

The purpose of this science project is to see how dirty the new building of Midwood High School, the annex is. The annex is built of three floors for the science department. The hypothesis is that the annex will have mainly a bacteria growth of zero. I thought that it wouldn't be dirty as it seems more cleaner visually than the old building. The way you measure how dirty the annex was is by going from each floor swabbing the doorknobs of all doors and recording the bacteria growth the next day. First you use sterile water and dip cotton swabs into the water and swabbed a doorknob. After you would spread the cotton swab on an agar gel plate split in half to save plates used in the experiment. The plate is then incubated overnight at 37 °C. The next day you record the bacteria growth. The bacteria growth is measured on a scale from a 0-3. Zero meaning there was no bacteria growth while three meaning the whole gel was covered mostly or whole in bacteria. According to the results, it seems that the third floor has the most bacteria on its doorknobs as it comes has most of its results as a 3. The first floor resulted in having the least bacteria with having mostly a bacteria growth of 0-1. You can conclude that the annex is fairly clean but it can be cleaner.

316-15 I See Vitamin C

Anum Hassan & Maqadus Khan (Roehrich – Chemistry)

Have you ever looked in the mirror and seen your skin look unhealthy, scarred, or dry? Well, you should try drinking orange juice once in a while instead of Pepsi. The vitamin C in the orange juice is actually very beneficial for you, internally and externally. The purpose of our project was to find which orange juice has the most vitamin C in it. Vitamin C is the active form of an acid that maintains the growth of healthy tissues in both children and adults. It is very important that we consume it through outside means because our body is not capable of producing it in amounts that will support normal physiological functions. We checked different brands of orange juice to see which one had the most vitamin C by titrating. We made a starch solution, and 10 drops of this was put into 20 mL of a type of orange juice to indicate the iodine. We made an iodine solution to titrate the orange juice. Our results showed that freshly squeezed orange juice had the most vitamin C since it took the longest to titrate with an average of 45 mL. The order from least to greatest vitamin C in orange juices was Tang, Tropical Fantasy Orange, Tropicana (no pulp), Sunny D, Tropicana (some pulp), Simply Orange, Ocean Spray, and freshly squeezed oranges with the most vitamin C. In conclusion, our experiment met what we were aiming for which was finding out which orange juice had the most vitamin C.

316-18 Dissolving Pain

Remi Henry (Ross – Products)

A pain reliever is used to alleviated pain or discomfort. Acetaminophen, aspirin and ibuprofen are some of the most common pain relievers. These drugs are known as analgesics because they relieve pain but don’t cause you to lose consciousness. Aspirin relieves pains such as headaches, arthritis, and fever from infections. Ibuprofen was developed in the 1960’s and 1970’s it is used to treat mild to moderate pain, fever, swelling and inflammation. Acetaminophen is used to relieve pain from headaches, muscle aches, menstrual periods, colds, sore throats, toothaches, and backaches. It was first introduced in 1893 under the name Phenacetin, but became a well-known drug by 1949. Although they all are effective against pain they all come with side effects like ulcers, rapid heartbeat, vomiting, stomach bleeding or liver damage if used incorrectly.

All of these pain relievers are sold under various trade names. For example, ibuprofen comes in Motrin and Advil, acetaminophen comes in Tylenol and Aspirin comes in Bayer and others. The whole idea is that the faster the pill dissolves the quicker it is able to spread through the blood stream to alleviate the pain. The pill dissolves in the stomach which is very acidic. Acids are a group of chemicals that are usually caustic, and have a sour taste There are small amounts of hydrochloric acid found in the stomach linings, it is one of the main acids that breakdown food in the stomachs. Gastric fluid is made of hydrochloric acid and an enzyme called Pepsin.

316-11 Just keep swimming, just keep swimming...

Stefanie Henry & Jessica Liang (Ross – Animals)

Effectiveness of Antioxidants on Daphnia Magna The purpose of this experiment was to determine the effectiveness of antioxidants on daphnia magna. These micro-organisms are translucent making it capable to monitor their heart beats as a measure of data for analysis. Hydrogen peroxide is utilized as an oxidizer. The function of an oxidizer in the human body is to speed up chemical processes that are not necessarily beneficial. We can measure this through heart beat per minute. Antioxidants which are found in various fruits and vegetables counteract the processes. The general trend of increase and decrease of heart beats per minute are indicative of the oxidizer and antioxidant, respectively. It was hypothesized that strawberries would be most effective in counteracting hydrogen peroxide based on prior research. However, this hypothesis was not supported by the results, and milk was found to be the most effective antioxidant. On average, Milk reduced the 0.1M concentration of hydrogen peroxide 102.8 heart beats, returning the daphnia to its neutral or resting pulse, making it the most effective, by far, against oxidizers. This research yields the result that milk would be the most effective in slowing down the effects of undesired oxidizers on the human body.

320-10 How does Force of Friction affect the speed of an Object?

Bilal Hussain & Tuzong Yang (Ross – Physics)

This project not only includes finding the force of friction that acts upon an object, but also includes calculating the coefficient of friction. The goal of this project was to find out which material would result in the highest force of friction that acts upon a steel track as well as the coefficient of friction. This was done by wrapping a wooden block in different materials such as aluminum foil and food wrap, and pulling on the object with a constant force. Upon finishing this experiment, bubble wrap had a higher force of friction then an object such as aluminum foil on a steel track. Bubble wrap had the highest force of friction which was around 3.02 newtons while all the other forces of friction were lower. Aluminum foil had a force of friction of 1.89 newtons. The coefficient of friction for bubble wrap was 0.22 and that for aluminum foil was 0.14. Bubble wrap had the highest coefficient of friction as well. The experiment concluded that out of all the materials tested bubble wrap had the highest friction out of all the materials.

319-14 Acids and Bases

Iqra Hussain (Roehrich – Chemistry)

In this experiment, my problem was to figure out 'Does temperature affect 'how acidic' or 'how basic' a solution is?" In order to try to solve this problem, I tested three acids, three bases and one control, which was water. To make sure the acids were actually acids, I took the blue litmus paper and put a sample of each acid onto its own blue litmus paper. It's proven to be an acid if the blue litmus paper turns red. Also, to make sure the bases were actually bases, I took the red litmus paper and put a sample of each base onto its own red litmus paper. It's proven to be a base if the red litmus paper turns

blue. After heating each of the three acids, three bases and one control each three times, because I had three trials per solution. Then, I heated the first solution, I would place the corresponding litmus paper (red or blue, depending on whether its an acid or a base) into the solution and record the results. The results of this experiment are important and can be helpful to someone who wants to know whether or not heating orange juice, for example, makes it more or less acidic. This procedure helped me conclude that: Yes, temperature does affect how acidic or how basic a solution is. This is true because anything that affects the concentration of hydrogen affects the pH level as well.

314-18 The Magic of Miracle Gro

Edward Isakov & Brandon Eng (Ross – Environment)

The project was done on the effect of different levels of fertilizer on plants. It had 3 plants in a group with 5 groups in total and every pot had a letter indicating what group the plants are in. 0%, 25%, 50%, 100%, and 150% of fertilizer were used. Radishes were used because of their ability to grow quickly. An even amount of soil was placed in each pot. The radish seeds were put into each pot half an inch deep. Each pot was watered, with the right amount of fertilizer. Group A had no fertilizer applied. Group B had 1 drop of fertilizer poured into the beaker that was watering the plants and mixed into the water for each plant in that group. Group C had 2 drops, group D had 4 and group E had 6. The plants were watered everyday with the correct amount of fertilizer applied depending on the group the radish plant was in and used the stopwatch to allow the growth shelf to give the plants 9 hours of light a day. Once the plants started growing their height measurements and average were taken. Group A had a height of 7.2 cm, group B 8.8 cm, group C 8.0 cm, group D 8.2 cm, group E 6.7 cm. It was thought that 100 % fertilizer would be the group to grow the highest but 25% was the group that grew the highest thus the hypothesis was not supported.

319-08 All Wrapped Up

Navish Javed (Roehrich – Chemistry)

The purpose of my project was to test to see which brand of plastic wrap is the best. To be more specific, I used a total of three plastic wrap brands: Reynold's, Giant, and Zippies. In order to test to see which brand of plastic wrap was the best, I decided to test many different variables to obtain better results. One variable that I tested was how well each plastic wrap could prevent evaporation. In order to do this, I filled three small containers with 80 milliliters of water, wrapping each with a different brand of plastic wrap. Throughout the course of the entire week, I measured the height of the water in each container. A second variable that was tested was the ability for each brand of plastic wrap to prevent oxidation. In order to complete this, I wrapped similar-sized apple slices with a different brand of plastic wrap. Again, throughout the course of the week, I kept note of which apple slice had oxidized the most. A third and final variable that I tested was which plastic wrap prevented itself from leaking. I wrapped slices of oranges inside different brands of plastic wrap and crushed those slices. I placed each wrapped orange slice inside a container, measuring to see how much of the liquid of the oranges filtered out. The data that I retrieved through this experiment proved that the most expensive plastic wrap -- Reynold's -- was, overall, the best out of all three.

316-01 How do beverages affect teeth?

Joel Jose (Roehrich – Chemistry)

The purpose of this experiment was to see how soft drinks affect your teeth. Before experimentation began, it was theorized that the drinks with the darkest coloring would cause the most decay and discoloration to teeth. Substituting teeth in this experiment, boiled eggs were used and placed into ten different samples of beverages.

Eggs were used instead teeth for their similarities such as their color and that they contain calcium. The eggs were placed in the variety of beverages and water and were left over night for twenty-four hours. After this time period, the variety of color changes were observed that showed that the darker the beverage the darker the eggshells were stained. The eggs were then brushed with toothpaste for one minute to see if the stains would completely disappear, and revert to their original color. The eggs were then observed again and then placed back in the beverages overnight and continued with the observation and cleaning. After the completion of the experiment, diet Coke and diet Pepsi were the worst beverages. The shells of these eggs had cracked by the fourth day! The remaining beverages followed the scale of worst to best, from dark colored beverages to lighter colored ones. It was always known that soda was bad for the teeth. Now it is known that soda weakens the enamel of the teeth which results in weaker teeth.

