

ESF in the High School

Environmental Summit

June 6, 2018

Hosted by



What is *ESF in the High School*?

ESF in the High School is a partnership program between SUNY ESF and High Schools throughout New York State that enables qualified students to:

- Experience college-level course work while still in high school.
- Understand the complex scientific and social perspectives behind the environmental issues that make headlines every day such as the relationship between energy and the environment.
- Learn about and explore diverse interests and career opportunities in environmental science, engineering, management, policy and design - and in related areas such as law, communications, technology and medicine.



Table of Contents

Welcome and Introduction.....	1
Schedule.....	2
Keynote Speaker Bio	2
Platform Presentation Assignments	3-4

Platform Presentations

Alternative Energy	5
Ecological Footprints and Energy Audits	6
Ecology and Climate Change.....	6
Pollution and Remediation.....	7-8
Sustainable Food Production	8-9

Posters

Alternative Energy	9
Biodiversity and Natural History	9-10
Ecological Footprints and Energy Audits	10
Ecology and Climate Change.....	11
Pollution and Remediation.....	11-13
Sustainable Food Production	13

WELCOME AND INTRODUCTION

The Environmental Summit is the culmination of a year's worth of scientific inquiry, skill development, and hard work. Today you will engage in an age-old tradition within the scientific community as you present your work and discuss your results with others who share your passion and interest in your subject. We hope this experience will inspire you to embrace the importance of scientific research and its influence on your day to day experiences and choices. We also hope that you've become active citizen scientists who are concerned with the science behind the headlines as a result of your involvement in an *ESF in the High School* course.

Ann Moore, Office of Experiential Learning and Outreach

S. Scott Shannon, Associate Provost for Instruction and Dean of the Graduate School

Maura Harling Stefl, Administrative Staff Assistant

Jacob O'Connell, Outreach Program Manager

SCHEDULE FOR THE ENVIRONMENTAL SUMMIT

- 8:15 AM – 9:15 AM Registration/Check-in Baker Laboratory Lobby and poster setup in Gateway Center.
- 9:15 AM– 11:15 AM Student Presentations in Baker Laboratory Presentation Rooms.
- 11:15 AM – 11:30 AM Transition to Gateway Center for Keynote Speaker.
- 11:30 AM– 11:50 AM Keynote Address – Gateway Center.
- 11:50 AM– 1:05 PM Lunch and Poster Sessions (Mixer Style) – Gateway Center and Judging of Posters.
- 1:05 PM– 1:30 PM Awards Presentation.

Keynote Speaker:

Lemir Teron, PhD

Lemir is an Assistant Professor in the Environmental Studies Department at SUNY-ESF. He received his BS in Social Science Education from the University of Georgia, an MS in Urban Policy Studies at Georgia State University and a PhD in Energy and Environmental Policy from the University of Delaware.

He has published in numerous journals and teaches courses in environmental justice, energy and sustainable development.

His thinking deliberates on problems related to inequality, conflict and empowerment. These implications are often times, though not exclusively, environmental. His intellectual playgrounds include urban spaces, coastal communities and sites of resilience.



Baker 145

Time	Topic Category	Student Name(s)	Project Title	School
9:15	Alternative Energy	CAUGHEY, J. C. DIX	USING SOLAR POWER TO INCREASE THE EFFICIENCY OF LAFAYETTE HIGH SCHOOL, WHILE DECREASING THE AMOUNT OF FOSSIL FUEL EMISSIONS RELEASED AND OUR EFFECT ON GLOBAL WARMING.	Lafayette
9:30	Alternative Energy	CERLANEK, J. A. CARAMANNA L. GRABOWSKI J. KOEHLER	ENERGY FROM WASTE: USE OF LEAVES AS A SOURCE OF RENEWABLE HEAT ENERGY	East Syracuse-Minoa
9:45	Ecological Footprint and Energy Audits	ALSAFI, M. Z. NKHUM M. PERALTA	CARBON FOOTPRINT AND ENERGY CONSUMPTION OF GAMING DEVICES	Institute of Technology
10:00	Ecological Footprint and Energy Audits	MCAFFEE, K.	30 DAYS FOOTPRINT FREE	Fulton: G. Ray Bodley High School
10:15	Ecology and Climate Change	COSENTINO, L. C. DO A. GOMEZ	GARBAGE TO GOLD: COMPOSTING	Institute of Technology
10:30	Ecology and Climate Change	GEITNER, J. A. BILLION N. JOHNSON	LET'S TALK ABOUT THE CLIMATE CHANGE CONVERSATION	Fulton: G. Ray Bodley High School
10:45	Sustainable Food Production	CRONE, A. C. SHAMY S. WELCH	SOIL DEPTH RELATIVE TO PLANT GROWTH	East Syracuse-Minoa

