Honors Science Program

The Upper School Science Department of
Heathwood Hall Episcopal School
invites parents, families, friends, and faculty
to join us in celebrating our Honors Science Students as
Independent Scientists at the

Honors Scientific Research Symposium
2019

Tue. March 26th, Wed. March 27th & Thu. March 28th 2018
from 4:30 p.m. – 8:00 p.m.

Susan Gibbes Robinson
Center for Science & Mathematics

Please join us as the Honors Science students present
their independent research projects in preparation for their presentations at
the SC Junior Academy of Science Annual Meeting.
Light snacks and refreshments will be provided.

Clickable link to - Alphabetical Listing By Author
Clickable link to - Schedule by time and date
Clickable link to - Projects listed by SCJAS Topics

Tuesday March 26th 2019 Consecutive 15 minute sessions

Click for Alphabetic Listing

TIME	Lecture Hall
4:30-4:45 PM.	Aaron Sawyer & Aidan Willhide
4:45-5:00 PM.	Molly Caballero
5:00-5:15 PM.	Robert Golden
5:15-5:30 PM.	Myles Roberts
5:30-5:45 PM.	Pete Peterson
5:45-6:00 PM.	Brooklyn Moore
6:00-6:15 PM.	Savannah Smith
6:15-6:30 PM.	M. Moran, A. Roberts, & R. Shelley
6:30-6:45 PM.	Van Clarke
6:45-7:00 PM.	Ellie Singerling
7:00-7:15 PM.	M Roney and Austin Tuller
7:15-7:30 PM.	Addie Grace Cook
7:30-7:45 PM.	Caroline TInch
7:45-8:00 PM.	William Morris

Wednesday March, 27th 2019 Consecutive 15 minute sessions

TIME	Lecture Hall
4:30-4:45 PM.	Dubose Tuller
4:45-5:00 PM.	Pritish Das
5:00-5:15 PM.	Andrew Sobel
5:15-5:30 PM.	Evan Barker
5:30-5:45 PM.	Olivia Merritt
5:45-6:00 PM.	Mary Fern
6:00-6:15 PM.	Nadine Hanna
6:15-6:30 PM.	Morgan Iseman
6:30-6:45 PM.	Isabelle Herndon
6:45-7:00 PM.	Jimmy Ruskell
7:00-7:15 PM.	Reid Avery & Owen Bennett (Wed cont's next page)

7:15-7:30 PM.	Frasier Peluso
7:30-7:45 PM.	
7:45-8:00 PM.	

Thursday April, 12th 2018 Consecutive 15 minute sessions

TIME	Lecture Hall
4:30-4:45 PM.	Hugh Wilcox
4:45-5:00 PM.	Catherine Barron
5:00-5:15 PM.	Serena Parmar
5:15-5:30 PM.	Christina Smith
5:30-5:45 PM.	Logan Trull
5:45-6:00 PM.	Hanna Coetsee
6:00-6:15 PM.	Anna Shainwald
6:15-6:30 PM.	Chi-Chi Nwanagu
6:30-6:45 PM.	Walker Draffin & Henry Haywood
6:45-7:00 PM.	Pamela Ann Pope
7:00-7:15 PM.	London Patel
7:15-7:30 PM.	Lilly Abernathy
7:30-7:45 PM.	Towns Christian
7:45-8:00 PM.	Sam Barker & Daniel Sobel

Lilly Abernathy

Zoology

The Effects of Environmental Changes on the Overall Productivity of Pogonomyrmex occidentalis

The purpose of this experiment was to study how environmental factors, specifically heat and humidity affect the foraging activity of Harvester Ants. If the environment plays an important role in the lives of ants, how much more could these environmental factors have an affect on the human population? Knowing that the environment plays a factor in the world of insects, it was hypothesized that a colony of ants placed in a habitat with increased humidity and heat levels would collect more food and be more productive. To conduct this experiment, three colonies of harvester ants, each containing about thirty workers, were placed in separate environments of differing environmental conditions. The first was introduced to high heat, the second to high heat and high humidity and the third remained a controlled environment set to the surroundings of the room. Food was placed in a container and the ants were allowed to feed for twelve hours. At the end of the trials, the environment which consisted of higher heat and humidity produced the most active ants, having foraged more pieces of food and visibly dug the most tunnels. This leads to the conclusion that under these conditions, the majority of Western Harvester ants would be more productive in an environment like this, however this could lead to ecological issues if there suddenly becomes a shortage of food. In theory more active and productive ants would appear to be a positive result, when in actuality it will probably lead to harming natural ecosystems.

Nico Adamo

Mathematics

A New Perspective on Zeta Functions under the Number Field Function Field Analogy

In this paper we present striking similarities between the zeta function of an elliptic differential operator and the Hasse-Weil Zeta Function, showing they both give rise to self-intersection numbers. This observation supports a more rigorous formulation of the function field analogy. Repercussions of this result on such a theory are discussed. Proofs are given relating the zeta function of an operator to the Selberg Zeta Function, which connects the Selberg Zeta Function to the Hasse-Weil Zeta Function. Finally, both functions are connected to Selberg's "relative trace formula". This connection lays the groundwork for a geometric theory of zeta functions as discussed in Brown (2009).

Reid Avery & Owen Bennett

Consumer Science

The effect of SPF on the UV rays absorbed.

The purpose of this project is to gather data on which type of SPF blocks UV rays the best. It was hypothesized that the higher the SPF of the sunscreen, the less the UV rays would be detected. Sunscreen was collected from the same brand and from the same website. The UV-lamp and the 4-cups were set up in the shape of a rectangle. A lid was laid flat on the ground, and the UV-lamp was placed on the lid. The sunscreen was used to cover the UV detecting card and allowed it to detect how much UV Radiation could get through. A hair dryer was used to dry the sunscreen. The card was then placed under the UV lamp, which was turned off. Once everything was set-up, the lamp and the stopwatch were turned on at the same time. At each previously chosen time interval, data was collected from the cards readings in order to tell the amount of UV rays detected.

Sam Barker & Daniel Sobel

Microbiology

Triclosan Soap Effectiveness At Killing Bacteria When Diluted with Water

The purpose of this experiment was to determine whether diluting antibacterial soap with water diminishes the effectiveness of Triclosan Soap. To test the hypothesis, 60 petri dishes were filled with Nutrient Agar, then Staphylococcus epidermidis was streaked across each plate. After incubating in a 37°C incubator for 24 hours, the antibiotic sensitivity discs that had been soaked in Triclosan soap concentrations of 100%, 75%, 50%, 25% and, 0% were placed into 60 sterile petri dishes with about 2 discs per petri dish depending on the size of the bacteria colony. The plates were incubated an additional 48 hours and the petri dishes were taken out of the incubator and had the diameters of the area in which no bacteria survived around the filter paper, measured. The results of the experiment found that there was a gradual decline of the zone of inhibition's diameter by about 0.33mm or 32.6% every time the Triclosan Soap concentration was decreased by 25%. This finding suggests that if you use antibacterial soap, you should not dilute antibacterial soap because there would be a noticeable decrease in the effectiveness of said soap.

