Dowling College's

7th Annual Symposium on the

South Shore Estuary

Thursday May 29, 2003

Poster Session, Workshops, Symposium,
Art & Photography Exhibit,
Clam Bake and Canoeing
(weather permitting)

8:30 a.m. to 3:00 p.m

Fortunoff Hall

Sponsored by

Dowling College Department of Chemistry
(631) 244-3180

Dr. Lori Zaikowski, Symposium Founder and Coordinator,
Department Chair and Associate Professor of Chemistry

Dowling College Department of Earth and Marine Sciences
(631) 244-3394

Dr. John T. Tanacredi, Department Chair andProfessor
of Earth and Marine Sciences

Dowling College Field Biology Club
(Les Coureurs des Bois)

Audra Selvaggio, President
Gina Ortolani, Vice President
Suzanne Rochel, Treasurer
John Steigerwald, Secretary
William Capurso, Environmental Council Representative
Danielle Ridge, Past President
Dr. John Tanacredi and Dr. Lori Zaikowski, Faculty Advisors

Dowling College Environmental Council
(631) 244-3166

in cooperation with

New York State Department of State, Division of Coastal Resources
South Shore Estuary Program

Randy A. Daniels , Secretary of State

and

Aquatic Research and Environmental Assessment Center (AREAC)
Brooklyn College CUNY

Dr. Martin P. Schreibman , Director and Distinguished Professor of Biology

Poster Session, Workshops, Symposium
Art & Photography Exhibit

9:00 a.m. to 1:00 p.m., Fortunoff Hall

8:00 A.M	BREAKFAST AND REGISTRATION Conservatory
8:45A.M	JUDGES' ORIENTATION Kramer Science Center (KSC 102)
8:50 A.M. ~ 11:00 A.M.	TEACHER AND STUDENT WORKSHOPS Kramer Science Center (KSC)
9:00 A.M. ~ 1:00 P.M.	ENVIRONMENTAL SCIENCE POSTER SESSION Ceremonial Rooms
9:00 A.M. ~ 1:00 P.M.	ART & PHOTOGRAPHY EXHIBIT Foyer
11:15 A.M. ~ 12:45 P.M.	SYMPOSIUM PRESENTATIONS Ballroom
12:45 P.M. ~ 1:00 P.M.	AWARDS CEREMONY Ballroom
1:00 P.M. ~ 3:00 P.M.	CLAM BAKE AND CANOEING The Great Lawn & Connetquot River

EXHIBITORS

U.S. Geological Survey	Jack Monti and Shawn Fisher
Connetquot High School	Stefani Scott (teacher), South Shore Estuary and Wetlands Activity Book Stephen Dassler and Anne Lobdell (students)
Connetquot High School	Karen Christensen (Art teacher) and Jillian Coratti (student)
Dowling College	Dr. Lori Zaikowski (Photography)

ENVIRONMENTAL SCIENCE POSTER SESSION JUDGES

Chief Judges

Dr. Stephen J. Shafer, Professor of Biology and Natural Sciences, Dowling College

Philip Sheridan, Adjunct Senior Associate Professor of Biology, Dowling College

Dowling College Judges

Frank Castelli
Dr. John Craven
Charles Erlanger
Dr. Stephen Farenga
Dr. Kurt Fisher
Shawn Fisher
Patricia Gonzales
Dr. Raymond Grinnell
Dr. Janet Haff
Dr. Beverly Joyce
Jessica Miller
Dr. Daniel Ness
Dr. Clyde Payne
Natalie Pedisich
Dawn Pierpoint
Patricia Sandilands
Dr. Stephen Shafer
Dr. Phil Sheridan

Guest Judges

Inshan Ali
Saint Francis College
Dr. Kwesi Amoa
Medgar Evers College
Michael S. Bilecki
Fire Island National Seashore
Alice Cialella
Brookhaven National Laboratory
Dr. Cleveland Dodge
Brookhaven National Laboratory
Patrick Dooley
New York Sea Grant
Candice Fraser
Saint Francis College
Dr. Timothy Green
Brookhaven National Laboratory
Dr. Andy Greller
Queens College
Steve Henderson
Fire Island National Seashore
Jennifer Higbie
Brookhaven National Laboratory
Lenny L. Lampel
Seatuck Environmental Association
Richard Levy
Brooklyn College
Jack Mario
Suffolk County Department of Health
Dennis Mildner
NY State Department of State,
Division of Coastal Resources
Jack Monti
U.S. Geological Survey
Fred Mushacke
NY State Dept. of Environmental
Conservation
Enrico G. Nardone
Seatuck Environmental Association
Dr. Kathy Nolan
Saint Francis College
Dr. Robert Nuzzi
Suffolk County Department of Health
Gregg Rivara
Cornell Cooperative Extension
Mala Subran
Saint Francis College
Barry Sullivan
Fire Island National Seashore
Chester Zarnoch
Brooklyn College