316-03 Dirty Hands

M. Tasnin Kabir (Ross – Microbiology)

The aim for this project was to find out which hand sanitizer and antibacterial soap is most effective on E. coli and S. epidermidis. Also to find out which works better: antibacterial soap or hand sanitizer? I hypothesized that Dial's antibacterial soap and Purell's hand sanitizer would work the most effectively, and soap overall, would be the most effective. This experiment was conducted by adding 0.5 mL of the bacterial sample and spreading it on the agar surface. Then adding the disks with soap or sanitizer, and a control. Repeating this for multiple trials and incubating the agar plates with the bacteria and disks in them overnight at 37 °C stored upside down. Then measuring the zone of inhibition the next day (in mm). According to data collected for S. epidermidis, there was a tie between Lucky and Bath and Body's hand sanitizer compared to for E. coli in which, Bath and Body's hand sanitizer did better. Dial worked the best for both the E. coli and S. epidermidis. Overall, the soaps did much better than the hand sanitizers. So the hypothesis was somewhat accurate. Dial was the most effective out of all of the antibacterial soaps, and was also the best out of all the products that were tested. The most effective hand sanitizer varied depending on the bacterium. The soaps were more effective in destroying the bacteria to a greater extent than the hand sanitizers.

316-08 Electrical Conductivity

Anna Kapitman (Roehrich – Chemistry)

"If there are ions in the solution, then it will conduct electricity" is the most important rule that anyone needs to know when learning about electrical conductivity. Because aqueous solutions have strong electrolytes, which are electrically charged ions, they can conduct electricity and electric currents. The reason why other solutions conduct electricity poorly is because of the smaller amount of electrolytes in their solution because the ions in the water can affect the electric current's strength of how it flows. In general, the more charged ions that are found in the liquid, the stronger the current can pass through the solution. In my experiment I am using bottled water, seltzer, aloe, milk, distilled white vinegar, olive oil, and tomato juice to see which liquid conducts electricity the best. These liquids all have different properties that make them unique and allow a greater electric current to pass. For instance, because Aloe, milk, and Tomato Juice have iron in it, and because iron, a metal, is a good conductor of electricity, they can conduct electricity well. The fact that tomato juice is acidic, contains a large amount of sodium (482 mg) and water, its ability to carry electricity is very high, which is why I hypothesize that tomato juice will conduct electricity the best. Plugging in an extension cord into an outlet will provide 110 volts, which is the energy source that I will need to power my extension cords. By placing both wires in each liquid, after conducting a controlled experiment, before each test, that gives me the brightness of the light bulb.

316-04 How Does Soil Acidity Affect Water Acidity?

Liya Katz (Roehrich – Plants)

In this experiment I will be testing to see if the pH of soil affects the pH of water and how that affects plant growth. The purpose of this project is to see if contact with different types of soil changes the pH of water. My hypothesis was that the soil would change the pH of the water and that plants will grow best in the soil with a pH of 6.7. I took soils with different levels of pH (6.2, 6.5, 6.7) and added the same amount of water to the soil samples and let the water sit for a few minutes. Once settled and mixed I used a pH meter and collected the pH of the water. After, I began testing to see under which soil the bean plant grew the fastest. I planted a bean plant into every soil sample and added water (50 mL) everyday. When the plants began to grow I recorded which one grew the most. My results were as follows: I saw that the water did change its pH, when the water touched the soil its pH changed to be about the same as the soil. When I planted the bean plants to see how pH affected bean plant growth my results were as follows: I saw that after a couple of days a plant was beginning to grow in the soil that had a pH of 6.2. I learned that bean plants are acidic plants and grow in soil that is acidic.

316-13 Plant Transpiration

Hassan Khan (Ross – Plants)

The purpose of this science fair project was to see what climates increase the rate of plant transpiration. Plant transpiration is the loss of water vapor from various parts of the plant; it can come from small pores in the roots and stem of the plants. Usually the water vapor is released into the atmosphere. How much water vapor actually comes out of plants, was needed to be determined. Plant transpiration is affected by temperature, plant type, soil, atmosphere, and to see if climates affected the rate of plant transpiration. Plants transpire because they have no more room to hold the water so it has to evaporate the water so it can be balanced. The hypothesis of this experiment is that sunlight would have the greatest affect on plant transpiration. My experiment was a real success because the amount of water vapor increased almost every day and there was a lot of water vapor that was being released throughout the experiment. My conclusion was that plants don't necessarily need a lot of sunlight depending on the plant type. My data tells me that one type of plant likes to be in a low altitude and sunlight throughout the day. My other plants data tells me that it transpires the most in high altitude and low altitude. So one type of plant transpires the most in the sun and the other type transpires in relatively high or low altitude.

314-06 Vitamin C in Peaches and Carrots? I Thought Only Citruses!

Jasmin Kim & Hanna Kim (Roehrich – Chemistry)

Vitamin C is a beneficial nutrient that enhances our immune system as well as reducing diseases such as; heart disease and skin cancer. Vitamin C can be found in natural foods such as vegetables and fruits. Citruses are popular fruits that contain a high concentration of vitamin C, so we used unexpected natural foods to see if they contained ascorbic acid (vitamin C) or not. Our goal of our experiment was to find the concentration of peaches and carrots in three types of juices; concentrated, natural, and frozen. In order to accomplish this, we did a redox titration. Iodine potassium was placed inside the buret and released 1 mL at a time into a flask containing a juice and a starch solution. Our indicator, soluble starch solution will react with iodine and produce a dark color change only if ascorbic acid is present in the juices. The color of every juice changed and this indicated that every juice contained vitamin C, but the concentration of vitamin C varied. In carrots, natural carrot juice contained the most vitamin C concentration as concentrated carrot juice contained the least amount of vitamin C. In peaches, concentrated peach juice contained the most concentration of

vitamin C as frozen peaches contained the least amount. Overall, the natural carrot juice contained more concentrations of vitamin C and the concentrated carrot juice had the least. Some errors that may vary our experiment are the extra ingredients in the concentrated juices and frozen peaches or carrots.

318-07 Insulation Exploration

Eliot Kontorovich (Roehrich – Products)

In my experiment I recreated an extremely warm day and a room in a house. I did this by using a heat lamp that produced approximately 135 °F taped to an open ended square foot wooden box. This wooden box attaches to another square foot wooden box with the tested insulation in between them. This other box is fully enclosed with a small thermometer stuck inside of the roof of it. The heat lamp acts like a sun and I am measuring the amount of heat that is allowed through the wall insulation. My results indicate that my hypothesis was correct. The Styrofoam was the least effective. It allowed an average of 4.5 °F to go through it. The condensed fiber was the most effective allowing only an average of 1 °F to go through it. However the Fiberglass with paper backing proved to be just as effective as the condensed fiberglass; Allowing also an average of 1 °F to go through it.

320-04 How do food preservatives affect the growth of micro-organisms?

Natalya Krilyuk (Ross – Microbiology)

This project uses bullion and salt to investigate the effects of different concentrations of food preservatives on microbial growth. Many people have used salt to preserve foods throughout history and it has proven to be a sufficient way to do so. This project focuses on slowing down the microbial growth which is one of the causes of food spoilage. The preservative should ideally interrupt the microbial growth while preserving the nutritional value of the food. The hypothesis in the experiment is: when testing the effective concentration of salt to most successfully preserve micro-organisms (micro-organisms in food are known as 'spoilage bacteria'), the higher concentration of salt will be the most effective. To go about finding out which concentration would be most effective the salt was distributed into separate liquids at different concentrations, keeping a liquid with no salt as a control. The independent variable being the amount of salt added and the dependent variable the amount of liquid for each concentration. After incubation of the agar plates the results are observed. Comparing each concentration from the results allows us to see how the number of colonies decreases or increases as concentration varies. In the end the hypothesis was supported. The agar plates with the highest concentration of salt visibly contained a significantly lower amount of bacterial colonies then the ones with low concentration of the salt preservative. This experiment was successful in determining how effective the concentration of salt is on the growth of micro-organisms.

316-16 Titrate and Indicate: pH Level and Vitamin C Content Over Time

Karen Kwong & Kelly Kwong (Roehrich – Chemistry)

A low level of pH is a danger to one's health since it might cause cancer, heartburn, and many other symptoms. Consuming too little vitamin C will result in bad health while consuming too much will be toxic for the body. This experiment was done to test if the pH level and vitamin C content in orange juices changes over time. The hypothesis was that the pH level will increase while the vitamin C content will remain the same throughout the experiment. Five different brands of orange juices were used. The brands used were Grower's Pride, Minute Maid, Sunny D, Tree Ripe, and Tropicana. The experiment was done by titration. Titration is the process of determining the concentration of a substance by adding a liquid substance of a known concentration until it reaches its endpoint. The endpoint is when the substance permanently changes

color. For pH level, NaOH was used to titrate the orange juices with Phenolphthalein as an indicator. For vitamin C, iodine solution was used to titrate the orange juices with starch solution. The results showed that the pH level and vitamin C content increases over time. This means orange juice tends to become less acidic and have more vitamin C content over time.

319-20 Electroculture: Does It Work?