Evan Barker

Microbiology

The Effect of the Amount of Penicillin Disks on the Growth of E.Coli and How Time Changes the Effectiveness of Penicillin

The purpose of this experiment was to see if adding penicillin disks would inhibit the growth of E.Coli K12 and to see if the longer the variables spent in the petri dish then would the penicillin lose its effectiveness. The independent variable was the penicillin disks and the dependent variable was the E.Coli. For the experiment, E.Coli was put on half of a petri dish using a sterile cotton swab while

the penicillin disks were put on the other half. After 3 days the petri dishes were checked to see if E.Coli had grown close to the penicillin disks and pictures were taken of each petri dish so that later the amount of bacteria could be graded on a scale of 0 - 5 where 0 is no bacteria and 5 is bacteria existing very close to the penicillin disk(s). This was done for two more days to test how the effectiveness of penicillin changes over time. The experiment resulted in a direct correlation that the more penicillin disks present the less likely the E.Coli is to grow as well as the more time the two variables spend in the same petri dish the less effective the penicillin. The two hypotheses were If there are more penicillin soaked disks of paper in a petri dish, then there will be less bacteria and If the penicillin disks and E.Coli spend more time in the dish, then there will be more bacteria. The hypotheses were supported.

Catherine Barron

Chemistry

The efficency and energy storage of 0%, 10%, 25%, 50%, 75%, and 100% ethanol concentrations in gasoline

The purpose of this experiment is to determine how much energy different concentrations of ethanol in gasoline store and how efficient 0%, 10%, 25%, 50%, 75%, and 100% concentrations of ethanol are. The hypothesis of this experiment is that if 0%, 10%, 25%, 50%, 75%, and 100% concentrations of ethanol in gasoline (by volume) are tested against pure gasoline, then they will be less efficient and store less energy. To begin the experiment, 3 mL of each concentration, poured into the crucible under the 250 mL beaker, and the temperature of the water was taken before and after testing. The concentration was lit and burned, the burn time was recorded. Three trials per concentration were run. The average change in temperature was calculated, and from this the number of calories per concentration was calculated. From the calorimetry data, there was not a clear pattern of what was occurring.40 mL of each concentration were poured into a lawn mower, and the time each concentration ran in the lawn mower was recorded. The lawn mower running times did show that the pure gasoline was most efficient with a running time of 4.54, and that the 100% ethanol concentration was least efficient because the lawn mower would not start. The part of the hypothesis stating that the ethanol concentrations will be less efficient than gasoline was proven true, but the part of energy production was inconclusive.

Molly Caballero

Psychology

The Effect of Subliminal Messaging on a Simple Decision of an Individual.

The purpose of this project is to show or illustrate how difficult/easy and effective/ineffective it is to use an unconscious visual stimuli in order to affect an individual's decision. The tests being performed are a control test, in which a group takes a survey without being shown a video, a subliminal messaging test in which a red rectangle subliminal message is shown and another subliminal

messaging test in which a blue subliminal message is show. The hypothesis is that the implementation of a visual subliminal message into a video will affect the decision of the individual who watches it. The null hypothesis is that the implementation of a visual subliminal message into a video will not affect the decision or opinion of the individual who watches it.

Van Clarke

Zoology

The Effect of Salt Concentrations on Mosquito Growth

The purpose of this project is to test the different concentrations of salt in still water and observe mosquito's growth. First the experimenter filled up the beakers with fresh water and then proceeded to put different concentrations of salt into the beakers. After that the experimenter placed about 30 mosquito larvae into the beakers with different amounts of salt concentrations. The Hypothesis was is if exposed to high concentrations of salt then it will negatively affect mosquito growth. The independent variable (IV) was the concentrations of salt and the dependent variable (DV) was the number of mosquitos growing without drawbacks. The results were that all the mosquitos from the water with zero salt survived while the mosquitos in the water with 0.5 teaspoons of salt all but 2 survived. With 1 teaspoon all but 6 survived and with 1.5 teaspoons all but 5 survived. In the water with 3 teaspoons of salt had only 16 survive while 14 died. The conclusion of this was that the data supported my hypothesis of when more salt was added the rate of mortality would increase as well. These results do support the hypothesis.

Hanna Coetsee

Consumer Science

Investigation and Comparison of Popular Water Bottle Brand's Quality of Water Before and After Heating

The purpose of this study was to test the effect of heat on the water quality within disposable plastic water bottles and to compare popular brands. The starting hypothesis was that Dasani would have the best quality water before and after heating at 55 and 76.6 degrees Celsius. To test the quality of the water, a Baldwin Meadows water test kit was purchased, which allowed for the testing of 14 different qualities of water. These were total alkalinity, pH, total hardness, iron, copper, bromine, lead, nitrite, nitrate, total chlorine, free chlorine, cyanuric acid, fluoride, and carbonate. After the procedures were conducted, the data was recorded and analyzed for final conclusion. Before heating at 55 degrees Celsius, the brands with the most to the least number of chemicals in the ideal range was as follows:1. Deer Park 2. Food Lion 3. Aquafina 4. Dasani. After being heated at 55 degrees Celsius, they were then ranked as: 1. Deer Park 2. Dasani 3. Aquafina/Food Lion. Before being heated at 76.6 degrees Celsius, the order was: 1. Deer Park 2. Food Lion 3. Dasani 4. Aquafina. After being heated at 76.6 degrees Celsius, the order was the same except for the switch of Dasani to #4 and

Aquafina to #3. Overall, it can be concluded that Deer Park and Food Lion generally have the most number of chemicals in ideal ranges before and after heating with Aquafina and Dasani almost always at the bottom of the list.

Addie-Grace Cook

Environmental Science

The Effect of the City Wastewater Treatment Plant on Water in the Columbia Area

This experiment aimed to discern the effect of the wastewater treatment plant in Columbia, South Carolina on fecal coliform and E. coli counts after and without precipitation. E. coli was tested as it is a fecal coliform that serves as an indicator species, noting the existence of pathogenic organisms. Sites in close proximity to the river and sites up and downstream from the plant on the Congaree river were sampled after precipitation and without precipitation. Samples were bagged and refrigerated. Then 3m petrifilm plates were inoculated with 1 ml of each sample, incubated for 24 hours at 42° +1° celsius, and then read using the colony counter app. The results suggest that non-precipitation trials yielded higher E. coli counts. The location with the highest number of E. coli was the Heathwood wetland R (right). These results contradict previous findings that suggest that CFUs (colony forming units) should be highest after precipitation. The results suggest that a number of factors could have influenced the high count of the wetland that day: animal feces, wastewater runoff from the Metropolitan Wastewater Plant, etc. The results of 0 colonies in the post-plant water may have resulted because of the lack of flowing river accessibility and rain rates, as high rain rates can flush pollutants from an area. This study had many possible sources of error, as the incubator temperature may have been too high at 42° + 1° and there was no way to control the amount of rain for the post-precipitation trials, among others.