STUDENT AND TEACHER WORKSHOPS

WORKSHOP PRESENTERS

Michael Bannon	Assistant Professor of Chemistry, Dowling College
John Black	Center for Community Research, Suffolk Community College
Veronica Kemler	Citizens Environmental Research Institute
Dr. Paul Lichtman	Uniondale High School Research Teacher
Stefani Scott	Connetquot High School Science Teacher
Dr. John Tanacredi	Professor of Earth and Marine Sciences, Dowling College
Dr. Richard Wilkens	Assistant Professor of Biology, Dowling College

STUDENT WORKSHOP LOCATIONS (KSC is Kramer Science Center)

Room	Session	Topic	Presenter
Dock	A	Biological & Chemical Sampling	John Black
KSC 201	B	Biological & Chemical Analysis	Michael Bannon
KSC 021	C	Coral Reef & Horseshoe Crabs	Dr. John Tanacredi
KSC 207	D	Sea Urchins	Dr. Richard Wilkens

STUDENT WORKSHOP SCHEDULE (According to assigned groups. See above for locations.)

Time	Group #1	Group #2	Group #3
8:50	A	C	D
9:30	B	A	C
10:00	D	B	A
10:30	C	D	B

TEACHER WORKSHOP SCHEDULE AND LOCATIONS

Time	Room	Topic	Presenter
8:50	KSC 201	Data Collection Using Probes	Michael Bannon
9:30	KSC 206	H.S. Environmental Research and South Shore Estuary Watch	Dr. Paul Lichtman Veronica Kemler
10:00	KSC 021	Marine Invertebrates as Research Tools	Dr. John Tanacredi
10:30	KSC 206	Pollution Prevention in Schools and South Shore Estuary and Wetlands Student Activities	Veronica Kemler Stefani Scott

SYMPOSIUM PRESENTATIONS

Time	Title	Presenter
11:15	Welcome	Dr. Albert E. Donor President, Dowling College
11:20	Preserving the Seas with C.E.E.S.	Legislator Ginny Fields Suffolk County Legislator, 9th District
11:30	What is the SSER, Anyway?	Jeff Fullmer Director, South Shore Estuary Reserve Office
11:40	A Shellfish Grows in Brooklyn	Chester Zarnoch Aquatic Research and Environmental Assessment Center (AREAC), Brooklyn College and Dowling College
12:00	Coastal Nocturnal Wildlife: It's Not All Night-life, You Know	Rusty Johnson Author, Twilight of the Wild
12:20	When is Pollution Really Pollution?	Dr. Anita R. Freudenthal Retired Chief of Marine Ecology Nassau County Department of Health
12:45	3rd Annual Outstanding Educator Award to Philip Sheridan	Dr. Stephen J. Shafer Professor of Biology
12:50	H.S. Poster Session Award Ceremony	Dr. Lori Zaikowski Symposium Coordinator and Chemistry Dept. Chair

PHILIP SHERIDAN

2003 Outstanding Educator Award

The Third Annual Award for Outstanding Educator is presented on May 29, 2003 at the 7th Annual Dowling College Environmental Symposium on the South Shore Estuary. The award goes to Philip Sheridan, an individual who has been stimulating and improving the minds of students for almost forty years. Philip Sheridan has had a profound effect on the lives of his students as a result of his caring and deep involvement in their academic development.

He graduated with a B.A. in biology and minor in chemistry from West Virginia University. He then went on to obtain a Master's degree in Biology from West Virginia University as well. The main goal in Philip Sheridan's life was to be a teacher, and he began as a teaching assistant at West Virginia University. After he received his Master's degree, he was offered a job at Patchogue-Medford High School. Philip Sheridan taught at the high school for 35 years, until his retirement in 2001. He made significant contributions to the biology program at the high school. He developed and taught a number of specialized mini courses in ecology, bacteriology, micro-techniques, research science and others. He became involved in the Patchogue-Medford Gifted and Talented Program. He supervised many student teachers. He published a number of articles in the American Biology Teacher.

As a result of his dedication and excellence in the classroom, Philip Sheridan was a recipient of the Lift/Ritec Award for Excellence in Science Teaching. He has also been nominated for the Presidential Awards for Excellence in Science and Mathematics Teaching for New York State.

Philip's involvement with student research projects has also earned him some additional honors. Twice, he was a recipient of a Certificate of Honor for Meritorious Work with Science Students by the Westinghouse Science Scholarships and Awards organization. As a long standing member of the Long Island Science Congress, he has been and still is very much involved in judging student research projects at their Science Fairs. Recently, Philip Sheridan was a recipient of the New York State Science and Engineering Fair's Lifetime Achievement in Pre-College Science Research award.

Twenty five years ago, I hired Philip Sheridan as an Adjunct Assistant Professor of Biology here at Dowling College, and he continues to make significant contributions to the College up to this very day. It is one of the few decisions I have made in life for which I am very proud. Philip's outstanding performance in and out of the classroom has earned him two promotions, and in 2001 he received Dowling College's "Personal Recognition in Demonstrating Excellence" award.