Jennifer Lauv (Roehrich – Plants)

Electroculture is the 'application of electricity to the cultivation of plants' (Definitions.net, 2011). Although most people think electricity would 'electrocute' the plants, electroculture is said to help them grow better. I decided to conduct an experiment to determine whether or not electroculture actually worked. To test how a direct electrical current in the soil would affect plants, I connected two 9 V batteries together in series (to get 18 V), put two copper nails in the soil on opposite sides of the pot, and connected the batteries to the nails with crocodile clips for five minutes every day. When an electrical current passes through a conductor, an electromagnetic field is generated (Hasan, Ali & Ahmed, 2011). To test the effects of these magnetic fields on plants, I created something similar to the Lakhovsky coil - a one turn copper coil that overlaps at ends, which are separated by a gap. I took one foot of copper wire and looped it around a plant, using a stick to hold it up. At the ends of the wire, I used crocodile clips to connect a 9 V battery for five minutes every day. I did the same with two feet of copper wire, making two loops around the plant. My results show that electricity does in fact help plants grow. The plants with one coil did better than the control group; the plants with two coils did even better. However, the plants with the 18 V did the absolute best.

314-03 The Antimicrobial Effects of Spices and Herbs

Aidan Lee (Roehrich – Medicine)

In the modern world, bacterial resistance for antibiotics has become a very serious problem. Thousands of people die every year trying to fight off antibacterial resistant strains of evolved bacteria. Modern medicine has caused bacteria that have not died to antibiotics to reproduce stronger, more resistant strains of bacteria. These super bacteria go on to spread through the world while being hard to kill, which means a higher chance to survive antibiotics which will cause a new evolution to occur, until the whole world is plagued with a completely resistant strain of bacteria. This causes a need for new types of antibiotics. My project is based on this real world problem. Past research has been done, but none that I have been able to find have been completely decisive on it's practicality. I mixed one gram of each independent variable (oregano, cinnamon, cumin, black pepper, rosemary, and thyme) separately with 15 mL of water. I then soaked 0.75 mm paper disks in each independent variable and tested each one's anti-microbial effects on Serratia marcescens. My findings show that thyme is the most effective. It had the largest zone of inhibition, the highest being 16 mm. Cinnamon was the least effective, showing no zone of inhibition. These results mean that spices and herbs have antimicrobial effects, but could be inconsistent depending on what type of each spice you use. Further research would have to be done to compare them to modern antibiotics and if bacteria can grow resistant to spices and herbs as well.

319-12 Stain Stain Go Away

Tommy Lee (Roehrich – Chemistry)

Have you ever gotten a stain on your favorite shirt and panicked? My experiment puts these stains to the test! A stain is a physical and or chemical interaction between substances and cause a change of color. I've been testing stain removal products to determine which and what type of stain remover works best with a particular type of

stain. I've tested 5 stain removers: bleach, nail polish remover, detergent, dish liquid, and vinegar on 3 types of common stains: vegetable oil, juice, and permanent marker stains. For each stain I had 2 trials of each stain remover applied, then in a few days on a scale from 0-10 with 0 being the most effective stain remover, I graded each trial and averaged the results. At the end of this project I've learned and experienced a lot more with stains and how to maneuver each one. Some stains left smudges with the application of specific removers while others had no effect. Each stain has its own characteristics as with every stain remover and every stain will need a different treatment to remove. This project hopefully will stop the panic reaction when someone leaves a stain on the new favorite shirt of theirs.

320-06 Variations of the Stroop Effect: Males vs. Females

Stephanie Leung & Jocelyn Chiu (Ross – Behavior)

The Stroop Effect tests the brain's reaction when presented with conflicting information. For this specific experiment, each participant was tested with the original Stroop Effect (which only used colors and names of colors) and two variations of the test (one which utilized shapes and the other shapes and color). The purpose was to see whether males or females would have the better performance. A total of twenty male and female students between the ages of 15 and 17 in the Midwood Medical Science department participated in the testing. Each individual was given a total of seven experiments, three controls and four tests. For each, the participants had thirty seconds to name as many cards as possible. On average, the participants took around five minutes to complete the entire test. Each experiment was recorded and reviewed separately after the tests. The videos were then double-checked to ensure that the exact number of correctly named cards and the total amount of cards attempted were marked down. The t-values and average were then found for each experiment. Based on the t-values, there wasn't a big difference between the genders, despite the female group having performed better in four experiments.

318-13 Let The Boiling Begin!

Shaunté Lewis (Roehrich – Chemistry)

Water exists in three separate phases: solid (ice), liquid (water), and vapor (steam). To change from one phase to another, you simply add or remove heat. When water boils, what happens to molecules that are dissolved in the water? Do they boil off too, or do they stay behind? This project will certainly answer all these questions. The purpose of my experiment is to separate pure water from liquids using a simple stovetop distillation apparatus. If you use the process of simple distillation then pure water can be separated from liquids because it will result to the dividing of each liquid and be left with the concentration and distillate separated. I conducted my experiment by pouring the liquid into the bottom of the pot first, then placing a coffee cup into the pot right in the liquid, positioned a bowl on top of the cup and placed the cover of the pot on the pot upside down and put ice in it. The liquids used in this experiment were apple juice, orange juice, cranberry juice, grape soda, and milk. I repeated these steps for a minimum of three trials for each liquid I used. Each liquid responded differently due to the fact that in each trial, the liquids boiled for a different amount of minutes. The results show that my hypothesis was indeed correct. In order for water to be separated from liquids you can use a simple stovetop distillation apparatus.

318-14 Relations between vitamin C and pH levels in citrus fruits

Cindy Li (Roehrich – Chemistry)

Citrus fruits contain a lot of vitamin C (also known as Ascorbic acid) and it is an essential nutrient for our diet. There are 2 typed of acids in citrus fruits, ascorbic and citric acid. In this experiment, testing will be on the relations between pH level and

vitamin C in different types of citrus fruits. I hypothesize that the higher the pH level it is for the citrus fruit, the more vitamin C it contains. The pH level will be determined by using pH meter. Titrations will be done to get the amount of vitamin C in 20 mL of freshly squeezed citrus fruits. Iodide reacts with vitamin C. If the amount of Iodine is found to completely react with vitamin C, then doing calculations can determine the amount of vitamin C. The indicator for this experiment will be soluble starch. The Iodide will be added until it has completely reacted with vitamin C, then it can freely react with the soluble starch producing a distinct color change. The control of this experiment is the vitamin standard solution and it will help determine the amount of vitamin C. My hypothesis is refuted; the results showed that there are no significant relationship between pH level and the vitamin C in citrus fruits. The pH level and the Concentration of Vitamin C in citrus fruit vary. This means that the 2 different types of acid in citrus fruit does not necessarily mean that they are directly connected.

318-03 My Study Sheet

Catherine Liang (Roehrich – Behavior)

The cerebrum is the biggest part of the brain and it takes up at least 85% of the brain (Nemours, 2012). Cerebrum plays a big role in the brain because it has important functions. The functions are thinking, saving memories, and reasoning (Nemours, 2012). In this experiment, the purpose was to find out if different methods were effective towards memorization. I predicted that the most effective method towards memorization is note-taking and the least effective method would be listening to music. The method used to test this experiment was to gather poems and ask the subjects to study the poems for five minutes. Then, the subjects are to recite as many words as they can in one minute. The data shows us the percentage of how much words each subject can remember. According to the data, the method that is most effective was note-taking. The least effective method was mnemonics. In conclusion, the best method to help memorization is note-taking. The source of error is the environment the subject is in. To improve this experiment, I suggest testing the methods between a group of people who study and a group of people who doesn't study. Also, I recommend testing the subjects for how long it takes for them to remember the words instead of giving them only one minute.

318-15 The effectiveness of hand soaps against S. epidermis and E. coli

Jessica Lin & Noor Hasne (Ross – Products)

For our experiment we tested the effectiveness of four different hand soaps against S. epidermis and E. coli. The purpose of this experiment was to see which brand of soap was most effective for people to use. Our hypothesis was that Lucky would be the most effective against the bacteria. During the bacteria test, a total of four tests were done, each having five agar plates, creating a total of twenty plates. Lucky and Johnson Parker were put into one group and Silk and Up & Up in the other. After that, discs were dipped in soap and then placed into portions of the agar plate. After they were incubated at the appropriate temperature, the zones of inhibition were measured and recorded. We determined that the brand of soap, Lucky, was the most effective against both positive and negative gram bacteria (S. epidermis and E. coli). This was determined by the results calculated from the zones of inhibition. The average zone of inhibition for Lucky was 23.2 mm for E. coli and 28.4 mm for S. epidermis. This was the highest compared to the other four brands of soaps. Therefore, our hypothesis was correct; Lucky was the most effective against S. epidermis and E. coli.

319-18 Corrosiveness of Soda on Eggs

Ting Lin (Ross – Products)

This project is to further acknowledge the effect of soda and how it corrodes the teeth, which in this case are eggshells because eggshells and the teeth have similar calcium compounds. 5 different types of soda were used (Coca-Cola, Pepsi, Sprite, Nestea Ice Tea, Fanta) and water, which would be the control and what results would compared to. The eggs were soaked in different types of soda and weighted daily. Coke was hypothesized to be the most corrosive because it is most acidic out of the sodas. Corrosiveness would be measured by the weight lost of the eggs. Hypothesis was refuted because at the end of the experiment, the egg in Sprite had shown to lose 10.6 g and the egg in water had gained weight. Therefore, Sprite was the most corrosive because it lost the most weigh and water was the least, because it gained weight instead of losing.

316-14 Magnetic Temper

Andy Liu (Roehrich – Physics)

Many pervious experiments have been done testing how temperature affects magnetic strength. This experiment, however, is aimed to observe if there is a relationship between temperature and the radius of the magnetic field of a magnet. After analyzing some previously completed studies and experiments of magnetic strength versus temperature, it seems that as temperature increases, the magnetic strength would decrease. In this experiment however, the data shows that there is a parabolic relationship between temperature and the radius of the magnetic field. The magnets were first tested at the temperature of the room, which is 25 °C. This serves as the control for this experiment. As temperature increases (by intervals of 5 °C) the radius of the magnetic field decreases. However, when the transition from 55 °C to 65 °C occurs, the distance between the bar magnet and the affected compass went from 0.052 m (at 55 °C) to 0.088 (at 65 °C). As I continued to raise the temperature to 75 °C, the radius continued to expand to 0.140 m. When the results were graphed, it clearly shows that there is a parabolic relationship between temperature and the radius of the magnetic field.