Pritish Das

Chemistry

Analyzing the effect of additives on soap's base pH value

In this experiment, the effect that additives have on the pH of soap is examined, to see if it makes a significant difference that could potentially harm skin. The purpose of the procedure was to determine if it would be useful for homemade soap manufacturers, soapers, and help them to make safe products since they don't have any regulations. It could be unhealthy for the skin to have pH imbalances, so it is important for soap makers to have some knowledge of the pH of soap. The hypothesis stated that additives could have a significant effect(more than +/-1) on the pH value of soaps. The experiment was formatted using the additives and soap bases as the independent variables, and the dependent variables being the pH value of the solution. Avocado oil, sesame oil, and high fructose corn syrup was used as the additives, and for the soap base, Sodium Hydroxide(NaOH) was combined with olive oil. The solution was poured into separate beakers, and then the pH value of the soap base in that separate beaker

was recorded, and the pH value of the additives separate from the beaker was recorded. The solutions were mixed and the pH value was recorded. This process was repeated times, with all the same measurements. The results of this experiment supported the hypothesis. This concluded that additives combined with soap have a potential to be create greater than a +/- 1.0 pH change.

Walker Draffin & Henry Haywood

Biochemistry

The Effect of Whey and Plant Protein Powder on the Total Growth of Worms

The goal of the experiment was to see which protein caused the worm to grow to an overall larger mass. The hypothesis of the experiment was that the plant protein powder will make the worms grow at a faster rate compared to the whey protein powder. The experiment was started with putting dirt into buckets. The total mass in grams of each set of worms that was being testing was measured on the mass scale. Three worms were measured at a time on the mass scale. The sets of worms were placed into buckets that had dirt and water. For buckets one and two there was ten grams of whey protein and fruit scraps put into the container. For buckets three and four ten grams of plant based protein,and fruit scraps was added. For buckets five and six there was fruit scraps, water and dirt. At the end of one week, the mass of the worms was measured by putting the sets of worms on the mass scale. The mass of each set of worms was measured in grams. The average growth after being fed plant based protein was 1.085 grams. The average growth after being whey protein powder was 0.4 grams and the average growth after being fed fruit scraps was 0.36 grams. The conclusion of the experiment was that the plant protein powder made the worms grow at a faster rate.

Mary Fern

Psychology

The Mental Health of Transgender Youth in Comparison to Cisgender Youth

The problem that is being addressed in this study is the effect that being transgender has on mental health. Being transgender is not a choice. This study is set up to bring attention to that and the people who are inadvertently hurt by ignorance and hate. This project was executed anonymously through an online survey by way of Instagram. Fifteen responses were collected, nine men, three women, and three non-binary individuals. As the data was being processed there appeared to be a correlation between the amount of dysphoria and the gender of the person answering the question. Non-binary people and women had, on average, less dysphoria when the men did. If transgender people are misgendered it then their mental health will severely decline. The hypothesis was supported with the data collected during the experiment.

Robert Golden

Sociology

The Effect Of Influencer's Grade Level On High School Freshman Movie Choices

The purpose of this project was to find how many Freshman in high school's movie choices were influenced by other grade levels and which grade level had the most influence. This experiment was conducted by having four influencers, one from each grade fill out a form of their favorite movies.Then freshmen were asked to fill out a different form in which they started out with their own choices, and were then shown the influencers movies, increasing by lowest grade level of the influencer to the highest grade level, and were asked if they would like to make changes to their movie choices. Finally the amount of changes were measured to see which grade had the most influence. Upon analyzing the data the hypothesis was not supported by the data when Seniors caused the least amount of changes to the freshmen's choices. The results however did show the exact opposite that the closer the class of the influencer to the Freshman the more influence they had.

Nadine Hanna

Botany

The Effect of Acid Rain on Plant Growth

The purpose of this research was to test the effect that acid rain had on the growth of plants. With the use of Wisconsin Fast Plants(plants that take only 40 days for full growth) in four groups of 24 treated with the different pHs of sulfuric acid such as 4.2, 4.6, 5.6, and 7 in the time-span of the first 11 days of growth, measurements of the growth such as the height and amount of leaves of each plant were taken and put into graphs and data sets to observe the growth rate and effect of the plants. It was noticed that the plant groups with the pH's of 4.2 and 4.6, of higher acidity grew at a faster rate than the plants of lower acidity with the pHs of 5.6 and 7. Although plants bend in the direction of light, the plants of higher acidity bent more than the plants of lower acidity. Another effect noticed about the plants was the fact that the leaves of the highly acidic plants became frail and damaged into a grey color, whereas the leaves of the plants with the pHs of 5.6 and 7 were perfectly green and healthy. More plants in the highly acidic plant group died than in the lower acidic plant group. The conclusion came to be that acid rain didn't stunt the growth of the highly acidic plants, it really just affected the plants over time.

Isabelle Herndon

Consumer Science

The Effect of Gender on Purchasing Habits among Adolescents

The purpose of this experiment was to examine the purchasing habits and behavior among adolescents with respect to gender. It was hypothesized that female adolescents would show to be more price and experience oriented on certain purchases while male adolescents would make more efficient and need-based purchases. For this study, the independent variable was gender, with the dependent variables being purchasing habits. To conduct this experiment, surveys (surveys had three sections: clothing, food, and entertainment) were created and administered to adolescents ranging from ages thirteen to sixteen. The surveys were then assessed in order to categorize each subject as either a price-shopper, an experience-shopper, a need-based shopper, or a loyal shopper. The data was then analyzed graphically and inferentially. It was found that, overall, there were actually more male experience-shoppers than there were female, and more female need-based shoppers than male, yet there were still more female price-shoppers than male price-shoppers. A single factor ANOVA test determined that there was no statistical significance in the difference between overall male and female purchasing habits. However, each individual section had somewhat different results, with the clothing section containing far more male need-based shoppers and far more female experience-shoppers, and fully supported the hypothesis. Food--while there are more male need-based shoppers--contains more male experience-shoppers than female. And lastly, entertainment contained far more female loyal shoppers and more male experience-shoppers. Nevertheless, the ANOVA tests ran on each of these sections showed the relationship between gender and purchasing habits to be statistically insignificant. Ultimately, my hypothesis failed to be supported.