Philip Sheridan is the consummate teacher, a role model for any of you who wish to go into teaching. Caring, dedicated, involved and loving his work, there is not much else one can say about this year's recipient of the outstanding educator's award. I therefore take great pleasure and pride in presenting the Third Annual Outstanding Educator Award to Philip Sheridan.

Stephen J. Shafer, Ph.D
Professor of Biology and Natural Sciences

Environmental Science Poster Session Participants

GREAT NECK NORTH HIGH SCHOOL ~ Research Advisor: Mr. Schorn

1. Marnie Rosenblatt.
   Ethological Responses of Uca pugnax as a Biomonitor When Exposed to Natural Pyrethrums in Chrysanthemum cinerariaefolium and Synthetic Pyrethroids

GREAT NECK NORTH HIGH SCHOOL ~ Research Advisor: Mr. Elkins

2. Yasmin Rozwadowski.
   The Effect of Cigarette Residue on the Growth of Grass

GREAT NECK SOUTH HIGH SCHOOL ~ Research Advisor: Dr. Carol Hersch

3. Daniel Alterbaum and Jonathan Gale.
   An Examination of the Potential Consequences of Organic and Synthetic Herbicides on Freshwater Algae

SACHEM HIGH SCHOOL, NORTH ~ Research Advisor: Dr. Michael Vaccariello

4. Will Hui.
   Analysis of Scrub Oak Galls in the Long Island Pine Barrens

5. Erin Lowry.
   An Ecological Analysis of Cryptobiotic Crust Growing in the Long Island Pine Barrens

6. Maria Michta.
   Radio Detection of Meteors.

7. Roger Nussbaum and Andrew Fox.
   The Effects of Porous Artificial Flight Barriers and Plant Architecture on Insects Visiting Quercus ilicifolia

SACHEM HIGH SCHOOL, SOUTH ~ Research Advisors: Mrs. Aimee Blumberg,, Mr. Richard Lemke, Dr. Michael Vaccariello

8. Amanda Brosnan.
   Do different slopes of Frost Gully contain different levels of pH, which cause different organisms to habitat the soil?

9. Samantha Cameron and Michael Forman.
   Pond Pollutants

10. Carolyn Gomes.
    Do the Nitrate, Phosphate or pH levels on the North Shore of Long Island Differ Through Urbanization?

11. Christopher Horvath.
    Analysis of Insect Flight Patterns in the Long Island Pine Barrens

12. Hira Muzammal.
    Effects of Different pH Solutions on Brassica rapa Plants

13. Corey Nolan.
    The Effect of Magnetized Water on Plant Growth

14. Matthew Pavlis.
    The Effects of Giberellic Acid on the Germination and Flowering of Brassica rapa

15. Kim Wodiska and Sally Mathew.
    Ultra~Elimination of Bacteria

16. Sornanong Yaibuathes and Olivia Long.
    Legume~Rhizobium Symbiosis

SAYVILLE HIGH SCHOOL ~ Research Advisors: Adriana Adler, Maria Brown, Janet Kazmerack, Brian Vorwald.

17. Katie Banaszak and Bijal Desai.
    The Health of Green's Creek, West Sayville, New York

18. Dan Capurso.
North American Migratory Routes: Pathways for West Nile Encephalitis

19. Brian Dulmolvis, Tom Koentje and Joseph White.
Depositional and Erosional Features Related to an Artificial Structure

20. Lori Hennemeier.
Chemical and Biological Comparisons of Seasonal Fluctuations of Residential and Nonresidential Water Bodies of the Central Pine Barrens of Eastern Long Island

21. Tovah Markowitz.
Are Salmonella From Turtles Really Salmonella?

22. Robert Paul and Roy Vespoor.
The Effects of Obstructions on Dissolved Oxygen Levels at Green Creek, West Sayville, New York.

SCHREIBER HIGH SCHOOL – Research Advisor: Mrs. Phyllis Serfaty

23. Pamela Arnett.
The Effects of Gibberellic Acid 3 on Growth and Development of the Landsberg erecta Arabidopsis thaliana

24. Adrienne Barasch and Melanie Maiman.
The Phases of Outdoor Construction and Their Effect on Particulate Matter Levels in Indoor Air

25. Dan Braman.
The Effect of Iron on the Growth of Chlorella sphaerica

26. Greg Hiller.
Determining the Optimal Conditions for the Thermal Depolymerization of Organic Waste

27. Maiko Kume.
The Utilization of pH as an External Control on Polhydroxybutyrate Production in Recombinant Escherichia coli

28. Steven Otterman.
The Efficacy of 2-Thienyl-4, 5-Difurylimidazole as a Photopesticide

29. Adam Silbert.
The Effect of Ultraviolet Radiation (UVB) on the lifespan of Caenorhabditis elegans

30. Hillary Wool.
The Effect of Di-(2-ethylhexyl Phthalate on Maturation and Longevity in Drosophila melanogaster

SMITHTOWN HIGH SCHOOL - Research Advisosr: Mrs. ElaineChampey, Mr. S. Ogonowski, Ms. Schneller, Mrs. Solomon