314-10 Salt and Fertilizer: Benefit or Loss?

Michael Lu & Jacqueline Gringauz (Ross – Plants)

This experiment tests whether kidney beans grow better with salt solution, fertilizer, or both components combined. If the bean was watered with fertilizer, it will grow faster. To do this experiment, start with weighing 5 kidney beans that are going to put into the Petri dishes. Each day, water the beans with salt, fertilizer, and both components combined. Use different concentrations of the fertilizer and salt to make the solutions but when watering the beans, use the same amount of each solution. Then weight all the beans separately and then record all the data in the end. In the end, the hypothesis is refuted. All data shows that fertilizer doesn't help the growth of kidney beans. Instead it slows down the growth of the beans. From this experiment data was collected showing the growth of the beans slow down as the concentration of the fertilizer went up. 1=1.35, 2=1.15,3=1.04,4=1,5=0.89. As for our control group which is water have better growth than all other solutions. The control group reaches 1.35 cm for the height.

314-08 Do shape words interfere with the task of naming shapes?

Ada Ma (Ross – Behavior)

The Stroop Effect was published in 1935 by John Ridley Stroop. The Speed of Processing Theory and Selective Attention Theory support the Stroop Effect. The Speed of

Processing Theory states that a person reads words faster than naming the color of the word. Typical human minds function to read automatically once they've learned to read as a child. The Selective Attention Theory states that naming colors require more attention than reading text. One's mind takes it's time to think what color the font is before it's said aloud, unlike reading, which can be read automatically. Sophomore high school students at the age of 15 or 16 were test subjects for this experiment, 25 girls and boys. All 50 subjects were given 4 different strips of stimuli randomly, one from each sheet. The first sheet has matching words and shapes (control), second with unmatched words and shapes, third with only shapes, and fourth with only shape words. Subjects identified the shapes, or read the words correctly while being timed. Overall, unmatched shape words interfered more with girls than the boys. Girls averaged 6.3 seconds for the unmatched shapes and words. Boys averaged 5.5 seconds for the same sheet. Both averaged 4.2 seconds for matching shapes and words. The results show the interference of un-matching shape words and shapes. The mind is set on reading not identifying shapes. Therefore, the brain processes the word read first, then realizes it is the shape that needs to be identified, taking more time.

319-17 The Affects of Acidic Water on Plant Growth

Ellysa Magloire (Roehrich – Environment)

The purpose of my experiment was to determine how acidic water affects growth and development of bean plants. Acidic rain is created when compounds such as sulfur dioxide and nitrogen oxides are released into the atmosphere, when these compounds are mixed with oxygen and water acidic pollutants are created (Walke, 2011). By conducting this experiment I gained a better understanding on how different amounts of acid can affect the growth of a bean plant and how precautions can be taken to secure forests that endure different amounts of acidic rain yearly. The acid that I have chosen for my experiment is a mild acid, vinegar. To complete this experiment I measured the acid given with additional distilled water. In each container I added distilled water so that each plant would be given a different proportion of acid. One container may include 60 mL of acid and 40 mL of water. Over a period of one week the first group of bean plants in seed form was given the solutions containing the acid. My results showed that none of the plants were able to grow except the controlled witch only contained water. My second group consisted of bean plants that were already fully grown. These plants were than watered with the same solutions as the first. The results showed that the plants that were given a higher percentage of acid began to die out and whither over a period of one week. To conclude acidic water has a great affect on the growth.

319-02 Memory Within Reading And Writing

Rabia Mahmood (Roehrich – Behavior)

The purpose of this project was to figure out whether memory is stronger and healthier if someone reads to themselves, or if someone reads to you. Each person prefers different learning styles and techniques such as reading, writing, listening, looking at pictures visually & etc. A persons choice of learning style differences are not related to intelligence or disabilities, but merely indicate the individual's preferred method for processing of information. For 15 year olds, these tests showed that memory is stronger when a person listens than when a person just simply reads themselves. Twenty students of the same age of 15 were tested by first reading to them an article then having them read an article with the same difficulty and answering questions. The results were opposite of what was hypothesized. In the listening section, 86.67% of the questions were correct and 83.33% of the questions were correct in the reading questions. The data shows that listening is a more reliable learning style. Listening causes the brain to imitate words and produce similar sentences to express the meaning. For readers it is opposite because it is harder to express the written sentence on their

own. If anyone's having problems comprehending in class, start with having someone read to you and figure out what your learning style is.

318-10 How Clean Does it Seem?

Tiffany Mai & Selena Huang (Roehrich – Products)

This experiment was conducted to test out which household cleaning products was the most effective against bacteria. Many household cleaning products have been advertised that it kills 99.9% of the germs on the surface of your counter, or the edges of your bathroom tiles. The bacterium that was used in this experiment was Serratia Marcescens. Serratia Marcescens is a type of bacteria that was named after the Latin word for decay. It is a short rod-shaped, gram negative bacterium often classified as an opportunistic pathogen. This was chosen for the experiment because they are usually found in urinary tract infections, wound infections, soil, nosocomial infections, and especially the edges of tiles. Since it was especially found in the edges of tiles, 12 housecleaning products were used to test against it. The purpose was to find which housecleaning product was most effective against it. The 12-housecleaning products included Windex, Tilex, Bleach, Bathroom cleaner, etc. The zone of inhibition was used to identify which housecleaning product was efficacious against the bacteria, Serratia Marcescens. The zone of inhibition indicates the amount of bacteria the product has 'killed'. After testing 12 housecleaning products, Tilex was claimed to work the most effective against the bacteria.

320-13 Colorful Vision

Danielle Medvinsky (Roehrich – Medicine)

The purpose of this experiment was to determine how eye color affects peripheral vision. Peripheral vision is the ability to see movement or objects that are not in your direct line of vision. Humans need it for basic survival. If any danger is coming at a human being from the side, they might be able to detect it with their peripheral vision. Initially the hypothesis was brown eyes would have the better peripheral vision, followed by green eyes, then blue eyes. To conduct the experiment, three groups of five people (Brown-eyed, green-eyed, and blue-eyed) underwent two tests. One was called the Finger Test, in which he/she said how many fingers were held up at the side of their face, and the second one was the Duck Inconsistency Test, an image of nine animals, all ducks except for one rabbit. He/she was questioned. (How many animals were on the paper? What's the middle animal in the third row?) The results were scored by percentage. The results showed brown-eyed people scored, on average, a 93%, green eyes: 88%, and blue eyes: 76%. In conclusion brown eyes scored the highest, while blue eyes scored the lowest.

314-11 The Truth About Toothpaste

Sumreen Meer (Ross – Products)

The experiment that was conducted tests which toothpaste removes stains the best. Boiled eggs were used to substitute for teeth. Egg shells have calcium just like teeth do so they will act in the same way. Aquafresh, Colgate Total, Colgate Optic White, and Crest Whitening Plus Scope were used. The hypothesis that was predicted was that Colgate optic white will remove stains the best because it claims to have whiter teeth in 1 week. It also claims that it has the same ingredients as the teeth whitening strips. Whitening strips have strong acids in them that is why it seemed this would work the best. Four different toothpaste were tested and the control group contained water but no toothpaste. The experiment tested 3 stains. The 3 stains that were tested are Coca-Cola, Kool-Aid, and Coffee. The eggs were left in each stain for 24 hours. 5 eggs were stained in coca cola, 5 in Kool-Aid, and 5 in coffee. This was repeated two more times in order to have 3 trials. Each egg was cleaned with different toothpaste. The eggs were

compared to each other. The eggs are rated (1-5) 1 is the cleanest and 5 is the dirtiest. The hypothesis was refuted. Colgate optic white was not the best toothpaste to use on all different kinds of stains. Crest whitening plus scope removed the stains the best.

318-09 Effectiveness of Popular Hand Sanitizers

Valerie Nemcheninova (Roehrich – Products)

Hand sanitizers first came about as an alternate to hand washing with the traditional soap and water. Referred sometimes as a waterless wonder, many are scented, have farfetched claims to moisturize skin, and some are even used to hospitals but the biggest use is to kill/reduce bacteria on hands that cause infections. This experiment evaluates the effectiveness of four of the most popular hand sanitizers sold in stores. The hypothesis is that sanitizers with a higher percentage of ethyl alcohol will kill more germs. Using two different bacteria, agar plates and four hand sanitizers, I was able to see how much bacteria is truly killed. With the use of two bacteria (Staphylococcus epidermidis and E. coli) this experiment tested the claims that all hand sanitizers kill 99.9% of bacteria and the claim that a hand sanitizer has to have at least a 70% ethyl alcohol content to effectively kill bacteria. The zones of inhibition with each product and with each bacteria proved that hand sanitizers with a higher amount of ethyl alcohol do kill more bacteria than those with a smaller percentage. The most popular hand sanitizer out of the four which was Purell happened to kill the most bacteria. The least effective were the brands Germx and Dial which only have a 62% ethyl alcohol content.

320-07 Grow Plants Grow!