Charlotte Hughes

Chemistry

Reduced-graphene oxide semi-permanent hair dye: durability and toxicity

Because many conventional hair dyes contain supposed carcinogens, toxicants, and skin irritants, a reduced-graphene oxide (r-GO) hair dye, was explored as an alternative to conventional dyes. This dye has even been found to decrease static electricity and conduct heat. It was hypothesized that r-GO would exhibit insignificant environmental toxicity and be significantly more durable than conventional hair dye. Graphene oxide and r-GO were produced by the methods cited in literature. To examine the toxicity of r-GO, a 48 hour r-GO acute aquatic toxicity assay was conducted using 150 Daphnia magna. The r-GO concentrations in the Daphnia magna acute toxicity assay were found to include significantly more fatalities than the control solutions. This fails to support the hypothesis that r-GO would exhibit insignificant aquatic toxicity, though further studies are needed because the r-GO solutions were significantly more acidic than the control. To examine the durability of r-GO, UV-Vis spectroscopy was used

to measure the wavelengths and absorptions of the r-GO hair dye on 80 human hair samples after successive washes. While the 5.00 wt% r-GO dye was found to be the most effective r-GO dye (using ANOVA; $\alpha = 0.05$), the control dye was significantly more durable than any r-GO dye, which failed to support the hypothesis. For future studies, the use of mass spectroscopy to control purity and a wider range of concentrations is suggested. Potential implications of this dye include helping people regulate their body temperature in extreme conditions and creating technology interfacing with the body.

Morgan Iseman

Environmental Science

The Effect of Organically Grown Bananas on the Lifespan of Drosophila Melanogaster

The purpose of this study is to determine the relationship between organic bananas and lifespan of Drosophila Melanogaster 9(fruit fly). It was hypothesised that if different fruit flies eat organic and non-organic bananas, then the fruit flies that eat organic bananas will live longer. Each test consisted of one vial culture with 10g of mashed organic banana as the lone food source, with a vial net for the flies to rest on. The vial was then sealed with a foam plug. Their were 25 flies in the vial for test one and 10 flies in each vial culture for test 2 and 3. The only difference in the control group was a non-organic banana was used in place of the organic banana. The amount of dead flies in each vial was recorded once daily for for 19 days. There was no clear difference in lifespan which may indicate that lifespan of Drosophila Melanogaster is not directly related to organic bananas.

Jackson Meriwether

Environmental Science

The Effect of Heathwood's Runoff and Water Quality on the Gills Creek Watershed

The purpose of this project was to test the water quality including the PH level, DO level, and the water temperature at heathwood hall, and compare it to Gills Creek measurements at bluff road made by the City of Columbia. The Independent Variable: Location of the measurements taken. Dependent Variable: The correlation or lack there of between the two data sets. The procedure involved collecting a sample from the heathwood pond and the runoff up the heathwood pond measuring the temperature there and then measuring the DO and PH levels once it had been brought back. After reviewing and analyzing the data and comparing the results to the hypothesis,

Olivia Merritt

Zoology

The Effect of the Pogonomyrmex Ant Species on Chemical Properties in Harvest Organic Soil

The purpose of this study was to determine the effect of the Pogonomyrmex ant species on chemical properties of Harvest Organic soil. There were four different levels of chemical elements being tested in the soil: nitrogen, phosphorus, potassium and pH. Hypothesis one states "if the Pogonomyrmex ant species live in Harvest Organic soil for a designated amount of time, then the ants will change the nutrient level (N, P, K, pH) in the soil." Hypothesis two states "if the Pogonomyrmex ant species live in Harvest Organic soil for a designated amount of time, then the ants will change the pH level in the soil." The null hypothesis states that there will be no change in the chemical properties of the soil after the Pogonomyrmex ant species have lived there. The Pogonomyrmex ants lived in a controlled environment for two weeks with Harvest Organic soil as the soil being tested. There were 20 ants per aquarium; there was 1000 mL of soil to ensure that each trial would contain an equal amount. The Harvest Organic soil will be tested around every three/four days. This experiment was run eight separate times. An inferential and descriptive statistical test was completed to test the mean and percent change of the data. All inferential analysis suggested that there was a statistically significant change in the different chemical levels of soil. Phosphorus had the highest percent change and potassium had the lowest. The mean for each trial was taken, then the overall mean for nitrogen, phosphorus, potassium and pH was gathered so that each variable had one mean. Therefore, the results supported the hypotheses. In conclusion the Pogonomyrmex ant species positively changed the differing chemical properties of the Harvest Organic soil.

Brooklyn Moore

Psychology

The Effect of the Lunar Cycle on the Female Reproductive System

The purpose of this experiment was to determine how the lunar cycle affects the female reproductive system. It was hypothesized that when the lunar cycle is in the full moon phase, there will be a higher percentage of people experiencing ovulation, higher aggression levels, and less sleep. In contrast, during the new moon phase, more people will record that they experienced menstruation, lower sexual desire levels, and a happier mood. After getting Human Consent Forms read and signed by a parent or guardian, 26 Heathwood Hall Upper School students (boys and girls of varying grades ranging from 9-12) completed forms regarding their reproductive system and everyday life, such as if they were menstruating or ovulating that day, as well as their sleep hours, sex drive level, and mood, among others. These forms were completed for four days on and/or surrounding the new and full moons for 4 trials (two new moons and two full moons). Each form was then separated by sex and moon phase and analyzed. It was concluded that during the new moon, more subjects recorded they had

experienced menstruation. Additionally, during the full moon, more subjects experienced ovulation, higher sexual desire levels, and increased volatile aggression levels and sleep hours. A relationship between sleep hours and mood was identified, considering that when each gender experienced less sleep, they recorded a more negative mood. This project rejected the null hypothesis that there is no relationship between the lunar cycle and the female reproductive system.

Michael Moran, Alexander Roberts, & Ryan Shelley

Microbiology

The Effect of Soaps With and Without Triclosan on the Health of Penicillium Italicum

Our intent is to research the effect of soaps with and without triclosan on the health of Penicillium Italicum. Penicillium Italicum is a fungus harmful mainly to citrus plants. Throughout our experiment, we used the following materials: 60 petri dishes, three 500mL bottles of agar, an incubator, a fridge, Colony Counter (a smartphone app), Ajax Antibacterial soap, Dawn Soap, an incubator, sterile swabs, and three tubes of living Penicillium Italicum. Google Sheets was used for data analysis. First, we filled all petri dishes with enough agar to cover the bottom, which translates to close to a millimeter. The two groups with soap were mixed with 1 part soap to 25 parts agar. From there, we divided the 60 dishes into the three separate groups of 20. The control group was introduced to the fungus with nothing added beyond the agar. The second and third groups both had soaps mixed into their agar and cultivated. Next, data was collected over the course of three days after it had been determined that the fungus had grown to a point where detection was possible. “Detection” relates to the Colony Counter app suggested by the head of science at our school that uses photos of petri dishes to identify colonies of fungi and bacteria.