31. Matthew Cons, J. Maxwell Gutman, and Charles Macanka.
The Effect of Deer Browse on Forest Structure in the Upton Reserve at Brookhaven National Lab

32. Megan Farley.
Analysis of Dwarfism of Pinus rigida in the Dwarf Pine Barrens of Westhampton Beach, Long Island

33. Kate Gromatsky.
What Causes Acidity in Our Streams?

34. Victoria Koke.
Is Bluff Erosion on Long Island Contributing to the Shrinking of Long Island

35. Christiana Marullo and Traci Novak.
Is Chlorine a Factor in the Cause of Breast Cancer?

36. Joe Pawluk.
Analysis of Nitrate Levels of Long Island

37. Jonathan Ravin.
Landfills: Are They Hazardous?

38. Elicia Selvaggio.
The Design and Development of an Apparatus and Method to Quantify Rooted Submergent Vegetation

39. Lauren Anne Sosulski.
Disturbance and Succession in the Long Island Pine Barrens: The Ecological Role of Arctostaphylos Uva-ursi

40. Erica Thogersen and Rebecca Berger.
Nitrate Levels in Local Wells

41. Shawna Tonick and Christina Poggioli.
The Effect of Local Urbanization on the Acidity (pH) of Precipitation

42. Jake Woloschin and Matthew Schapiro.
The Effect of Precipitation on the Nissequogue River

SOUTH SIDE HIGH SCHOOL – Research Advisor: Mr. Richard Kurtz

43. David Randell.
Free Choice Turning and Turn Alternation in Different Species of Isopods

44. Philip-Edouard Shay.
The Use of German cockroach (Blattella germanica) pheromone extracts as a lure to a chosen food source

UNIONDALE HIGH SCHOOL – Research Advisor: Dr. Paul Lichtman

45. Tatiana Antoine.
Analysis of Interspecific Variation in Plant Growth Responses to Nitrogen

46. Erica Buddington.
The Green Generation

47. Melissa Budhoo and Leslie – Ann Fletcher.
Seedling Emergence vs. Soilborne Pathogens

48. Janalee Campbell.
THE GREEN MACHINE!!: A New Method For Hydrogen Production from Chlamydomonas reinhardtii

49. Carol Anne Celestine and Tersha Griffith.
Entering the Rhizosphere: How Beneficial are Mycorrhizal Interactions?

50. Jordan Crafton.
The Truth About EMF: A Novel Method to Determine Species Mortality in the Presence of Electromagnetic Radiation

51. Malcolm Edwards and Ackley John.
The Long and Short of It: A Study on Plant Stem Elongation

52. Rhonda Gomez.
The Effects of Ethyl-Alcohol on Drosophila melanogaster

53. Aquiera Halsey and Aisha Phillip.
Feeling the Pressure: Plant Growth in Microgravity

54. Macha Jean Pierre and Brian Chavez.
Will There Be Clean Water For Our Children?: A Modern Way To Alleviate Salt Water Intrusion

55. Catherine Mariduena and Kricel Francis.
Arbuscular Mycorrhiza on Root- Organ Cultures

56. Tatianna Mott.
Food Fights: Effects of Hunger Level and Body Size on the Aggressiveness Over Food in Acheta domesticus

57. Gandhy Pierre-Louis.
A Neighborhood War: A Unique Approach to Plant Species Competition via Allelopathy

58. Khaivchandra Ramjeawan.
ALL IN THE FAMILY: Using Phylogenetic Systematics to Develop a Family of Arsenic Hyperaccumulators

59. Paul Richards and Rishaun English.
The Effect of Two Commercial Surfactants on Water ~ Repellent Soil

60. Diana Ruano.
Greener Than Green: A Novel Approach to the Use of Natural Substances as Plant Growth Regulators in the Family Poaceae

61. Gopaul Singh.
Empirical Evidence For Predator~Prey Source~Sink Dynamics

WEST ISLIP HIGH SCHOOL ~ Research Advisor: Mr. Robert B. Purdy.