Baker 146

Time	Topic Category	Student Name(s)	Project Title	School
9:15	Pollution and Remediation	NASH, C. E. AUWAERTER	HOW CLEAN ARE OUR LOCAL BODIES OF WATER?	Nottingham
9:30	Pollution and Remediation	BENNET, C. R. SALERNO	EUTROPHICATION OF LAKE NEATAWANTA WATER SHED	Fulton: G. Ray Bodley High School
9:45	Pollution and Remediation	HAJI, D. S. BHATTARAI J. WEAH	ENVIRONMENTAL AFFECTS ON PERFORMANCE	Nottingham
10:00	Pollution and Remediation	PAYNE, S. S. SHORT H. VINENT.F	AIR QUALITY STUDY AT INSTITUTE OF TECHNOLOGY	Institute of Technology
10:15	Pollution and Remediation	RUZEKOWICZ, J.	SPORT FISHERMAN TRASH COMPOSITION OF ONEIDA LAKE	Fulton: G. Ray Bodley High School
10:30	Pollution and Remediation	SHAFFER, J. M. SHUTE I. DOW	WILL THERE BE MORE PLASTIC IN THE OCEAN THAN FISH BY THE YEAR 2050?	Lafayette
10:45	Sustainable Food Production	BEAULIEU, E. J. FERRARI J. NEUBAUER	SUSTAINING PLANT LIFE IN A GREENHOUSE YEAR ROUND IN CENTRAL NEW YORK	East Syracuse-Minoa
11:00	Sustainable Food Production	CASTRELLO, M. K. KIRKGASSER E. ZELENZ	THE IMPLEMENTATION OF AQUAPONICS IN A SUSTAINABLY HEATED GREENHOUSE FOR YEAR ROUND FOOD PRODUCTION	East Syracuse-Minoa

PLATFORM PRESENTATIONS

Alternative Energy

CAUGHEY, J. and C. DIX — *Lafayette High School* **USING SOLAR POWER TO INCREASE THE EFFICIENCY OF LAFAYETTE HIGH SCHOOL, WHILE DECREASING THE AMOUNT OF FOSSIL FUEL EMISSIONS RELEASED AND OUR EFFECT ON GLOBAL WARMING.** Our project is about finding the ability of LaFayette Jr. / Sr. High school to be able to run on one hundred percent solar energy generated from school solar panels. This is important because it could forever change the way that, not only our school, but thousands around the world are powered. There are 98,817 schools in the United States alone and if each one was able to run on alternative energy, then the countries fossil fuel emissions would be cut down significantly. Our hypothesis was if we spend the next decade increasing the amount of solar energy used in our school by ten percent every year, then by the year 2028 our school will run on 100 percent solar energy. We determined the feasibility of our project by investigating the efficiency of solar panels, the cost of solar panels, and the amount of sun central New York receives annually. When we conducted our research we found that our original numbers in our hypothesis were skewed, as it is very unlikely that we could run our school on one hundred percent solar energy alone. Overall, our results were not consistent with our hypothesis, but there was one thing that was unaccounted for and it could alter the entire experiment which is an increase in technology. Between now and 2028, we could see a great increase in the technology used in solar panels which could result in this becoming a more feasible option for LaFayette. Our results show that solar energy could be an option for some bigger school with more money and a more conducive climate. This should give hope that we could significantly shrink the carbon footprint of our nation by switching energy in schools from more traditional methods over alternative energy, specifically solar energy.