William Morris

Zoology

The effect of sound and food on the intellect and resultant behavior of wild squirrels.

In this experiment, the effect of sound and food on the training and the intelligence of wild squirrels was tested upon. The purpose of this research project was to support Pavlov’s Theory of classical conditioning and to find if it was possible to train wild squirrels using sound and food. Pavlov has already proved it possible to train animals that are accustomed to human contact, but this experiment did not support that it is possible to train animals that are not used to human contact. It was hypothesized that if the squirrels can relate the sound on the phone to the food, then the squirrels will rush down to the platform after the sound is played. There was a board set up on a tree in the researcher’s backyard. Food was put on the board everyday for 10 days. Whenever the food was put on the board, a sound was played. If the squirrels related the sound to the food then the

would've thought that the sound means food. On the last day of experimentation, just the sound is played. If the squirrels come to look for food on the board, then the experiment would've been a success. In this experiment, the squirrels found the food and ate it, but never related the food to the sound.

Johannamarie (Chi-Chi) Nwanagu

Microbiology

The Effect of Prolonged Exposure of Copper Sulfate in Germicide on the Growth of Microbes

The purpose of this experiment is to see if $CuSO_4$ in a cleaning product could continuously limit the growth on a surface after a period of time for use in a medical setting. If $CuSO_4$ is added into a hospital grade germicide, then the number of bacterial colonies after 8 hours will be less than a surface cleaned with germicide without $CuSO_4$. Four solutions with varying concentrations of $CuSO_4$ were used to clean a masked off portion of a school desk. The portion of the desk that was cleaned was swabbed eight hours later and used to inoculate 1 mL of luria broth. The broth was then incubated overnight then spread onto petri dishes and incubated overnight. The resulting colonies of bacteria were counted using the phone application ColonyCounter. After running a single factor ANOVA test the results found are statistically insignificant and do not support or refute the hypothesis because the results are inconclusive.

Serena Parmar

Botany

The Effect of LED, UV, and Fluorescent Light on Lactuca sativa in a Hydroponic System

Hydroponics has revolutionized the world of agriculture. Its advancement has led to the successful growth of plants without soil. Many studies have compared plants grown hydroponically to plants grown traditionally in soil. This study was conducted to observe the effect of LED, UV, and fluorescent light on the growth rate of Lactuca sativa, compared to a control group grown under natural sunlight. It was hypothesized that plants grown under natural sunlight would have a higher growth rate than plants grown under other lighting. During this experiment, plants were grown in hydroponic systems under respective lighting for 4 weeks. Their height and number of leaves were measured three times a week and both the average height and average number of leaves were tested in single factor ANOVA tests. The statistically significant data was further analyzed in post hoc testing. The results obtained for average height under various lighting groups was not statistically significant in contrast to the data for average number of leaves which was statistically significant. After further analyzation, it was concluded that the plants grown under UV light had a significantly lower number of leaves than the plants in other groups. The null hypothesis that if lettuce is exposed to UV, LED, fluorescent, or sunlight, then there will be no variation between the different lighting groups was rejected.

London Patel

Environmental Science

The Effect of Bromine, Hardness, Cyanuric Acid, and pH on Tap Water

The purpose of this experiment was to compare different states' tap water with respect to pH, bromine, cyanuric acid and hardness. Free Chlorine, Iron, Copper, Lead, Nitrate, Nitrite, Total Chlorine, Fluoride, Lead, Carbonate, and Total Alkalinity data will be included if statistically nominal. The hypothesis for this experiment is that northeastern states will have better water quality due to the increased amount of total rainfall compared to southern states. The procedure for this experiment included immersing the water test strips into the solution of water from each state. After two to three weeks, another trial for all of the states were conducted. The first trial's data showed a constant pH of 6 throughout the country; Cyanuric Acid levels were high in Atlanta, Georgia; Charlotte North Carolina; and Key West, Florida. Regions located in the south, such as Charlotte, North Carolina; Atlanta, Georgia; Key West Florida; and Dallas, Texas all contained high Copper levels. Philadelphia, Pennsylvania; Bangor, Maine; and Key West, Florida contained high amounts of Nitrate, with only Key West, Florida having a high amount of Nitrite. Even when St. Louis, Missouri had a hardness level of 120, all of the other regions contained hardness levels from 25 to 50. In conclusion, states in the southeastern region of the United States have worse water than northern states. Key West, Florida showed to have the worst water in all of the tested regions.

Frazier Peluso

Physics

The Impact of Gravity On the Habitability and Structure of Life on Trappist-1e

In this paper, we assess the possible environmental conditions on Trappist-1e, as well as the structure of life if any organisms exist on the planet. Through the analyzation of previous data, we have determined that Trappist-1e is most likely a water-dominated world, and if habitable, would possibly contain a large number of aquatic organisms within its oceans. We assumed an Earth-like atmosphere for the planet, as well as implementing different climate models to assess the planet's habitability. The planet has shown itself to be a remarkable candidate for habitable exoplanets, with it being in both the conservative HZ (habitable zone) as well as the tidal HZ, giving it enough heat to contain water on its surface, regardless of atmospheric pressure (however, we assumed an atmosphere of 1 bar for planet e). Furthermore, the planet shows signs of containing a magnetosphere similar to that of Earth, giving the planet protection against the UV fluxuations from the planet's host star, Trappist-1. Life on the planet would most likely be a majority of aquatic organisms, with a similar ecosystem to that of Earth. However, due to pressures presented by a mass ocean, most aquatic lifeforms would most likely be in equilibrium with the environment in order to adjust to a great deal of pressure, much like deep-sea organisms on Earth.

Pete Peterson

Zoology

The Effect of Earthworms on Soil pH

In this experiment, the purpose was to see if there was correlation between earthworms and soil pH. Two containers of soil were put on a porch outside and every week from October 27, 2018 to December 15th, 2018, the pH of that soil was checked. Each week, however, several increasing amounts of earthworms were added to both containers. At the end of the 7 weeks, a combined 36 worms were in both containers. Around week 2 for one container and week 4 for the other container, the pH shifted to 8.0 on the scale from the 7.5 it started out on. While it is possible that this shift could be due to the earthworms, poor experimental design let other factors interfere with seeing if the earthworms exclusively affected the pH. Another issue that disallows a statement about whether the earthworms affect the pH or not is that the two containers, despite being in the same location, shifted at two different times.

Pamela Ann Pope

Psychology

The Effect of Clothing on Test Taking Abilities.