62. Caiti Caputo.
The Effects of Metallic Solutions on Oat Plants.

63. Brooke Engeldrum.
Local Effects of Coral Reef Succession on Ocean Water Chemistry.

64. Peter Hurley.
Effects of Different Types of Water on the Growth of Brassica rapa.

65. Jon McManus.
The Effects of Dissolved Inorganic Nitrogen on Microspora galbama and Botrydiopsis turneri.

66. Matthew Milligan.
The Effects of Ultra Violet Light on Amphidinium carterae.

67. Katharine Olsen.
Water Quality Study of the Connetquot River Estuary System.

68. Michael Ruscito and Lindsay Paladino.
The Effect of Nitrates and Phosphates on Cambarus Sp.

High School Poster Competition Abstracts

Great Neck North High School

1. Marnie Rosenblatt. Ethological Responses of Uca pugnax as a Biomonitor When Exposed to Natural Pyrethrums in Chrysanthemum cinerariaefolium and Synthetic Pyrethroids

Threats of the West Nile Virus compelled the spraying of insecticides, like Anvil 10+10 (10% sumithrin, 10% Piperonyl Butoxide). Pyrethroids found in Anvil 10+10 are synthetic analogues to the natural pyrethrins produced by Chrysanthemum cinerariaefolium. By observing Uca pugnax's ethological responses to natural pyrethrins and synthetic pyrethroids, the salt marsh fiddler crab's ability as a biomonitor to indicate the presence of harmful chemicals could be determined. Phase I, conducted at an aquarium, utilized 36 fiddler crabs that were exposed to the control plant, Impatiens wallerana, and 36 fiddler crabs in the experimental group were exposed to Chrysanthemum cinerariaefolium. Chela waving, foraging, pellet removal, standing, agonistic behavior, entering the water and wandering were recorded a week prior to and after exposure to the plants. In Phase II, 36 male and 4 female Uca pugnax in an experimental tank, and 27 male and 3 female Uca pugnax in a control tank were observed for the seven ethological behaviors for a week, and fed a glucose, Tetra fish food, and saltwater mixture. The Spectracide® Flea and Tick Spray (0.06% pyrethrin, 0.60% Piperonyl Butoxide, 99.34% inert ingredients) was sprayed twice into the experimental group's mixture. In Phase I, Uca pugnax exposed to the Chrysanthemum cinerariaefolium had statistically significant altered behavior. In Phase II, the fiddler crabs experienced a substantial decrease in life functions. Uca pugnax function as the canaries of the salt marsh signaling the presence of toxic pesticides in the environment.

Great Neck North High School

2. Yasmin Rozwadowski. The Effect Of Cigarette Residue On The Growth Of Grass

Cigarettes are constantly being thrown down after they are finished being smoked. There are more than 4,000 chemicals in cigarette tobacco, and there are 43 known carcinogens. The chemical processes occurring at the lit part of the cigarette create even more poisonous chemicals. Cigarette smoke contains 150 billion particles per cubic inch. When the cigarettes butts are tossed, these harmful chemicals have the potential to be transported throughout various habitats of living organisms. Cigarette litter is constantly affecting plants. This experiment sought to determine the effects of cigarette residue on the growth of grass. Trial one tested the effect of cigarettes on the growth of grass, and trial two, to further the experiment, tested the effect of cellulose on the growth of grass. Cellulose makes up 7.4% of the cigarette papers, which may be tossed on the ground. There were six trays of soil of the same size used in both of the studies. Each tray received approximately an inch and a half of soil. There were three kinds of grass seeds used: rye, sun, and shade. Two trays were allocated to each type of seed and one of the trays was used for the experimental group and the other for the control. The three experimental trays received six grams of cigarette butts and one gram of ash, and they only differed in which seeds were placed. The other set of six trays received cellulose solutions in the experimental trays. All the trays were watered with 500 ml and were kept in the same conditions. The heights of the grass were recorded on the final day of the experiment and were statistically analyzed using a T-Test. Both sets of data, when analyzing the total mean of the control and the experimental group, were statistically significant. This suggests that the chemical pollutants people litter with may inhibit the growth of grass.

Great Neck South High School

3. Daniel Alterbaum and Jonathan Gale. An Examination of the Potential Consequences of Organic and Synthetic Herbicides on Freshwater Algae

The primary goal of this experiment was to compare the environmental impact of synthetic herbicides to organic herbicides. The synthetic herbicides used were Roundup and Weed-B-Gon, which have the active ingredients, Glyphosate and 2,4-Dichlorophenoxyacetic acid, respectively. These herbicides were compared to the commonplace organic herbicide Burnout, which depends upon the action of vinegar (acetic acid) and naturally occurring acids. During experimentation, the range of use for these herbicides was between two microliters and fifty microliters of the stock solution per fifty-milliliter culture (2 PPM to 40 PPM). In order to determine the ecological impact of these herbicides, the commonly found algae, Chlorella, was exposed to these chemicals in varying concentrations. Based on previous research, the hypothesis formulated for this experiment was that the organic herbicides would have a less injurious impact upon the environment than would the synthetic herbicides. In addition, we expected to confirm our results from our experimentation in the previous school year, in which we determined that 2,4-D had a more ruinous impact on the environment than did Glyphosate.

In conducting this experiment, a uniform stock culture of Chlorella was grown in the growth medium Alga-Gro (from Carolina Biological). Five milliliters of this stock culture were inoculated into several flasks along with 45 milliliters of Alga-Gro, and were kept on an orbital shaker set at ninety rotations per minute. Furthermore, experimental cultures were treated with varying concentrations of the aforementioned herbicides (up to 40 PPM). Over the course of the experimental period, a spectrophotometer was used to measure light absorption through culture samples, since increases in light absorption correlate to increases in algal population size. Measurements from the spectrophotometer provided relativistic growth rates. To guarantee the efficacy of the herbicides, all three were tested on sunflower plants, ultimately killing the treated cultures. Recorded results for the algae portion of the experiment confirmed the above hypotheses, as shown by observed growth rates.