CERLANEK, J.; A. CARAMANNA; L. GRABOWSKI and J. KOEHLER—*East Syracuse-Minoa High School* **ENERGY FROM WASTE: USE OF LEAVES AS A SOURCE OF RENEWABLE HEAT ENERGY** In this study, students developed a system to heat a greenhouse through the winter in the Village of Minoa. Leaves collected by the village were used to create a thirteen foot tall leaf pile. Heat was emitted by the leaf pile through the decomposition process, and was used to heat the soil of the greenhouse. The heat was transferred to the greenhouse by two controlled systems that were developed by the students. One system had two water tanks inside the leaf pile in which the water would be heated and then pumped to the greenhouse by pex tubing. Another system that was previously developed by students at East Syracuse Minoa Central High School also heated a section of the greenhouse. Overall, the systems used were successful and allowed plant growth throughout the winter months. The average soil temperature was roughly 4.5 degrees celsius (50 degrees fahrenheit) and the average temperature of the leaf pile was 51.7 degrees celsius (125 degrees fahrenheit). Students believe that growing food with a renewable resource in the winter months could be used on a larger scale.

Ecological Footprint and Energy Audits

ALSAFI, M.; Z. NKHUM and M. PERALTA —*Institute of Technology @ Central* **CARBON FOOTPRINT AND ENERGY CONSUMPTION OF GAMING DEVICES** People often wonder about which gaming device is most superior, however, most do not take into account the amount of energy consumed. As energy consumption increases, so does the impact on the environment, due to increased CO₂ production which contributes to climate change. We tested the hypothesis: Consoles with the power saving mode will use the least amount of energy having the smallest carbon footprint. We compared the energy consumption of gaming devices: PS4, Xbox One, Gaming PC, Xbox 360, & PS3 using a Watt Meter. Different variables were tested: phantom load, energy consumed, and energy consumed when consoles are under rest mode. The data was collected in kilowatts per hour and tested five times. The data indicated that the Xbox One and PS4 with the energy saving mode consumed the least amount of energy. This correlates to a lower impact on the environment with less CO₂ production. The Buying energy efficient devices such as the Xbox One or PS4, would allow consumers to save money, energy, and in turn save, the environment.. Devices that contain the energy saving option require less fossil fuels decreasing CO₂ emissions and have a reduced effect on climate change.

MCAFFEE, K—*Fulton: G. Ray Bodley High School* **30 DAYS FOOTPRINT FREE** I tested the concept of zero waste and analyzed the carbon footprint of an average family over a month. I think if people see how easy it is to make small changes over time, as a whole community we can have a huge impact. I think that is why it was important for my family and I to focus on what exactly we were going to change rather than go 100% immediately. While I really wanted us to succeed in reducing our trash production, I honestly believed we weren't going to be able to do it. I thought somehow we were going to end up producing more waste rather than less.

Ecology and Climate Change

COSENTINO, L.; C. DO and A. GOMEZ —*Institute of Technology @ Central* **GARBAGE TO GOLD: COMPOSTING** With the consumption of food increasing every year, more and more waste is being produced. Instead of throwing the waste into the trash we can reuse it for a greater purpose. Our research project focused on a way that we can reduce the amount of garbage, while simultaneously helping the environment. We tested if different carbon to nitrogen ratios would influence the efficiency of composting. Three composts were set up with different carbon to nitrogen ratios (0:25), (1:25), (2:25). Sawdust was added to a nitrogen rich working compost to obtain the ratios. We conducted two trials with the first one lasting ten days and the second one lasting two weeks. In both trials, the second bin resulted in the fastest decomposition rate. Our research indicates that the ratio of carbon to nitrogen influenced the efficiency of the rate of composting.

GEITNER, J.; A. BILLION and N. JOHNSON—*Fulton: G. Ray Bodley High School* **LET'S TALK ABOUT THE CLIMATE CHANGE CONVERSATION** Over the course of the past four months, the three of us created and conducted an online survey in order to demonstrate the influence of political connotations on the way we perceive our news. The survey helped to establish the effects that mainstream sources have on original, unbiased research; utilizing two reputable scientific sources, against six mainstream sources that either have right or left leanings. We conducted this survey in order to analyze the ways in which climate media is overshadowed by politically charged reports, along with how our participants select their news without the influence of the information's publisher. As we published the survey, we expected for the original study to be defined as a neutral source of information, while the articles with political leanings would be separated as biased and with limited credibility.

Pollution and Remediation

NASH, C. and E. AUWAERTER—*Nottingham High School* **HOW CLEAN ARE OUR LOCAL BODIES OF WATER?** Our project is looking to encompass water pollution within our County. This includes testing over half a dozen local lakes and bodies of water for Oxygen levels, Nitrogen, Phosphorus, and PH levels. We will then use our findings to conclude which local body of water is the cleanest in regards to these chemical aspects.