The purpose of this experimental research project is to determine if the type of clothing being worn has a correlation to test taking abilities. The investigation started out by reading Predictably Irrational and then researching questions to use on the test that the subjects would take. The researcher then wrote down the questions and created the test. Next the researcher printed out the tests and created consent forms. The researcher gave the consent forms to the subjects that would be taking the test and then received the consent forms back. The researcher then told the subjects what to wear (fancy or casual clothing). Then she had the subjects come into a room, and they were handed a test. They had no time limit when taking the test. The subjects turned in the test, and the researcher then corrected their tests. Then, the researcher had the same test subjects take the test again but in a different outfit than what they wore the first time. The researcher repeated the same steps that were done before. The researcher then looked at the correlation between the test results regarding fancy and casual clothing. The researcher repeated the experiment with different people in each group for a total of three trials. Lastly, the researcher thanked the subjects that participated in the experiment. The results concluded that there was no correlation between fancy and casual clothing. In conclusion, when taking tests, it does not matter what people wear; people will get the same test results.

Myles Roberts

Zoology

The Effect of Varying oxygen levels on Lithobates catesbeianus

This experiment is on the effect of different levels of oxygen on the growth rate and size of Bullfrog tadpoles. This research could be used to help create solutions for creating a larger food supply by trying to replicate this on an animal we use for food, lowering the price of that food and making it easier for less fortunate people to get a source of food. I hypothesize that the shrimp exposed to the most oxygen will grow to the largest size and have the highest growth rate. My null hypothesis is that the varying levels of oxygen will have no effect on overall growth and growth. My alternate hypothesis is that the shrimp exposed to no extra oxygen will grow to larger sizes than the ones exposed to extra oxygen. This will be accomplished by starting with 33 tadpoles, which have been in water with normal oxygen levels. They will be raised in these conditions and will be measured every other day for 11 days. The independent variable is the oxygen levels, which will be changed by spraying boost 95% oxygen into the water. The dependant variable is the size of the tadpoles which I hypothesize will be dependant on the amount of oxygen in the water. The data was analyzed and it was discovered that an increase in oxygen caused the tadpoles to become smaller and less healthy than those raised in water with regular oxygenation.

M Roney & Austin Tuller

Sociology

The Effect of Public and Private Schooling on Teenage Boys Toxic Masculinity

The purpose of conducting this social experiment was to discover if the environment in which high school boys spend most of their time impacts their toxic masculinity. The researchers hypothesized that the private school boys would have a higher concentration of toxic masculinity. The experimenters created an anonymous quiz (on google forms) with 13 questions, including possible situations the teenage boy may experience which may indeed indicate whether he has toxic masculinity or not. Once having permission from each of the boys, the researchers emailed out an anonymous quiz to 10 public school boys and 10 private school boys. The researchers appreciate that this is probably too small of a sample to be statistically significant, but it is felt that the results are meaningful and provide a basic understanding of the issue. After receiving all of the boy's results, the researchers concluded that overall, the public school boys had a higher level of toxic masculinity. In certain circumstances private school boys did indeed show more toxic masculinity compared to the public school boys, however, the majority of the results indicated that public school boys exhibited more toxic masculinity more often. In conclusion, the researcher's hypothesis was refuted. The data shows that public school boys have more toxic traits than boys who attend private school.

Jimmy Ruskell

Microbiology

The effect of chlorine and bromine on the amount of bacteria on the skin of raw poultry products

The purpose of this project is to measure the ability of different antimicrobials to eliminate or reduce the amount of bacterial colonies in relation to the amount of bacterial colonies on untreated chicken. The Center for Disease Control reported that, between 1998 and 2008, the annual amount of food borne illnesses in humans caused by bacteria on poultry was 653,622. Two of the most common ways that chicken is protected against bacteria is by washing the chicken in chlorine or bromine. The researcher wanted to test the effectiveness of these methods. The two different treatments, chlorine and bromine, were tested on raw chicken by submerging small amounts of the chicken skin into them. The chicken was placed into the treatments for one minute, then soaked in water. The water was then swabbed onto petri dishes and placed into an incubator for two days. The petri dishes were then scanned using an app called Colony Counter to count how many bacterial colonies were present in each petri dish. The average number of bacterial colonies for the petri dishes that were not treated with anything was 54.833. The bromine trials had almost double the control, with 104.02 bacterial colonies. The chlorine trials had over triple the amount with 164.18 bacterial colonies. The results suggest that bacterial colonies are more likely to grow when subjugated to antimicrobials, but this result was most likely produced due to an error, either procedural or technological.

Aaron Sawyer & Aidan Willhide

Engineering

The Effect of Wind Speed on Voltage Generated; Using an RC Aircraft's Propeller as a Generator

This experiment was designed to test the amount of voltage generated by a propeller in varying wind speed, in an attempt to reduce the likelihood of remote control aircraft crashes resulting from loss of battery power. First, a wind tunnel was constructed out of cardboard. Next, an RC aircraft motor was placed inside the testing chamber on a stand. Wind was generated using three box fans and a leaf blower, and the wind speed was measured using an anemometer. The motor was started by a 9 volt battery, then disconnected and hooked up to an electrical multimeter. The data was recorded into data tables. The experiment was conducted three times with both the leaf blower and box fans, and three times without the leaf blower to have variations in wind speed. A separate test was performed with the motor connected to a 1 farad capacitor. An attempt was made to run the motor off of the voltage stored in the capacitor. Results showed that the motor would not turn below a certain wind speed, and, more volts are generated at a higher wind speed. When the motor was connected to the capacitor, it wasn't able to make a single rotation. In conclusion, the windmilling propeller driven motor generated current and voltage; however the current likely will not produce a sufficient amount of power to be practical to power RC aircraft

Anna Shainwald

Psychology

The Effect of Different Methods of Memory

In this experiment, the purpose was to determine the effect of different methods of memory. It was hypothesized that if the three different methods of memorization were used, then rote memorization would be most effective for primarily auditory learners, while the story and loci methods would be most effective for visual learners. Three methods in particular were examined: loci, rote, and story. To carry out this experiment, four different lists, with various objects, places, and ideas, were produced. Three lists were made, one for rote, one for story, and one for loci, as well as a fourth for the subject's preferred method, the control group. There were then human consent forms sent out, to each test subject. Once returned, the experimentation began. One subject was tested at a time. The person would memorize one list at a time, for however long the subject preferred, and then waited approximately two minutes before taking the test. This process was repeated five times, with five different test subjects. Once the trials were completed the data was collected and analyzed. After research, it was determined that there was not a direct correlation between the type of learner the subject was, and the amount of information the subject remembered. What did seem to affect the amount of information the subjects remembered was simply the method of memory. The amount of information remembered was higher when using the loci, and story methods, rather than the rote method.