Sachem High School, North

4. Will Hui. Analysis of Scrub Oak Galls in the Long Island Pine Barrens

The problem investigated was the spatial distribution of galls in Scrub Oaks in the Long Island Pine Barrens. It was hypothesized that there would be more galls in the scrub oaks in the Dwarf Pine area than there would be in the Burn Zone area of the Long Island Pine Barrens. The reason for this prediction was that the Burn Zone barely has any pine trees to help protect the gall making insects or galls from natural predators such as birds, insects, beetles, and other parasitic insects. The materials used were galls, plastic bags, paper bags, marker, measuring tape, spinner, alcohol, plastic containers, caliper, ruler, string, probe, razor blade, garden shears, watch and a microscope. The method used included a spinner to find a permanent location in the Dwarf Pines and Burn Zone, and for random sampling. The results of the experiment showed that there were a more consistent number of galls in the Dwarf Pines than in the Burn Zone. The galls located in the Dwarf Pines had an average frequency of 3.92 in each Scrub Oak and a standard deviation of +/- 2.22. The galls in the Burn Zone were scattered with a standard deviation of +/- 3.67 and an average frequency of 3.75 in each Scrub Oak.

5. Erin Lowry. An Ecological Analysis of Cryptobiotic Crust Growing in the Long Island Pine Barrens

The Long Island Pine Barrens is the water recharge area for the Long Island aquifer system, and the island's last non-urbanized recharge zone, essential for purified water. In the Long Island Pine Barrens, a structure similar in appearance to cryptobiotic crusts of western deserts was found. Cryptobiotic crust contains a combination of cyanobacteria, lichens, mosses, and algae that creates a complex structure in sandy soils. Often found in arid environments, cryptobiotic crust serves many ecological roles such as retaining moisture, reducing the effects of wind, preventing erosion, and producing nitrogen. The cryptobiotic crust found seemed to be associated with the Sunrise Fire that occurred in 1995. Though superficially similar in appearance to burn residue, the crust proved to be moist, spongy, and pliable. After microscopic analysis, I confirmed that the crust was indeed cryptobiotic. The presence of a cyanobacterium, Microcoleus vaginatus was identified. The crust covered a great area of the Burn Zone of the Pine Barrens. Through observation it appeared that there was a relationship between the growth of the crust in differing elevations and canopies. In the area of lower elevation the crust produced more vegetation in comparison to the higher elevation. The greater presence of vegetation in this depressed region was most likely due to runoff that produced a greater amount of moisture for the crust absorbed, thus enabling more lichens and mosses to grow. The crust was more extensive in areas of open canopies as compared to areas of closed canopies. However, in the closed canopy the crust yielded more lichen and moss growth due to the reduced effects of transpiration caused by the shaded region. Physical tests that included a depth test, water retention test, and erosion test were later taken to develop a better understanding of the impact the crust has on the environment upon its growth. It was found that the crust significantly prevented erosion, created an environment conducive for other plant and lichen growth, and retained a considerable amount of water. The crust retained more moisture than its surrounding sand deposits. This increased moisture aided the growth of surrounding flora. The presence of saplings in the crust suggested that cryptobiotic crust provides the necessary source of nutrients and water that are needed for successful seed germination and plant growth. The importance of water retention affecting flora was especially noted in the overwhelming presence of scrub oak (Quercus ilicifolia) in the Burn Zone, compared to other areas of the Pine Barrens, thus demonstrating that cryptobiotic crust may be significant to the Long Island Pine Barrens with respect to ecological succession

6. Maria Michta. Radio Detection of Meteors.

The potential for meteorite impacts to cause widespread environmental devastation necessitates the development of reliable and accurate means of meteor detection. In this investigation, meteors were detected by use of a radio. The maximum hourly rate and approximate average velocity of meteors from several showers (2001 and 2002) were determined as the ionized trail produced by the meteors reflected the radio waves of a distant radio station that was below the horizon, and this in turn created a "ping" which could then be analyzed. A three-element Yagi antenna was designed and hooked up to a single side band radio receiver set on 83.26 MHz (channel six video carrier-frequency), and this single side band mode will produce a tone (Doppler shifted around 750 Hz) when the ping is received. The output of the radio was hooked up to a PC's audio input to provide long-term recording to its hard drive. The recorded audio was then analyzed (for velocity data) using the programs: Spectrogram and Cool Edit. The Spectrogram Program was used to view and monitor the Doppler shifted return signals (pings), which were recorded as wave files. The Cool Edit Program provided an accurate means of measuring the period of the oscillations associated with these pings, which were used to calculate the velocity of the meteors. A custom Windows based program, used during data reduction, utilized a Fast Fourier Transform (FFT) to find and count these meteor pings. The count and velocity data were compared to the International Meteor Organization (IMO) data. All of the recorded velocities fell within one standard deviation of the IMO published data. The technique of radio detection of meteors proved successful in finding the zenith hourly rate and velocities, and is much better than visual methods when the skies are overcast or if maximums fall during daylight hours.