BENNET, C. and R. SALERNO—*Fulton: G. Ray Bodley High School* **EUTROPHICATION OF LAKE NEATAWANTA WATER SHED** We collected samples of water and soil from 50 different spots around lake Neatahwanta, in hopes of finding the differences between the west side and the east side of the lake. In the end we also hoped to correlate the amount of nitrogen or phosphorus, to the number that we gave the soil and water on the map. It was also very interesting to learn how our hometown lake was in the midst of being restored to how it used to be and that the lake isn't irregularly high in nitrogen and phosphorus.

HAJI, D.; S. BHATTARAI and J. WEAH —*Nottingham High School* **ENVIRONMENTAL AFFECTS ON PERFORMANCE** We are focusing on a specific school and littering from students affect the surrounding environment and the wildlife. April 22nd was earth day, we collected the data. We planned to see how much trash our school collects from the outside environment. We can walk around and observe where the trash is and how it hurts ecosystem.

PAYNE, S.; S. SHORT and H. VINENT—*Institute of Technology @ Central* **AIR QUALITY STUDY AT INSTITUTE OF TECHNOLOGY** We conducted an air quality study to determine the amount of particulate matter and living microbes that affect the air we breathe at ITC. These factors may contribute to health problems in our student body. We predicted that areas that consisted of the largest amounts of people would be of the lowest air quality. We tested to find living microbes by using nutrient agar being exposed to air and particulate matter by using a slide with vaseline in a petri dish. For both of the test, we placed petri dishes in selected rooms for 4 hours and exposed it to the air. Our study concluded that particulate matter was highest in the gym and lowest in nurse's office. After 48 hours of exposure to air, microbial growth was highest in the gym and cafeteria. This was consisted with our hypothesis, which stated that high traffic areas would have the lowest quality of air.

RUZEKOWICZ, J.—*Fulton: G. Ray Bodley High School* **SPORT FISHERMAN TRASH COMPOSITION OF ONEIDA LAKE** My project was a trash composition of Oneida Lake, primarily Big Bay. I analyzed the trash after collecting samples for an entire winter from the lake. I separated the trash into categories, such as biodegradable and non-biodegradable, to properly determine how much trash was being left annually by fishermen. From there I was able to make assumptions that allowed me to project this data onto fishing populations nationally. My primary motivation for this project was a concern for my local lake and the quality of the water I would ultimately be swimming and fishing in. I worried about the impacts fishermen were having and how culture played a role in the composition of the trash. From my research previous to the conducted sampling, I expected to find anywhere from 25% to 40% of the trash composed of tobacco related waste. I also anticipated a majority of the waste to be non-biodegradable and in some way game related. This meant that I assumed most of the trash would consist of bait containers and fishing line. I was certain that most of the trash would be, in some way, related to the culture of the fishing society.

SHAFFER, J.; M. SHUTE and I. DOW—*Lafayette High School* **WILL THERE BE MORE PLASTIC IN THE OCEAN THAN FISH BY THE YEAR 2050?** Will the amount of trash in the ocean outnumber the amount of fish in the ocean by the year 2050? This is the question that our project sought to answer. This question is important due to both the environmental aspects and how much humans rely on our oceans for food as well as other resources. We had expected to find that the amount of plastic entering the ocean would outnumber the amount of fish in the ocean by the year 2050. We felt this would be the case due to how much waste is generated by the world's population, and how much of that waste is thought to have entered the ocean. By processing the information gathered on both the amount of waste in the ocean and its projected growth as well as the amount of fish in the ocean and its projected growth. We placed this information in a linear equation (one for the fish and the other for the trash) and mapped the growth until the year 2050. Based on the calculations we performed, our results do not support our hypothesis and the amount of plastic in the ocean will not outnumber the fish in the ocean by the year 2050. Though our hypothesis was proven wrong, this still brings to light the amount of plastic entering the ocean. Though it will not outnumber the amount of fish in the ocean (based off of our calculations) plastic will continue to fill up the ocean unless something is done to limit the amount of plastic entering the ocean.