Alma Nesimi (Roehrich – Plants)

Nitrogen is an essential element in fertilizers that keeps plants green, promotes growth and root production. Most plants can't use nitrogen from the atmosphere, but kidney beans and other legumes can capture nitrogen and turn it into ammonia to feed themselves. An experiment was conducted to see how nitrogen fertilizer affects the growth of kidney beans. Different concentrations of 1%, 4%, and 10% nitrogen sulfate (21-0-0) were used. After the kidney beans sprouted, they were divided into four groups of two plants each. One group received only water, one group received the 1% solution, another group received the 4% solution and the last group received the 10% solution. This procedure was conducted for two weeks. It was hypothesized that the addition of nitrogen concentrations will negatively affect the growth of kidney beans. Increasing the percentage of the nitrogen solution did not promote kidney bean growth. This occurred because kidney beans regulate their nitrogen intake on their own. The kidney beans were shriveled and looked unhealthy from the addition of the nitrogen solutions. The kidney beans that received only water grew the most. They responded well to the 1% solution, but very poorly to the 4% and 10% solutions. Knowing the kidney bean's response to nitrogen fertilizer, farmers can have better farming methods that can improve food production.

320-20 Music vs. Concentration

Kiara Nuñez & Shadika Jahan (Ross – Behavior)

Music is said to have several purposes and function for humans. These functions are entertainment, comfort, improvement of physiological functioning, and intellectual stimulation. For students, music is said to have the ability to strengthen intuitive thinking skills, induce relaxation and sleep, enhance mood, improve memory, and increase concentration. The question that was raised due to studies was how music affects a person ability to do a simple task? The purpose of this experiment is to determine whether or not music can help a student concentrate better while doing a task that requires concentration such as homework. The hypothesis was, if a person

solves a maze while listening to music, then the person listening to classical music will have better concentration and complete the maze faster. To conduct the experiment each student solved 3 mazes of the same difficulty. Maze A was solved without music, maze B was solved while listening to classical music and maze C was solved while listening to a faster paced song with lyrics. T-tests were conducted after the results were gathered. The t-test results were all below the critical values of t. This means that it cannot be concluded that music helps increase a person's concentration. The hypothesis was refuted due to the fact that the results did not show one type of music being better for concentration than the other.

318-04 The Affects of Acid on Crystallization

Chukwunonso Nwasike (Roehrich – Chemistry)

In the formation of crystals, many factors can change the crystals shape, size, and speed of crystallization. These factors include temperature, mass of solvent versus solute, and finally pH. In this experiment, the effects of pH on crystallization rates were explored using potassium nitrate (KNO3) dissolved in water, then hydrochloric acid (HCl) was added to the solution in different volumes to observe whether the acid aided or inhibited crystallization. HCl In this experiment temperature and mass of solute versus solvent were kept constant in order to insure the most accurate results possible. It was observed that overall, adding HCl to the KNO3 solution inhibited crystallization because the control crystallized in 33 seconds with 20 mL of water while the fastest crystallization time for the experimental group was 63 seconds with 2 mL of acid and 18 mL of water. Although the presence of acid in solution overall inhibited crystallization, there was a point in which the HCl was in less concentration than the experimental group before it, but had slower crystallization rates. This showed that the KNO3 had a point in which crystallization is inhibited less. This could mean that certain concentrations of acid are less harmful to crystallization and showed an optimal concentration within the experimental group. Finally, at 12 mL, 14 mL, and 16 mL acid, crystallization was impossible, concluding that once the ratio of acid to water exceeds 1 to 2 crystallization cannot occur.

318-20 Have You Dyed Your Hair Lately?

Dami Oniga & Angela Ubanwa (Sullivan – Products)

This experiment was conducted to test the tensile strength of hair after it has been dyed with blonde hair dye for different amounts of time. The prediction was that the strength of hair will decrease the longer the dye was left in. The tensile strength was tested using the Lab Pro which is a force sensing machine. The dye was left in the hair for 5, 10, 15, 20, 25 then 30 minutes while applying heat using a hair dryer. The hair was then tied to the Lab Pro and onto a wooden block and using the Logger Pro software on the computer, the force used to break the hair was recorded. The computer would show how much force was being used. The data shows that the force of the samples of hair varied with no pattern which refuted our hypothesis.

316-06 Homemade Glue vs. Brand Glue

Fionne Pham & Ashley Yip (Roehrich – Products)

Our approach for this experiment was to compare brand name glues and our homemade glue and see which can hold the most amount of weight. To create the glue, we used typical items that can be found at home; hot water, milk, baking soda, and vinegar. We also created two variations of the homemade glue by changing the amount of baking soda that is put in. We chose to change the amount of baking soda because it acts as a base, causing a chemical reaction to make the milk become sticky. We hypothesized that Elmer's glue would be the strongest. We used weights that weighed from 500-1000 grams to test each brand. The brand named glues all generally were able

to hold the same amount of weight; 2000-3500 grams. After collecting all our data, we calculated the average for each glue. As a result, Variation 1 was the strongest.

316-05 The Fibonacci Sequence: Solar Panels

Akeem Pinnock & Stanley Wong (Roehrich – Math)

In the 18th century, there was an Italian mathematician and naturalist named Leonardo Pisano, also known as, Fibonacci. He was able to discover the secret pattern in nature which can be applied to rabbit reproduction and the spirals in flowers, plants, and trees called the Fibonacci sequence. In our experiment, we are determining whether or not the Fibonacci sequence can be used to gather solar energy more efficiently. Energy consumption is a major issue in the world and finding new and more efficient ways to gather more energy is a priority. There are two groups. One group has seven solar panels flatly arranged (control) while the other group has seven sonar panels arranged in an artificial tree using the Fibonacci sequence (experimental). The solar panels in each group were arranged in a series circuit. Each circuit was connected to a multi-meter which measured the voltage of the solar panels in each group. To determine which group was more effective at gathering energy we compared the different voltages gathered from the groups during testing. For three days, we placed both groups in the same location at the same time to collect solar energy for nine hours during each day. On a certain day, the control group had a maximum voltage of 2.8 V and a minimum voltage of 1.2 V. Contrary, the experimental group had a maximum voltage of 3.22 V and a minimum voltage of 1.88 V. In our experiment, we were able to support that the experimental group using Fibonacci sequence was able to gather more solar energy than the control group using the solar panels flatly arranged.

314-02 Egg Shells vs. Coffee Grounds

Mary Qiu (Roehrich – Plants)

In this experiment, I am testing which compost pile will help plants grow taller. The two types of compost piles I am using is an egg shell compost pile and a coffee ground compost pile. I predicted that the egg shell compost pile would help the bean plants grow taller. Egg shells contain calcium in which it will greatly help plant growth. Coffee grounds contain nitrogen and nitrogen is the energy source for bacteria. The bacteria will use the energy to break down the nutrients. I place 2 bean plants in the control group, the egg shell compost pile, and the coffee ground compost pile. The plants were placed in a plastic cup with holes in the bottom of the cup. I sprayed water into the plants of egg shell compost pile, the coffee ground compost pile, and the control to keep the soil moist. I recorded the height of the plants from each group. Once I gathered the data, I averaged the height of the plants from each group. The average height of the plant in the egg shell compost pile is 5.52 cm. The average height of the plant in the control group is 3.60 cm and the average height of the plant in the coffee ground compost pile is 3.40 cm. The results supported my hypothesis. The egg shell compost pile did help the bean plant grow taller. I conducted a T-test between the data I gathered from the egg shell and coffee ground compost pile and I found that there was no significant difference between the height of the plant from the egg shell compost pile and the height of the plant from the coffee ground compost pile.

319-09 No Salt Please

Sangitaa Ragoonath (Roehrich – Engineering)

Using solar energy there are ways to obtain clean water through homemade procedures. This experiment tests different methods of water desalination using the desalinated water to grow plants. Water desalination is the process of removing salt from seawater making it suitable for various uses. Three methods were used, the simple method was placing a small container into a larger container with seawater and

covering it to condensate. Condensation is water that collects as droplets on a cold surface comes into contact with humid air. Another was creating a solar powered oven by reflecting sunlight to water increasing temperature. The last method was connecting solar panels to power up a light bulb to condensate water. The condensed water in all projects was used to water the plants. Each project was improved by increasing the temperature to purify water better. Materials used were solar panels, seawater, containers, kidney beans, 12 volt light bulb, plastic wrap, cardboard boxes, most affordable and obtained easily. Results for plant growth using solar panels were the highest, the solar oven second and simple method third. Sources of error were plants began testing at different heights and some days the solar panels could not power up the light bulb. An improvement is using solar panels to heat up a kettle. Using the solar panel method compared to using tap water almost had the exact results which shows the desalinated water is almost the same as regular tap water. These procedures can be used in countries where there is a lot of sun and not clean drinking water such as Africa or India.

319-15 Hydroponics vs. Soil Plant Growth

Francesca Ramos (Roehrich – Plants)

Is it better to grow tomato plants in soil or water? This experiment looks at the growth of tomato plants raised hydroponically (the process of growing plants in sand, gravel, or liquid, with added nutrients but without soil) and in soil. I created my own hydroponic system with everyday materials at home. Pre-grown tomato plants were planted and grown in both systems. Both plants received the same amount of sun and were exposed to the same conditions. The development of the plants were observed and recorded daily for a week and a half. I expected that the plants raised in the hydroponic system would grow better (taller and healthier). The experimental results revealed that the plants grown in the hydroponic system did not grow as expected. At first, I observed that the hydroponic plants appeared healthy and grew taller than the ones in the soil for the first few days. However, after a week the plants in the hydroponic system began to wither and die. The plants grown in the soil, on the other hand, grew healthy at a constant rate for all the time observed. By the end of the experiment, the plants in the soil grew larger and appeared healthier than the plants grown hydroponically. Based on the results observed by my experiment, tomato plants thrive better in regular soil than when grown hydroponically.