Ellie Singerling

Chemistry

The Effect of Temperature on the Reaction Time of Vinegar and Baking Soda

The purpose of this study was to investigate if the temperature of vinegar had any effect on the time it took for its reaction to stop, when mixed with baking soda. It was hypothesized that the temperature of the vinegar will cause a change in reaction time, specifically colder temperatures causing a slower reaction time, while hotter resulted in a faster time. Four different temperatures of vinegar were tested, based off of the room temperature vinegar: -2℃ (50° below room temperature) 12℃ (25° below room temperature) 40℃ (25° above room temperature), and 52℃ (50° room temperature). The heated or cooled vinegar was poured into the baking soda, and when put together, was timed until the reaction completely stopped without being touched or tampered with. The results supported past experiments; the vinegar with higher temperatures had a significantly faster reaction time, while the vinegar that was cooled, or had a lower temperature, took much longer to fully react with the baking soda.

Savannah Smith

Botany

The Potential Correlation Between Soil pH and Color Vibrancy of Yellow Chrysanthemum Blooms, Dendranthema Grandiflora

The purpose of this experiment is to determine whether or not the pH of a soil has an effect on the color vibrancy of select plants growing in that soil. The null hypothesis claims that the soil pH will have no effect on the color vibrancy of yellow chrysanthemums. The hypothesis states that yellow chrysanthemums will experience a color change when grown in soils of different pH. Photographs were taken at specific time intervals, and were then downloaded into Adobe Lightroom and analyzed. The photographs were cropped and set to the white balance using a digital gray card. The computer cursor was placed on the most common or middle shade of yellow, and the amount of red, green, and blue pixels in that specific spot were recorded. This was done for each photograph. Those normalized RGB values were then translated into an HEX number, and the color was produced in Google Docs to generate color swatches. Google Docs uses HEX numbers while Adobe Lightroom uses an RGB scale. Upon producing the average color for each time frame by converting RGB percentages to an HEX scale number, it was concluded that a difference in soil pH does result in a variation of petal shades in yellow chrysanthemum blossoms.

Christina Smith

Psychology

The Effect of Mindfulness on Short-Term Memory in Teenagers

The purpose of this experiment is to compare the effect of mindfulness with respect to short-term memory capacity. Each subject was met twice. The first time they were given a list of twelve words which were randomly gathered online. Studying the words and stopping when they chose, fifteen seconds later the subject wrote down every word they remembered from the list, assessing the subject's free recall accuracy. At the second meeting, the subject participated in a mindfulness exercise, "Fading Tones." A chime was rung twice, with the subject listening until the tone faded. The process was repeated, then data was recorded, comparing the individual subject's first test to their second test to get rid of any outliers, which are trials 17-20, for more accurate results. The results showed that through the procedure used, the number of words remembered by subjects, the dependent variable, has no relationship to the independent variable, the tones of the chime, since the dependent variable is volatile throughout trials. This lack of a relationship indicates that the hypothesis, which is "if the memory tests are taken, then the test results taken with two complete tones of the chime beforehand will be better than the test results with no complete tones of the chime," was not supported by the data. The null hypothesis, which is "if the memory tests are taken, there will be no difference in how well the memory tests are completed with or without mindfulness practice," was supported by the data.

Andrew Sobel

Mathematics

The Effect of Monopoly Group and Improvement Level on the Return on Investment of Monopoly Properties

The purpose of this experiment was to determine the return on investment (ROI) for Monopoly properties with respect to the property's improvement level (i.e. the number of houses/hotel) & the monopoly to which the property belonged. It was hypothesized that if a property was located farther clockwise from GO & had a greater improvement level, then its return on investment would be greater. The two independent variables were the improvement level and the property's monopoly; the dependent variable is the return on investment. A total of 6 trials, each for a different improvement level (e.g. 2 Houses), were run using a Java code that simulated a four player game of Monopoly. Whole monopolies were randomly assigned to each of the four players, and property ownership remained constant throughout the experiment. The hypothesis was not fully supported as it was determined that no houses or hotels resulted in the lowest median ROI, while 1 Hotel resulted in the greatest median ROI. It was additionally concluded that the monopoly to which the property belonged had less of an effect on that property's ROI than originally anticipated.

Caroline Tinch

Consumer Science

The Correlation Between the Flavor of a Vape Liquid and the Ketones Produced

The purpose of this experiment was to determine which flavors of vape liquid, when heated and vaporized, contained the highest amount of ketones. It was hypothesized that the liquids with creamy or buttery flavors would contain higher amounts of ketones because these flavors are often artificially produced with Diacetyl, a ketone that is been connected with lung disease. Nine different flavors of vape liquid and one unflavored vape liquid base (control) were heated and vaporized. The vapor was collected using an erlenmeyer flask and a bunsen burner. Rubber tubing was attached to the flask, and the other end of the tubing was inserted into a graduated cylinder, which was upside down in a water bath. The graduated cylinder was water-filled so the rate of gas collection could be measured. When the liquid was vaporized, the vapor was collected in the graduated cylinder , where it was mixed with water to create a solution, which was then tested for ketones using ketone test strips. Each flavor of vape liquid tested negative for ketones, which showed that ketones were not directly present in any of the vape liquid flavors. These results rejected the hypothesis, but confirmed the null hypothesis.

Logan Trull

Consumer Science

The Effect of the Brand of Feminine Hygiene Products On the Number of Chemicals Absorbed into a Solution

The purpose of this investigation was to determine the levels of chemicals absorbed into an aqueous solution from different feminine product brands. The hypothesis was that if the brand of feminine hygiene product is changed, then the amount of added chemicals absorbed into the solution would also change. The experimenter tested four tampons from varying brands including one scented. The types gathered included: Tampax Pearl Scented/Unscented (both with flow size regular), Safe & Soft (Unscented, flow size regular), and Playtex Sport (Unscented, flow size regular). An aqueous solution with a viscosity near 0.6922 mPa.s was created by heating water to a temperature near 37 Degrees Celsius. After, five tampons from each of the four tampon brands were inserted into the solution and soaked for 8 hours. The testing strips were inserted into the solutions (after removing tampons) and the researcher reviewed the color changes to determine the levels of absorbed chemicals. The regular water at the temperature was tested as well, without tampons. The results recognized the Tampax Pearl Scented provided a harder water than Tampax Pearl Unscented. The evidence implies that the fragrance applied to the Tampax Pearl Scented tampons was the cause. The average total alkalinity levels of the different brands were higher than the controlled water meaning the contaminant must have been absorbed into the water from the tampons. The pH of all tested were shown in the analysis to be normal, and the free chlorine and total chlorine were shown to be inconclusive.