Sustainable Food Production

BEAULIEU, E.; J. FERRARI and J. NEUBAUER—*East Syracuse-Minoa High School* **SUSTAINING PLANT LIFE IN A GREENHOUSE YEAR ROUND IN CENTRAL NEW YORK** In this study, data was collected to determine if plants could be grown in a greenhouse year round in central New York. Students created a smaller greenhouse inside of a larger greenhouse for a double-layer effect. Both used a self sustaining heating system to keep plants thriving in a frigid, winter climate. The greenhouse was heated by a leaf pile and kept temperatures high enough for plant life during the winter. The growth of six different plants were studied from November of 2017 to May of 2018: emerald lettuce, spinach, shell peas, carrots, broccoli, and yellow squash. Each plant thrived and was able to be harvested except for the broccoli and yellow squash plants, which grew little to no sprouts. The average plant heights at the end of the data collection were between 30 and 45 cm. The light levels and temperatures of both air and soil were recorded as well to determine the effectiveness of the second layer of plastic. The temperature averaged at about 5°C (41°F) and the lack of light was not an issue whatsoever. These methods were tested with the idea of reducing global food miles by perfecting the greenhouse method and finding the cheapest and easiest way to grow food locally. This self-sustaining growth could be especially productive when implemented in low production environments in order to reduce hunger and starvation.

CASTRELLO, M.; K. KIRKGASSER and E. ZELENZ—*East Syracuse-Minoa High School* **THE IMPLEMENTATION OF AQUAPONICS IN A SUSTAINABLY HEATED GREENHOUSE FOR YEAR ROUND FOOD PRODUCTION** Freshwater usage and food security concerns led to development of an aquaponics system and a sustainably heated greenhouse. A small scale aquaponics system was planned, constructed, and observed over an 8 month period. Aquaponics is a combination of fish farming and growing plants in water rather than soil (hydroponics); the waste produced by aquatic life supplies the nutrients for the plants grown hydroponically. The plants in turn purify the recycled water for the fish. The system is a closed-loop and recognized as a sustainable method of agriculture. Two single loop systems were constructed inside of the DeSiato-Donovan Greenhouse located at the Cleanwater Education Research Facility at the Village of Minoa Wastewater Treatment Plant. Goldfish (*Carassius auratus*) were implemented into the systems. Lettuce and tomatoes were planted in grow media. The greenhouse is sustainably heated through the decomposition of leaves. Microbes break down leaf litter and the heat generated is carried through conductively heated tubing to heat the soil of the greenhouse. Water temperatures ranged from 10°C to 45°C throughout observations. Four weeks of plant growth was observed resulting in the potential for success of the systems in the future. Definitive conclusions of success could not be developed fully due to problems with system function arising and limitations in system interaction.

CRONE, A.; C. SHAMY and S. WELCH —*East Syracuse-Minoa High School* **SOIL DEPTH RELATIVE TO PLANT GROWTH** The goal of this study was to determine if a difference in soil depth would affect the growth of various plants in a heated greenhouse. Soil depth plays a key role because there was less soil to heat up the lower area, the soil tended to be on average hotter than the upper area. Overtime as plants began sprouting on 1/25/18, the two plants that were tested were the Spinach and Lettuce because of their abundance. Lux readings were also taken to determine if the light levels played a significant role in the growth of the plants. While in this scenario, the Spinach tended to grow best in the upper level, with an average height at 48.4 cm, while the lettuce averaged out at 34.9 cm in the same level. The height of the lower Spinach averaged at 41.2 cm while the lettuce height averaged at 29.0 cm tall. More testing would be beneficial to determine if this holds true with other vegetables. Given this study is an accurate representation of how plants would grow in this setting, the results can be used to further determine the proper soil depth of a greenhouse and further increase the potential output of a heated greenhouse.

POSTER PRESENTATIONS

Alternative Energy

HSER, M.; B. KING and A. NEGASH—*Nottingham High School* **THE SUSTAINABILITY BETWEEN NEWER HOUSES AND OLDER HOUSES** Our group is presenting our project on the sustainability between older houses and newer house. We're going to compare prices, the locations, appearance, national grid bill ,window quality, advanced framing, and energy source

ROSENBARKER, K.—*Fulton: G. Ray Bodley High School* **IS ETHANOL THE BEST OPTION?** I determined whether or not corn ethanol was the best biofuel to be used compared to alternative vegetation. I chose my alternative biofuel based on vegetation that is around New York. From there, I compared the EROI and nitrogen values of the three different types of biofuel: corn ethanol, algae biofuel, and switchgrass biofuel. My reason behind doing this experiment was to find a clean, efficient source of energy to be used for gasoline. Corn is used for both ethanol and as a food resource, so I wanted to see if an alternative vegetation could be used as a means of fuel instead of corn. I expected for corn ethanol to be the best biofuel to use due to how much it is used as an alternative source of energy. I was surprised to find corn ethanol has a much lower EROI than the alternative vegetation I compared it to.