7. Roger Nussbaum and Andrew Fox. The Effects of Porous Artificial Flight Barriers and Plant Architecture on Insects Visiting Quercus ilicifolia

This work investigated two areas, separated into two experiments: 1) the effects artificially constructed barriers have on insects visiting Quercus ilicifolia (Scrub Oak) bushes and 2) the flight patterns of insects visiting Q. ilicifolia. It was hypothesized that small openings between leaves, or the presence of artificial barriers will deter insects from visiting the inner layers of the Q. ilicifolia bush; and when flying insects approach a Q. ilicifolia bush, it will perceive it as a black, impenetrable ball. The first experiment was designed to analyze three Q. ilicifolia bushes. Each bush was split into three zones (experimental, first control, second control). Varying mesh sizes were suspended in the experimental zones to act as flight barriers. The second experiment was designed to observe insects as they flew in and around Q. ilicifolia bushes. Every type of insect behavior observed was classified, and a tally was kept as to how many insects were observed for each behavior. After analyzing the data, it was concluded that insects are sensitive to the presence of the barriers and up to a point (approximately 2.5cm) the size of the openings is largely unimportant. In addition, the data supported the hypothesis that insects perceive objects as an impermeable black ball.

Sachem High School, South

8. Amanda Brosnan. Do different slopes of Frost Gully contain different pH levels, which cause different organisms to habitat the soil?

Do different slopes of Frost Gully (a gully located in the Long Pine Barrens of West Hampton) contain different levels of pH, which cause different organisms to habitat the soil? I hypothesized that the pH levels would be approximately the same allowing comparable species to exist in each sample since all the gully's slopes are subjected to the same environmental elements and similar plant species on all slopes. I observed and recorded the difference in pH levels using Gardeners Guide Soil Acidity Test as well as using the Winogradsky Column Test to identify the organisms that inhabits the soil. In Frost Gully I picked a starting point for the first transaction using a spinner. I then took one topsoil sample followed by a bottom/subsoil sample, which should be taken about six inches down (due to the maturity of the soil). Then every ten feet follow the transaction and take another soil sample, repeated until the top of the gully hah been reached. Depending on the length of the slope, approximately 18 samples per slope were taken. After all samples had been collected, they were left out to dry and then were tested for their pH levels. I then used the Winogradsky Column Test to identify the organisms. I found that most subsoil's contained alga, protozoa, sulfur-oxidizing bacteria and cyanobacteria. Plus the topsoil contained floating soil and white foam indicating some sort of unidentified bacteria. In conclusion all slopes had variations in their pH levels. In two out of four slopes, topsoil samples taken from the bottom of the gully were more acidic than the bottom/subsoil soil samples and this remained throughout the slope. This therefore proved that my hypothesis was wrong

9. Samantha Cameron and Michael Forman. Pond Pollutants

The problem of our experiment was to find out which parts of the Gatelot School Pond were most populated with pollutants and bacteria. Also we wanted to find put which types of pollutants were found in the water. We hypothesized that the center of the pond would be the most populated with pollutants. We started our experiment first by collecting the samples from the pond. Once we did this we began our testing. We tested for pollutants such as nitrate, phosphorous, ammonia nitrogen, chromium, chlorine, copper, cyanide, iron, and the pH level. Once we got our results we put the data into graphs and charts. We then took samples of the water to see if we had any bacteria in the pond water. After the bacteria were incubated for about 48 hours we took the petri dish out and took pictures under the microscope. Our results proved our hypothesis. Although the pollutants were found scattered around the pond, the most populated, where we found a high percentage of pollutants, was in the center.

10. Carolyn Gomes. Do the Nitrate, Phosphate or pH levels on the North Shore of Long Island Differ Through Urbanization?

The problem being investigated was, "Do the Nitrate, phosphate, and pH levels differ through urbanization?" The levels I will be testing are nitrate, phosphate, and pH levels. Nitrates are univalent radicals or compounds such as salt or an ester of nitric acid that contains the radical NO3. A phosphate is any salt or ester formed by the reaction of a metal, alcohol, or other radical with phosphoric acid. Lastly, pH is the acidity of any given substance, in this case water. I will go to my three locations; Cold Spring Harbor and Long Island Sound and take three sites from each location (A-F). The materials I will be using include a phosphate kit, nitrate kit, pH strips, 6 8-ounce bottles, a mop stick, 2 foam cups, hot glue and my log. First the mop stick and foams cups were glued together to make a contraption that would allow me to collect the water samples away from the shore. One liter from every site was collected. First the pH was taken, then the phosphate levels were taken. All of the instructions had to be carefully follow to ensure accurate results. Following the phosphate testing was the Nitrate testing. Once again all instructions were followed to ensure accuracy. It was found that urbanization does affect the pH, phosphate and nitrate levels of the water. The closer that the sites were to urbanization, the higher all levels were recorded. Precipitation also played in a role in the high levels. The more precipitation there was the higher pH level the water had and there was a higher concentration of phosphates and nitrates in the water. In conclusion the hypothesis was proven correct. Urbanization does affect the water of North Shore Long Island. It was also found that precipitation had the same affect, making the samples higher in phosphate/nitrate content and result with higher pH levels.