318-12 Smile for the Camera

Shubh Rana (Roehrich – Products)

Teeth are an important part of our body. They help us eat our foods, and also speak properly - Few letters in the alphabet cannot be spoken properly if we have crooked teeth or missing teeth e.g. 'T' sounds as 'D' if teeth are inclined towards the inside. Besides that our teeth give us that bright smile to our face. Over time our teeth tend to get discolored for example colors like yellow and brown. To help stop the staining process of our teeth and keep the best smile one can brush their teeth with whitening toothpaste. Now here come the big question which teeth whitening toothpaste works the best? In my experiment I will be testing which Brand of teeth whitening tooth paste works the best on teeth, and since I cannot use real teeth I will be using egg shells because they both have identical compositions like same calcium salts, calcium keeps teeth and eggshells healthy and strong, egg shells also contain calcium carbonate, and proteins also found in teeth. I used 4 brands of tooth paste on the eggs which were Aqua Fresh, Sensodyne, Crest, and Arm & Hammer. The eggs were stained with Tomato Paste, Tea, and Coffee. I tested this experiment for 2 weeks. I found out that the Crest tooth paste worked the best since it had cleaned the teeth in a shorter amount of time than the other brands as well as removed most of the stains that had been applied during staining.

320-03 Orangey Vitamins

Saba Rao (Roehrich – Chemistry)

All over the world people drink orange juice thinking that they are receiving their daily vitamin C. The USDA recommends 75 mg of vitamin C per day for women and 90 mg per day for men. However, not all brands provide the same amount of vitamin C. The purpose of this experiment was to test which type of orange juice has the highest vitamin C concentration. In order to test this, a titration was done on eight different orange juices. A titration is a common lab method that allows one to determine the endpoint of a reaction and the amount of reactant in the titration flask. A chemical reaction is set up between a known volume of solution of unknown concentration and a known volume of solution of known concentration. The endpoint of a titration is determined with a permanent color change in the solution. In this experiment, the products tested were premium orange juice brands with no concentrate, as well as orange juice from frozen concentrate, and hand-squeezed orange juices. These juices were titrated using iodine and starch indicator solution. Three trials were conducted for each juice. After conducting titrations for all of the juices, it was found that the fresh orange juice has the highest vitamin C concentration. It has more vitamin C than is recommended by the USDA since it's concentration is very close to that of a 250 mg vitamin C tablet. Most of the other juices have concentrations that fit the recommended amount of vitamin C given by the USDA.

314-07 Does Cooking Fruits and Vegetables Deplete Their Vitamin C Content?

Georgia Ross (Ross – Chemistry)

Vitamin C is an important vitamin that helps us develop and grow. Do you wonder what happens to it when our food is cooked? An iodine solution lightens in color if a lot of vitamin C is present. The fruits that were used kiwis, strawberries, blackberries and tomatoes. The vegetables that were used were broccoli, Brussels sprouts, carrots and cabbage. The focus of this experiment was to see if cooking fruits and vegetables would deplete them from their vitamin C content. The fruits/vegetables were blended and were separated into fruit/vegetable cooked and fruit/vegetable raw. A cornstarch/iodine solution was made. 10 drops of the fruit/vegetable raw was put into the cornstarch/iodine solution. Then the observations were collected. 10 drops of the fruit/vegetable cooked was into a separate cornstarch/iodine solution. The observations were collected.. The hypothesis was that if the fruits and vegetables are cooked then the vitamin C content will decrease. My observations support my hypothesis. The cooked fruits that were tested had a darker color in the solution. The cooked vegetables also had a darker color in the solution. The raw fruits that were tested had a lighter color in the solution. The raw vegetables that were tested also had a lighter color in the solution.

320-01 Raw vs. Cooked Foods

Elzyata Sangadzhiev (Roehrich – Chemistry)

We cook food for various reasons, most notably taste, making foods more digestible, and killing bacteria or other organisms within the food. Do you think cooking food will increase or decrease calories? In this experiment I will use a bomb calorimeter to measure and calculate the amount of energy (calories) within various foods to determine the benefits, or drawbacks to cooking food. My hypothesis is that raw foods will have the least amount of calories, being the healthier food choice. In each group were tested broccoli, carrot, onion, potato, and zucchini. After setting up a bomb calorimeter, I recorded the initial and final temperature to calculate the change in temperature. Then I calculated the amount of energy consumed using the formula: change in temp. x mass of water x specific heat. Finally I can convert the energy consumed to calories by dividing energy by the sample weight. The cooked foods were

boiled or steamed while the raw food was the control. My data showed that cooking food will increase calorie rate, however, I found that, onions (boiled) had 14 calories, being the lowest calorie. The bottom line is that it's good to eat plenty of fruits and vegetables, no matter how they are prepared. Consuming a diet that's high in raw fruits and vegetables can also help you lose weight, because the fiber can help you feel full while consuming fewer calories. I recommend a diet that consists of a variety of cooked and raw foods.

320-08 Antacids and HCl

Michael Scolavino (Roehrich – Products)

Antacids are drugs that treat occasional heartburn, indigestion and reduce stomach acidity by increasing the pH balance in your stomach. Americans spend currently spend close to $1 billion per year on antacid drugs. Stomach acid contains large quantities of Hydrochloric acid at a pH of between 1 and 2. This means the HCl in the stomach has a concentration of. 1 moles/Liter. By testing various antacid drugs with Hydrochloric acid of. 1M and. 5M (an even stronger acid) I was able to closely simulate which drug would work best to reduce stomach acidity and improve the pH balance in the stomach. I tested seven different brands of antacid drugs against both. 1M HCl and. 5M HCl. I used the recommended adult dosage for each brand and placed it in 50 mL of. 1M HCl and. 5M HCl (at different times). I stirred each solution for 2 minutes, let the solution sit for 1 minute, stirred for another and finally let the solution sit for another minute; a total of 5 minutes. I took a recording of the pH of the solution using a pH meter after every minute. My hypothesis was that Milk of Magnesia would increase the pH balance the most because in researching past experiments, this was the case. This was also true for my experiment as Walgreen's brand Milk of Magnesia increased the pH of the HCl the most for both the. 1 and. 5 M tests.

314-04 Are Nutrition Facts Valid?

Sade Seidu (Ross – Products)

Carbohydrates are an essential need for the human body. They are known to be one of the main dietary components. We need carbohydrates because they play a major role in energy transportation. Most complex carbohydrates provide calories, starches, and natural sugars which can sometimes be no good for the body. It all depends on the structure of the food. There is a particular amount of carbohydrates you need in a day, so when you exceed that limit the rest becomes extra fat. The different milks that were tested had a particular amount of carbohydrates per serving, but don't mean it's actually true. This experiment is constructed in order to figure out whether the amount of carbohydrates in the nutrition facts is actually correct. The hypothesis was that the nutrition facts were valid, and it was proven correct. The procedure was to get ride of the casein, add calcium carbonate and filter, allow it to boil until 25 mL was left and add the ethanol. Heat the new substance with the ethanol and allow cooling. As it cools, crystals will form. The amount of crystals that formed and the carbohydrates on the nutrition facts were no more than 4 grams away from each other. So therefore, including all the possible sources of error, the hypothesis was proven right that the nutrition facts were valid.

318-08 Testing Which Acne Product Is Most Effective Against Bacteria

Almas Shafiq (Roehrich – Medicine)

Teenagers are plagued by acne due to changing hormones, bad diet, and several other reasons. Many use products on the market which claim to cure acne. With the variety of acne products available, it's hard to decide which product actually works. This project tests which acne product is most effective against bacteria that causes acne. Store bought acne products were tested in two different categories. One category was factory

produced acne products, while the other was natural acne products. Serratia marcescens and Staphylococci epidermis were the two bacteria that were used since research supports that they are similar to the bacteria that grows on the skin. The products effectiveness was tested by using the antibiotic sensitivity test, however acne products were used instead of antibiotics. The initial hypothesis was that Erythromycin-Benzoyl Peroxide Topical Gel would be most effective against the bacteria. After the completion of the experiment, it was concluded that Erythromycin-Benzoyl Peroxide Topical Gel was the most effective factory produced product, while tea tree oil was the most effective natural product. It was learned that natural products are more effective against bacteria than factory produced.

319-05 Mysterious Red Eye

Devina Sharma (Roehrich – Physics)

Red eye happens to some people in pictures while it doesn't happen for other people. Why does this happen? My experiment is trying to learn what conditions causes red eye and who can get red eye. First off I gathered 3 people with different eye color: blue eyes, green eyes, and dark brown eyes. Then I placed them against a blank wall with lights on and took a picture of them without flash on. After I had taken pictures of in this condition, I turned the lights off in the room and placed the person against the wall once again. I turned the flash for my camera on and took a picture of the person. For my results, no one had gotten red eyes in the first trial with the lights on. For the second trial with the lights off and flash on, my subject with green eyes had gotten red eyes. The person I used that had dark brown eyes, their eyes also turned red in my opinion but I think it can be debatable. It just looks like the eye color was just brightened to a reddish brown. My subject that had blue eyes, their eyes didn't turn red but you could see the flash reflected in their pupil. To summarize pictures taken in dark lighting with a flash on will possibly turn out with red eyes. I've learned that it would be best to take pictures in bright lighting to reduce this demon eye effect in pictures.

314-16 Dirty Plants vs. Clean Plants

Spencer Siu & David Cham (Ross – Plants)

Most gardeners don't want to handle the problem of having bugs in their soil while they are planting. To solve this problem some gardeners bake the soil to kill any of the larvae or the bugs. Does this affect how the plants will grow later on? To test this we baked trays of soil and compared it to the original soil. To ensure that a very minimal amount of bacteria can be transferred, we used a diluted solution of apple cider vinegar and water to sterile the seeds. We planted morning glories, lettuce, tomatoes, cucumbers, and sweet peas in the sterile soil and control soil. We put 3 cm of soil in 150 individual cells and put tabs to distinguish the control and experimental plants and color coded them to differentiate the different species of plants. We watered them every day with 5 mL of water and waited a week for the plants to germinate. The next 3 weeks we recorded the heights of the plants. The results show that most of the control had a higher growth rate than the experimental. However the only exception was the cucumbers who had the experimental do better than the control.