Biodiversity and Natural History

COPELAND, D.; S. LLOYD and M. HUSSIEN—*Nottingham High School* **DEER POPULATION** The deer population in Upstate NY has been a major problem. In our final project we will be explaining how deer population effects the community. We will talk about how to improve or come up with a solution to reduce the deer population. By showing a graph we will show how many effects deer have on the environment. Over the past year a group at Nottingham High School has come together to discuss the problem involving the deer in the neighborhood.

KIRBY-WILLIAMS, A.; M. CHEREBIN and S. WILLIAMS—*Nottingham High School* **CAN YOU BELIEVE IT?** Bees are an essential part of human life, whether we acknowledge it or not. While bees go under appreciated and are slowly dying out; what would really happen if all bees went extinct? This project will look at what bees do for society, how they do it, and what would happen if they were to all disappear. Would other animals be able to pollinate the plants? Can we as human beings mimic the pollination process? Do we really need pollination for our vegetation to grow and prosper? These are the questions we will look at and try to answer in relation to bees.

WALOVEN, E.; A. SNYER and E. HILTON—*Fulton: G. Ray Bodley High School* **THE EFFECTS ON AGRICULTURE WASTE ON WATER DAPHNIA** The purpose of our experiment was to witness the effects of different pollutants that impact Lake Neatahwanta. A major problem in the lake is the increased harmful farm runoff and the growth of algae blooms. We wanted to see the effects of agricultural wastes on a small scale so we could understand the impacts they hold on our local lake. We used pesticides and fertilizers to witness the direct effects they can have on Daphnia, as well as the lake water to see how the conditions of the lake are affecting the environment.

We expected to find that the agricultural wastes (pesticides, fertilizers and lake water) would negatively impact the quality of the water in the beaker and that they would kill the Daphnia population in a much shorter time span.

Ecological Footprint and Energy Audits

CHAPLIN, M. and T. VALDES—*Institute of Technology @ Central* **THE COMPARISON OF STANDARD HOUSEHOLD APPLIANCES VIA ENERGY CONSUMPTION** My group conducted an energy audit to find out which household appliances use the most energy. Understanding how much energy these appliances use could be very useful because homeowners would know which appliances consume the most energy and be able to conserve energy with certain appliances over others. My group believed that refrigerators, washers and dryers would use more energy than things like TVs, modems, and routers. My group measured the kWh (kilowatts per hour) of each of these appliances five times, once with low usage and once with high usage. We found that the refrigerators and dryers did use more energy than the modems and routers. Our results were consistent with our hypothesis. Knowing this, there are some ways to conserve energy targeting these appliances. For washers and dryers you could buy more energy efficient ones. Some energy star appliances that would be more efficient are the GE energy efficient side by side refrigerators which save over 20% of energy over standard models. There is also the GE energy efficient front load washer which also saves over 20% of energy over standard models.

KOSTIV, V.; A. EVANS and T. ALBRO—*Lafayette High School* **MAKING THE SCHOOL MORE EFFICIENT** The purpose of our experiment was to see if we could make the lighting in our school 20% more efficient if we used a different form of light. We are looking at how much money our school could save on the electric bill if LED lights replaced the fluorescent lights. We counted the number of lights in our school and we determined the current wattage of the total lights in the school. We also calculated how much money we spend a month just on lighting the school by multiplying the kilo wattage the lights use up per month by the 15 cents per one hour per one light. We concluded that our school spends \$5,044.032 per month on only the lights, using our assumptions. Then, we determined the wattage of LED lights if they were placed in our school, which was half of the fluorescent lights kilo wattage. The LED lights turned out to be 50% more efficient than the current lights. Although LED lights are expensive, they would save us money in the long run. We also calculated how long it would take before we actually start to see some money return to us from our investment. It would take 20 months for our school to get out of the payback period from this investment. Our hypothesis was correct, in fact it would be 50% more efficient.

Ecology and Climate Change

HO, N.; M. PAR and A. ZOKARI—*Institute of Technology @ Central* **STINKBUGS, DO YOU HAVE?** The stinkbug, known as *halyomorpha halys*, is an invasive species originating from China. This pest is found in many homes in Central New York and is very difficult to get rid of.