DuBose Tuller

Engineering

The Effect of a Motorized Gimbal on Local Accelerometer-Based Position Tracking

The purpose of this experiment was to investigate the accuracy of a position-calculating device by finding the average difference in distance between what is measured by a camera from above and what is calculated by an accelerometer/gyroscope attached to a motorized gimbal. A drone acted as the aerial camera used to check the system's accuracy. Position tracking accuracy was determined between two groups: one with the motorized gimbal system turned on, and one with it turned off. Neither setup was able to effectively determine its own position, but the group with the motorized gimbal was able to do it statistically significantly better.

Hugh Willcox

Psychology

The Effect of Mental Imagery on Baskteball shots

The subjects were asked to shoot 10 free throws to establish a base indicator for each subject. The average number of succesful shots made for a base was 4.667 shots. Subjects then either watched a video of a person making four free throws in a row, or a video of a person missing free throws. After watching the video of someone making four free throws in a row, the average number of shots made out of ten was 5.267. After watching the video of someone miss free throws, the average shots made out of ten was 4.267. There were uncontrolled variables such as weather and if the subject was sick that day. The results were too close to definitively conclude a difference in said results. The conclusion of the experiment was that there was not enough significance in the results to say that there was a difference when showing the videos. The point of the experiment was to show evidence that mental imagery worked, but the results showed that there was no significant evidence that it does.

Alphabetical List of Presenters

Click on a name to go to the abstract

Project by SCJAS category

Biochemistry

Walker Draffin & Henry Haywood	The Effect of Whey and Plant Protein Powder on the Total Growth of Worms

Botany - Non-mentored

Nadine Hanna	The Effect of Acid Rain on Plant Growth
Serena Parmar	The Effect of LED, UV, and Fluorescent Light on Lactuca sativa in a Hydroponic System
Savannah Smith	The Potential Correlation Between Soil pH and Color Vibrancy of Yellow Chrysanthemum Blooms, Dendranthema Grandiflora

Chemistry

Catherine Barron	The efficency and energy storage of 0%, 10%, 25%, 50%, 75%, and 100% ethanol concentrations in gasoline
Pritish Das	Analyzing the effect of additives on soap's base pH value
Charlotte Hughes	Reduced-graphene oxide semi-permanent hair dye: durability and toxicity
Ellie Singerling	The Effect of Temperature on the Reaction Time of Vinegar and Baking Soda

Consumer Science – Non -mentored

Reid Avery & Owen Bennett	The effect of SPF on the UV rays absorbed.
Hanna Coetsee	Investigation and Comparison of Popular Water Bottle Brand's Quality of Water Before and After Heating
Isabelle Herndon	The Effect of Gender on Purchasing Habits among Adolescents
Caroline Tinch	The Correlation Between the Flavor of a Vape Liquid and the Ketones Produced
Logan Trull	The Effect of the Brand of Feminine Hygiene Products On the Number of Chemicals Absorbed into a Solution

Engineering-Non-mentored

Aaron Sawyer & Aidan Willhide	The Effect of Wind Speed on Voltage Generated; Using an RC Aircraft's Propeller as a Generator
DuBose Tuller	The Effect of a Motorized Gimbal on Local Accelerometer-Based Position Tracking

Environmental Science-Non-mentored

Addie-Grace Cook	The Effect of the City Wastewater Treatment Plant on Water in the Columbia Area
Morgan Iseman	The Effect of Organically Grown Bananas on the Lifespan of Drosophila Melanogaster
Jackson Meriwether	The Effect of Heathwood's Runoff and Water Quality on the Gills Creek Watershed
London Patel	The Effect of Bromine, Hardness, Cyanuric Acid, and pH on Tap Water

Mathematics-Non-mentored

Nico Adamo	A New Perspective on Zeta Functions under the Number Field Function Field Analogy
Andrew Sobel	The Effect of Monopoly Group and Improvement Level on the Return on Investment of Monopoly Properties

Microbiology-Non-mentored

Sam Barker & Daniel Sobel	Triclosan Soap Effectiveness At Killing Bacteria When Diluted with Water
Evan Barker	The Effect of the Amount of Penicillin Disks on the Growth of E.Coli and How Time Changes the Effectiveness of Penicillin
Michael Moran, Alexander Roberts, & Shelley	The Effect of Soaps With and Without Triclosan on the Health of Penicillium Italicum
Johannamarie Nwanagu	The Effect of Prolonged Exposure of Copper Sulfate in Germicide on the Growth of Microbes
Jimmy Ruskell	The effect of chlorine and bromine on the amount of bacteria on the skin of raw poultry products

Physics- Non- mentored

Frazier Peluso	The Impact of Gravity On the Habitability and Structure of Life on Trappist-1e

Continued on next page

Psychology & Sociology- Non-mentored

Molly Caballero	The Effect of Subliminal Messaging on a Simple Decision of an Individual.
Mary Fern	The Mental Health of Transgender Youth in Comparison to Cisgender Youth
Brooklyn Moore	The Effect of the Lunar Cycle on the Female Reproductive System
Pamela Ann Pope	The Effect of Clothing on Test Taking Abilities.
Anna Shainwald	The Effect of Different Methods of Memory
Christina Smith	The Effect of Mindfulness on Short-Term Memory in Teenagers
Hugh Willcox	The Effect of Mental Imagery on Baskteball shots
Robert Golden	The Effect Of Influencer's Grade Level On High School Freshman Movie Choices
M Roney & Austin Tuller	The Effect of Public and Private Schooling on Teenage Boys Toxic Masculinity

Zoology- Non- mentored

Lilly Abernathy	The Effects of Environmental Changes on the Overall Productivity of Pogonomyrmex occidentalis
Van Clarke	The Effect of Salt Concentrations on Mosquito Growth
Olivia Merritt	The Effect of the Pogonomyrmex Ant Species on Chemical Properties in Harvest Organic Soil
William Morris	The effect of sound and food on the intellect and resultant behavior of wild squirrels.
Pete Peterson	The Effect of Earthworms on Soil pH
Myles Roberts	The Effect of Varying oxygen levels on Lithobates catesbeianus

Notes: -

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Heathwood Hall Science Department

Jim Morris
Department Chair
Biology, Forensics & Genetics
Honors Research,

Ben Holladay
Chemistry, Honors Chemistry, AP-Chemistry
Honors Research

Tim McKnight
Physics-1, Honors Physics-1, AP-Physics, Astronomy,
Honors Research

Lisa Norman
Academic Dean AP Biology, Honors Research

Geoffrey Thomas
AP-Biology, AP Environmental Science

Tuesday March 26th 2019

Wednesday March 27th 2019

Thursday March 28th 2019

Consecutive 15 minute sessions in the Robinson Center for Science and Mathematics –
LectureCategory_listCategory_list Hall