319-03 Stealthy Shapes: How to Make an Aircraft Invisible to Radar

Deniss Sivohins (Roehrich – Physics)

Most human beings around the world believe that invisibility cannot be achieved during our lifetime and that we humans cannot comprehend the science behind it, but the truth to the matter is that invisibility which may sound like the stuff out of science fiction is already developing in a branch of the military. But do we humans really understand how the military is making invisibility a reality. This project is looking into which certain 3-D geometric shapes scatter the most and least light from an artificial

light source which acts as radar, one of the detection methods. The 3-D geometric shapes were tested inside a box one at a time at a fixed distance from the light source by measuring the lux of the light that got reflected back (dependent variable) at different time intervals (independent variable) for each 3-D geometric shape. My hypothesis was that W-shape would scatter the most light. The experimental results supported my hypothesis by showing that the W-shape had given out 0.092 lux of light back to the direction of the light source which is the least amount than any other 3-D geometric shape. The experiment also showed that the cylinder shape, a common shape among vehicles, scatters 0.296 lux of light which is greater than the crumpled cylinder shape 0.232 lux. My project contributes to the area of stealth technology by showing that a shape to be considered less observable or even invisible shouldn't have a circular shape.

314-13 Relationship Between Music Genre and Reaction Time

Milo Sklar (Roehrich – Behavior)

It has been proven that music can affect reaction time. This experiment tests whether different music genres have a positive or negative effect on reaction. There were three genres tested: Bluegrass, Hip Hop, and Rock. My hypothesis was that the faster the music's tempo, the lower the reaction. So, the order of reaction from lowest to highest would be Bluegrass, Hip Hop, Rock, and the Control. The participants in the experiment were 10 teenagers in Midwood High School between ages 15 and 16. There were 6 males and 4 females. The students were tested three times a day. Each day the students listened to a different genre of music while there reaction time was tested. The genres were tested in the order of: Control, Bluegrass, Hip Hop, and Rock. The students listened to Earl Scrugg's 'Fireball Mail' for Bluegrass. For Hip Hop they listened to Game's 'Martians vs. Goblins'. And lastly, the students listened to 'Don't You Evah' by Spoon for the Rock genre. The trials were spread out over the course of a two-week testing period so that the students being tested could not become well practiced in the activity used to test their reaction time. After the data was collected, it showed that the experiment was inconclusive. Rock had the lowest reaction average with the 29.33 centimeters, but it was only 3.417 centimeters lower than the highest reaction, Bluegrass.

319-06 Nature is the best solution

Adam Soliman (Ross – Microbiology)

Herbs have been always used in cooking because they add flavor to our food. They also have been used as remedies because of their medicinal properties. The oils and extracts from these herbs are found to effectively kill bacteria and viruses. Garlic has always been known to have the ability to fight bacteria and viruses. It is effective against a wide range of bacteria. The substance that fights the bacteria and viruses in garlic is called allicin. The garlic properties in garlic get destroyed if cooked because it will destroy the allicin, so it should be consumed or applied raw. Some studies showed that garlic was proven that it had an ability to fight bacteria that has developed resistance to antibiotics. Garlic along with other medications have been also tested to enhance the effectiveness of these drugs. Ginger also has a percent of Allicin. The test was with different concentrations of garlic and ginger on E. coli bacteria. I am going to make Petri dishes with E. coli bacteria and test the garlic and ginger concentrations, and distilled water was used as the control group in the experiment. I hypothesized that the garlic extract will affect the bacteria growth rate, but the ginger extract will not affect it at all. This experiment was done to find out if garlic is effective in killing bacteria. This will help us understand the effectiveness of home remedies such as the use of natural herbs (including garlic and ginger) for medicinal purposes.

314-20 What's your pre-game ritual?

Krzysztof Szermuszyn (Ross – Products)

Billions of people run everyday whether it's to stay healthy or for fun. Staying nourished and hydrated is very important but what works the best is it water? Gatorade? Or Simply drinking nothing. The hypothesis stated that Gatorade will benefit the runners more. Five different people's running times on a fixed distance. These people ran while being slightly dehydrated, drinking a cup of water, or drinking a cup of Gatorade. The volunteers run three laps around a standard baseball field rhombus. This topic was chosen because it could benefit a lot of people. The results showed that staying hydrated with water or Gatorade while running a short distance is beneficial compared to running without water or Gatorade but it doesn't make a huge difference in performance. When you run a longer distance (i.e. 5 miles) you lose water and therefore it can benefit you more and drinking Gatorade can replenish your electrolytes which can help you out even more. There are many factors which play important roles getting accurate results. These factors are very hard to control and vary from person to person. For the most part you can get good results and come to a valid conclusion.

320-12 Saving the Wildlife One Feather!

Jia Tan (Ross – Environment)

The purpose of this experiment was to bring exposure to the topic of how wildlife species are heavily affected by oil spills. On April 22, 2010 the world's largest accidental oil spill was leaked on to Gulf of Mexico. Around 206 million gallons oil was leaked into the ocean. Thousands of birds and sea creatures were harmed. Oil spills not only pollute our oceans but harm and impact our wildlife and their habitats. The title of this experiment is Saving the Wildlife One Feather! The objective was to discover the safest, fastest, and easiest way to remove oil from animal feathers. The hypothesis was that Dawn dishwasher was the most effective way to remove motor oil from bird feathers. In this experiment 10 different household cleaning products were used, to test which product was most effective when it came to scrubbing off oil. 55 duck feathers were scrubbed, and 5 trials of each cleaning product was completed. According to the results, only 3 out of 10 different household cleaning products had a 90% or higher significant difference. The experiment revealed the hypothesis supported the results. As advertised on television, Dawn dishwasher soap does work best when it came to getting the most oil off of the duck feathers.

316-12 The Affect of Temperature on pH

Victoria Tanskaya (Roehrich – Chemistry)

The purpose of my experiment was to check the pH levels of different liquids, and to see how heat affects the pH. I hypothesized that the pH levels would stay the same at room temperature and when heated. I started my experiment by testing orange juice. The average room temperature was 25 °C. The orange juice had a pH of 4.08 at room temperature. I heated my liquids my liquids in a microwave to an average temperature of 53.5. The heated orange juice had a pH of 3.88. Then I moved on to testing apple juice. At room temperature the apple juice had a pH of 3.52. After heating the apple juice, the pH level dropped to 3.36. Just from these two trials, there has been a decrease in pH levels after the liquids have been heated. This shows that when the liquids were heated they became more acidic. The pH decreases with higher temperatures because when dissociation occurs in my liquids the equilibrium shifts to the right forming more H+ and OH-. Additionally more protons are released because the liquids are given more energy by the heat to dissociate.

314-12 Which cleaning product is most effective in killing E. coli?

Gardenia Taza (Ross – Microbiology)

E. coli is a rod-shaped bacterium that usually grows in the intestines. E. coli is a gram negative bacterium which means it stains pink or red. Usually E. coli is not dangerous, but some types of E. coli can cause bloody diarrhea and bad stomach cramps. Infection from E. coli occurs when one consumes food containing the bacteria. This experiment tested cleaning products affectivity to kill this bacterium. Six different products were used and their effectiveness varied. The zone of inhibition refers to the area around the filter paper that is clear due to the lack of bacteria growth. The zone of inhibition was recorded during all 15 trials for the six products. The data supported the hypothesis formed which said that if bleach products were used, then they would be the most effective. The most effective product was Clorox and the least effective was Windex Antibacterial. This may have been due to the high pH that causes cell membranes to break and also causes the denaturing of proteins, thereby limiting their effectiveness. The ineffectiveness of the proteins leads to the killing of bacteria.

316-10 Calcium & Protein in Milk

Lubin Toussaint & Mark Goldman (Ross – Chemistry)

The main goal of the experiment was to compare the differences/similarities of Calcium & protein in various milk(s). The three different milk(s) tested were regular school milk, school chocolate milk, and brand milk. To get the Calcium to precipitate out of the milk add a measured amount of solid Sodium Phosphate (Na3PO4) to approx. 100 mL of water. Then stir the solution until all the Sodium Phosphate dissolved in the water; next pour a specific amount of milk into the same solution and then mix for 3 minutes. Filter paper is then used and the weight is measured. All the milk is filtered into a new beaker. After the filtration was complete the filter paper is measured again, this time dry to determine the amount of Calcium. To get the protein, boil the milk until all of the water from it was evaporated. Once the water evaporated the precipitate of protein was left behind in the beaker. Finally the beaker was measured with the precipitate and the mass of the protein was measured. After getting all results it can be concluded that brand milk appeared to have way more calcium and protein than the school milk(s).

318-11 Which Meat is Toxic to Planaria?

Jeffrey Tsui & Yassine Kaouadji (Ross – Animals)

The purpose of the science project is to determine which meat is toxic to the brown planaria or also known as Dugesia tigrina. Our hypothesis for this project was that if we fed the planaria four different types of meat then the chicken would be the most toxic. The constants in our project are the type and amount of water and also the amount of meat being fed. The control group is the 6 planaria that were not fed for the duration of our experiment. The variables in our experiment include the four meats we fed to 6 planaria each which are pork, lamb, chicken, and fish. The way we collected our results is that for each of the five days we checked to see if each planaria was still alive. The dead ones we disposed of and every 2 days we changed the planaria's water. The results of this experiment are that our controlled planaria had more living planaria then any other group and fish had no planaria living after the experiment. The results show that our hypothesis was incorrect because chicken turned out to be not as toxic to the planaria as fish and still had 2 out of 6 planaria living after the experiment. If we were going to do this experiment again in the future or expand on this experiment we would test each meat to observe which one allows the planaria to regenerate quicker.

316-09 Do females have better peripheral vision than males?