The purpose of our study was to identify which areas of the central New York had the highest infestation of stinkbug and what factors favored their invasion. We hypothesized that there would be no difference in the location in which stinkbugs would be found. A survey was conducted to investigate which areas stink bugs favor along with potential factors that could cause them to enter homes more easily they showed that most of the people who had stink bugs lived near woods or had wood siding on their houses. Nineteen out of the thirty-two people who said they had stink bugs had wood siding and eight said they lived near woods. Our results showed that the majority of people who live in the suburbs had stinkbugs. The north and south sides of the city showed the highest concentration of stinkbugs. Due to the limited size of our survey, the results may have been skewed.

JEREZA, M.—*Rochester Academy Charter School* **DOES WATER TEMPERATURE AFFECT HURRICANE/TYPHOON STRENGTH?** Hurricanes and Tropical storms occur every year, causing moderate to severe damage throughout a large area. However, occasionally a hurricane can do much more damage than expected due to its strength and duration. Factors like the track of the hurricane and its point of origin may differ from one occurrence to the next, but hurricanes that are capable of causing severe damage may share common factors that contribute to strength and size. In this project, I analyzed different hurricanes that have occurred around the world and looked for common factors in an effort to understand hurricanes and develop a more fitting response to prevent possible deaths.

SHAMMA, Y. and M. YUSUF—*Nottingham High School* **WHAT DOES WASTE DO TO THE EARTH?** In our project, we are researching land pollution and we are exploring and analyzing the locations in Syracuse that are suffering from land pollution. Which includes the decline in the quality of earth's land surfaces.

WALLACE, N.—*Fulton: G. Ray Bodley High School* **WATER CRISIS: NOW OR LATER** Water Crisis from around the world were analyzed, specifically in the most scarce and the most plentiful locations. I chose this topic because I feel that this topic is merely grazed on the surface when we could dive deeper into these events that happen around the world. It was predicted that countries with impending water crisis were not preparing appropriately.

Pollution and Remediation

DAVIS, T.; S. POIRIER and A. ABDI —*Nottingham High School* **RAINWATER HARVESTING** The purpose of this research project is to find an alternative solution to obtain clean water. Many places in the world don't have access to clean water like the residents in Syracuse, NY do and are left with little to no clean water. Although we get our water from Skaneateles Lake, people choose to buy bottled water under assumptions that tap water is unhealthy. With the production of bottled water, the plastic gets transported to landfills, which results in air and water pollution. To counteract these problems, we proposed that rainwater harvesting is the best solution. This process collects rainwater and convert it into usable water for people to cook, eat, and do other things with.

FREITAG, B. and S. CLEETON—*Nottingham High School* **LITTER IN DIFFERENT INCOME AREAS** we will be comparing the "litter intensity" of two areas with about a 5000\$ difference in income rates. i expect there to be a slight difference but nothing too major. we will be figuring this out by most likely asking the people who live in the area.

JACKSON, K.—*Nottingham High School* **WATER QUALITY BASED ON CITY ZONING** The purpose of the research was to examine the water quality in open bodies of water around Syracuse, then determine whether or not the zoning of Syracuse has an effect water quality in those bodies of water. The researcher wanted to know whether or not there were more pollutants in areas of relatively high incomes compared to areas of low income. The researcher hypothesizes that the income of the people in the area and the location of the water on the zoning map will have an effect on the quality of water. Along with factors such as the environment around the body of water and the amount of activity. The researcher expects that in areas where the income is lower and has more public activity and business activity there will be an increase in the amount of pollutants. Samples of each of selected bodies of water will be compared and the researcher will see whether or not the hypothesis is correct.

JUSTINIANO, J.—*Rochester Academy Charter School* **NITRATE POLLUTION IN LAKE ONTARIO** Charlotte Beach is located in the northwest quadrant of the city on the shores of Lake Ontario. Located at 50 Beach Ave, Rochester NY 14612. Charlotte Beach is known for being famous for a century-old carousel, swimming, boating and rent-able shelters. It even offers swimming lessons but doesn't include the effects its water can have on human beings who know no better. Nutrients such as phosphate and nitrate are healthy for water, but an excessive amount can lead to serious harm especially the high amount of nitrate that is found in the waters. In this project, we analyzed the amount of nitrate at different locations of sites connected and on Lake Ontario which shows that the human activity contributes to high nitrate levels while non-point sources like Park fertilizer can also add to the high nitrate levels. We went personally to gather samples that shown us that the amount of nitrate is more elevated than EPA standards which leads to severe harm. We conducted our analysis on a nitrate probe with buffers of 1 mg/L as low standard and a high standard of 100 mg/l and each sample we tested three times. Throughout each test, we did a quality check with the buffers to make sure our data is accurate.