Jenny Wang (Ross – Behavior)

Although our eyes have extremely low resolution in areas that are not the center of where we're looking, we may still decipher the object (Balas, October 12, 2009). This ability has something to do with our peripheral vision. Because the density of receptor cells on the retina of our eyes is the greatest at the center and lowest at the edges, objects can be seen (Hans-Werner Hunziker, 2006). Peripheral vision is the things you see around the target. The things you see around your target is determined my many factors. These factors vary with each person. People believe that females have better peripheral vision than males, but it still haven't been proved. Peripheral vision is also very good at detecting motion (Hans-Werner Hunziker, 2006). My hypothesis is that females have better peripheral vision than males to test the claim. In order to do this test, A protractor two feet wide will be held at eye level. The person taking this test will look straight at a point ahead of them, marked by a cardboard. Then a strip of paper will be moved around the protractor from the side to the middle. When the person sees the target, the degree of angle will be marked down. This will be their angle of peripheral vision. Because vision can vary between the left and right eye and some people may have better vision on their left than right or vice versa, they will be tested twice; once of the left and once on the right side of the eye. Twenty-five male and twenty-five females will be tested. Their scores will then be averaged to see which have a higher degree angle of peripheral vision. The higher the peripheral angle is, the greater peripheral vision they have. This data will then tell which gender have a greater angle of peripheral. My data shows that females don't have better peripheral vision. Males, actually, have better peripheral vision, based on the average scores. This proves that my hypothesis is incorrect.

319-19 How does the increase of distractors distract people?

Helen Wu (Ross – Behavior)

People have said that doing more than 1 thing at the same time distracts people. Multi-task is an example of performing more than 1 thing at the same time. Experiments were done to see if distractors distract people. In an experiment that was performed, there were 2 groups- the control and the experimental group. The control group had to perform a task without distractions while the experimental group had a constant beeping noise to distract them. From the experiment, the researchers found out that different parts of the brain were used when there were distractors and when there wasn't any distractor. The control group used the part of their brain that involves memorization while the experimental group used the part of their brain that performs repetitive skills. Not only do distractors distract people, but they also cause people to use different parts of their brain. The statement saying that more distractors will distract people even more was supported by the experiment. In the experiment, 20 girls and 20 boys within the ages of 15 to 17 performed a visual search, and each time another distracted was added on. There were a total of 4 distractors at the end of the test and there was also a percentage of how much the person got correct. The percentages were used to perform a t-test. Although there isn't a 90% level of confidence that more distractors distract people, you can tell from the data that from trial 1 to trial 4, the t-value increased. The increasing of the t-values mean that they are getting closer to a percentage that will make it safe to say that there is a certain level of confidence that distractors do distract people. There was a discrepancy in the experiment because there was a boy who performed very poorly on the experiment. This may have cause the average of the data to be lower than if the percentage was higher. An improvement would be to talk less with the people performing a visual search because it could be distracting to them, and they could lose their concentration on doing the test.

320-09 The Effect of Different Beverages on Tooth Decay

Junjie Wu (Roehrich – Products)

It is a well known myth that Coca Cola can deteriorate teeth at an amazing rate. This is due to the large quantity of phosphoric acid that is responsible for the tangy taste in the soda. In citrus flavored beverages, it is replaced by citric acid. Eggshells are often used as a replacement for teeth in science experiments due to their similar crystalline composition. Eggshells are manly composed of calcium carbonate, which come in a crystalline solid form. In this experiment, four different beverages are used to test for their effects on tooth decay: water, Coca Cola, Minute Maid orange juice, and Arizona green tea. The water would serve as the control group. Instead of using actual teeth, ~2.5 grams of calcium carbonate will be submerged into 100g of each beverages and will be kept in the same temperature for nine days. After each day, the mass of each piece of calcium carbonate was measured and recorded. After the ninth day, the results were analyzed and plotted as a scatter plot. Overall, Coca Cola had the greatest total decrease in mass. The Minute Maid orange juice was second, and both the water and Arizona green tea barely caused decay. Overall, these results agree with prior research since both Coca Cola and citrus juice contain high contents of acid and can have a pH of ~3.

318-05 Kimchi Chemistry

Kenne Yang & Jennifer Wu (Ross – Chemistry)

Kimchi is a traditional Korean dish that is 3,000 years old. Kimchi is cabbage that has been soaked in salt so that the liquid inside the cells of the cabbage will be drawn out and then mixed with a mixture of spices, sugar and vegetables. People eat kimchi because it's very beneficial and lasts a long time due to a process called fermentation. During fermentation, the pH of the kimchi changes towards acidity. The pH changes because the more acidic it is, the more resistant it's going to be towards bacteria (Emily Maggrett). pH has to be less that 4.6 to kill bacteria. The sugar in the ingredients which converts into lactic acid is a big factor to the change of pH (Tae Ikl Mheen). Fermentation is used because the lactic acid lowers the pH therefore, killing off bacteria (Emily Maggret). Without any bacterial growth, kimchi takes longer to spoil. This experiment is to test if altering the amount of ingredients in kimchi will affect it's pH level. A original batch that has undergone osmosis but hasn't gone through fermentation yet is made. Then we split into 15 bags with varieties. pH level will be checked daily. If there's a change in pH level it shows then altering the ingredients affects pH level, if there isn't any change in pH then altering the ingredients will not affect pH level. The results showed that altering the ingredients of Kimchi will not change its pH level.

314-05 Showdown: Runner vs. Distance from Base

Jonathan Yuen & Matthew Piccione (Roehrich – Math)

In our experiment, 'Showdown: Runner vs. Distance From Base' we tested what would be the optimal lead in baseball. In a baseball sense the optimal lead would be a lead that assures the runner not getting picked off of first base and if the runner were to receive a steal sign they would be able to reach the next base safely without being thrown out. We tested leads from the distance of four feet to ten feet. Before experimentation we hypothesized that a seven foot lead would be the ideal lead because it was close enough to dive back and be safe in the event of a pickoff and far enough from the base to steal safely. But, after the completion of the experiment it was found that if a runner were to take an eight foot lead off the base then the runner would succeed in stealing sixty percent of the time and would be picked off forty percent of the time. This ensures a sixty percent success rate in stealing which was the best stealing success rate and one of

the median pick off percentages assuring to us that an eight foot lead off of first base in baseball is the ideal lead.

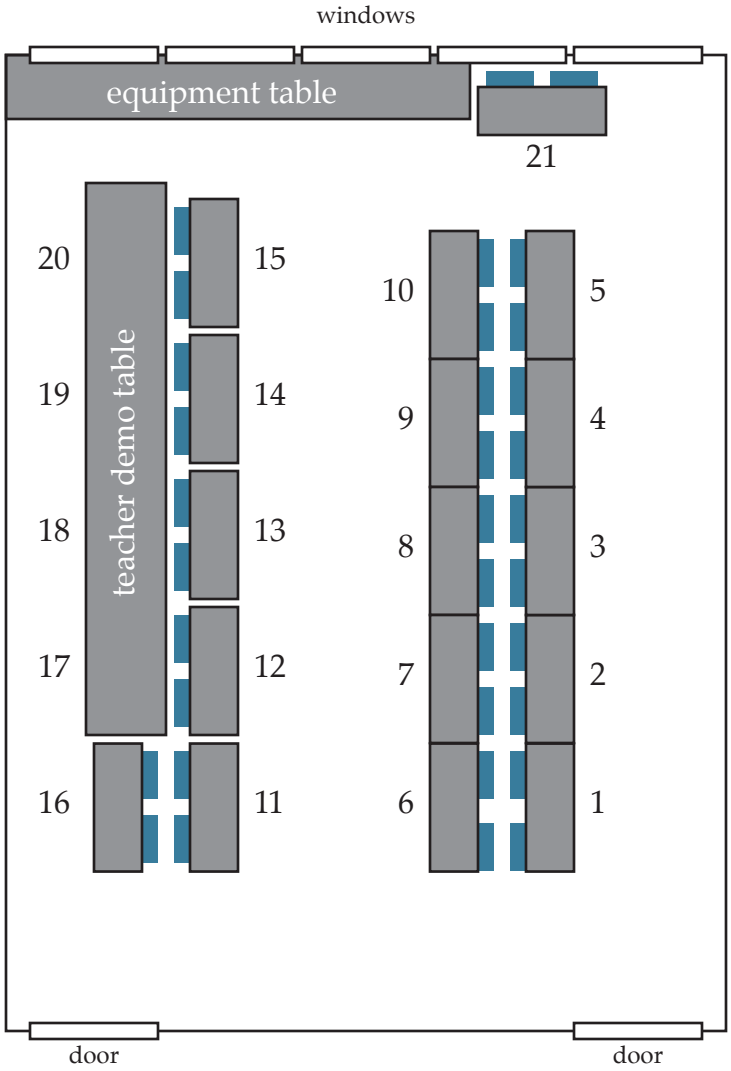
320-16 Ugly Teeth

Tian Hong Zhang & Andy Xu (Roehrich – Biochemistry)

The objective of this experiment is to determine the effects of different types of beverages on teeth. Since teeth samples were not available, twenty hard boiled eggs were used to represent the teeth instead. Eggs were used to represent teeth because both teeth and eggshells are made from a hard material that contains mostly calcium. The eggs were inserted into plastic cups which each contained a different kind of beverage. Since the experiment was started on a Friday, the next time observations was recorded was the following Monday. After recording the observations on Monday, eggs were returned to the beverages and observation was being recorded for the next two days. Besides the first observation that was recorded, the eggs changed very little for the next two days. After the fifth day of the experiment, the eggs were removed from the beverages and grouped into three different categories. The groups were determined by the effect the beverages had on the egg shell. The eggs were then brushed to see if the stain comes off easily and completely. An before-and-after photo was also taken to show the changes of the eggs. As expected, most of the carbonated beverages have the worst effects on the eggshells.

Room Arrangements

A314, A316, A318, A320



A319 (Chemistry Lab)