LOGUIDICE, M.—*Nottingham High School* **EFFECT OF POLLUTION ON THE LIVES OF ECOSYSTEMS IN THE OCEAN** I am going to focus on the effect of pollution and waste in the ocean on the lives of sea turtles and whales. In my presentation, I hope to show people the impact they make on the lives of these animals and list some ways they can reduce the rate of pollution entering the ocean.

NICHOLSON, E. and K. JONES—*Fulton: G. Ray Bodley High School* **RAIDER RECYCLING** Our project was on the effect of adding backboards to recycling bins. We created two groups (classrooms with backboards/ classrooms without backboards) and compared the data we collected from weekly recycling on Thursdays. We wanted do a project that involved the student body here at GRB and their tendencies when it comes to recycling. We also wanted to incorporate sports in some way as they are something that we both participate in year long. In planning our project we expected that the classrooms with backboards would have more recyclables in them because students would throw paper and cans into the bis in reenactment of a basketballs.

SCOTT, M.—*Nottingham High School* **STYROFOAM IN SCHOOLS** This study analyzes the effect of Styrofoam on the environment, the history of Styrofoam usage in schools, and plausible alternatives of Styrofoam. The researcher referenced their own school district to explore the budget of the food services department, recycling organizations including Onondaga County Resource Recovery Agency (OCRRRA), and schools throughout the nation that use alternatives to Styrofoam in their cafeterias. The purpose of this study is to raise awareness about the effect of Styrofoam on the environment and to advocate for realistic change within the researcher's school district.

STEVENS, A.—*Rochester Academy Charter School* **EFFECT OF CONSTRUCTION IN THE PH LEVEL OF WATER** A little-known issue to most people is the effects of high pH levels on animals that live in the water. Since most bodies of water that we drink from, are regulated and filtered we don't think much about how the water is naturally. The average pH of river water is usually around 6.5 and 8.5. If pH levels in water become highly alkaline, approximately 9.6, then the water can cause skin damage to a fish's gills, eyes, and skin and possibly death. Data was collected from a tributary in the Letchworth Park and Mount Morris area. Since this area is used a lot by people and the RG&E hydroelectric plant, it would be assumed that the water would be more on the basic spectrum. The data collected showed that the pH levels were basic, just not to the extreme where fish would be harmed.

WRIGHT, D. and K. RAWLINS—*Nottingham High School* **OCEAN POLLUTION** Indian Ocean being smaller than the Pacific and the Atlantic ocean but is the second most polluted. This ocean being very sufficient to the area involving much more traffic being a smaller area compared to larger oceans. Our group will investigate the amount of pollution within that ocean. Also examining the solutions that may arise when researching this topic

YEBOAH, P. and L. PINCKNEY —*Nottingham High School* **TESTING THE WATERS** For our project we are testing different brands of water. There are studies that have proved that there are a number of contaminants inside of these different brands of water. To do this project we will use seven different water brands and a water testing kit. We are doing this project because water is one of our main drinking sources and we want to make sure that what we're drinking is safe for our body and other's.

Sustainable Food Production

CLARKE, C.—*Fulton: G. Ray Bodley High School* **CAN I MAKE AQUAPONICS WORK?** For my project I tested the concept of an aquaponics system using fish waste. In order to test its effectiveness I created two systems one that used water from a fish tank and an identical system that drew water from a tank without fish. I controlled conditions by using the same pump aerator and grow light for each system. I hypothesized that the system that was connected to the fish tank would produce far better than the system connected to the water tank. The presence of excess ammonia from the fish ideally would have acted as fertilizer and helped to lettuces grow larger and in turn the lettuce plants would filter out the unwanted ammonia from the tank.

NOTES

Office of Experiential Learning and Outreach

217 Baker Lab

SUNY-ESF

1 Forestry Drive

Syracuse, NY 13210

Tel. 315-470-6811

Email: mhstefl@esf.edu

Website: <http://www.esf.edu/oelo>

**COLLEGE OF ENVIRONMENTAL
SCIENCE AND FORESTRY**