11. Christopher Horvath. Analysis of Insect Flight Patterns in the Long Island Pine Barrens

In my project, I wanted to see if insects have a specific flight pattern in the Long Island Pine Barrens. The specific location contained an open area surrounded by a dense forest in the Long Island Pine Barrens. My main goal was to compare the difference of insect flight between the dense and open area using my IPTS (Insect Pattern Tracking System). The reason why I chose the Long Island Dwarf Pine Barrens is because it is a globally unique area that can only be found in 6 or 7 areas in the world. The dwarf pine area of the LI Pine Barrens was the area I chose because last year, I had done project work with the Scrub Oak Tree. The dwarf pine area is only one of three sections that make up the Pine Barrens; the other two are Tall Pitch Pines and the Transitional Pines. In addition to the flight pattern, I also studied the comparison of insects flying at the elevations of: 2, 4, or 6 feet off the ground. In order to do this the IPTS was created. It was set up to have two traps at each height to collect the most insects. I noticed that there were more insects on the traps closest to the dense area rather than the traps in the open area. My research discovered that the most insects were at the 2 ft. height. This may occur because the insects would blend in easier if they were closer to the ground to avoid predators. Two feet is also high enough for insects to fly above the ground to avoid webs spun by other insects or spiders. The majority of the insects appeared to be flying and non flying ants in addition to a large number of flies. I subtracted the crawling insects from my results.

12. Hira Muzammal. Effects of Different pH Solutions on Brassica rapa Plants

Acid Rain has many effects on plants and the environment. Different pH solutions were tested on Brassica rapa (Wisconsin fast plants), including tap water (control), rainwater, acidic water ("acid rain"), and alkaline water. It was hypothesized that the lower pH solution would stunt plant growth and damage the leaves. Every other day, the plants (four in each group) were watered with the solutions (5 sprays of solution per plant) and after they were watered, their height and leaf condition was recorded. Overall, the plants in the acidic water and alkaline water groups grew the fastest and the tallest, but they rapidly decreased in size. The control maintained a constant growth rate over the course of study. The rain watered plants were the first to die. The "acid" watered plants' leaves were the first to be damaged. The "acid" watered plants lived the longest, while the control lived the second longest

13. Corey Nolan. The Effect of Magnetized Water on Plant Growth

The effect being studied was that of magnetized water on the growth and development of Brassica rapa, commonly known as Wisconsin Fast Plants. They are ideal experiment plants because of their rapid life cycles and responsiveness to environmental stimuli. Alnico magnets with an average Gauss reading of 13 mG were used, and were taped to the container/reservoir of water in order to magnetize it. My hypothesis was that the magnetized water would have a positive effect on their growth and development. Three quads (12 plants) were used for either of the two reservoirs. One reservoir held the control group, which received normal tap water, the other group received magnetized water. All other factors such as lighting, temperature, and the amount of moisture were kept the same. The dependent variables were height, number of leaves, flowers, and seeds. The results showed the plants with magnetized water grew taller, had more leaves per plant, more total flowers and flower buds during the days when the buds first appeared and the flowers first bloomed. However, the most significant difference was in the seedpods. The Fast Plants had more and they grew to be almost 2 centimeters longer than the plants with non-magnetized water. In conclusion, the plants receiving magnetized water grew taller, and their growth rate was much faster. Their germination rate was about the same, however there was about a week difference in their times until the flowers bloomed, and the Fast Plants receiving magnetized water wilted sooner.

14. Matthew Pavlis. The Effects of Giberellic Acid on the Germination and Flowering of Brassica rapa

Gibberellic Acid is used is in agriculture for the development of seedless fruit production and frost protection. The problem of this experiment was to see the effects of Gibberellic Acid on the growth and development of Brassica rapa. It was hypothesized that Gibberellic Acid would increase the number of flowers on Brassica rapa and increase the germination percentage of Brassica rapa. For each concentration of Gibberellic Acid, consisting of 1ppm, 10ppm, 100ppm, and control, five seeds were used in each group. Plants were measured individually over time, and averages were recorded. Rates were also tested on seed germination. It was found that Gibberellic Acid increased the number of flowers on Brassica rapa. However, it was also found that Gibberellic Acid does not help in producing a greater percentage of Brassica rapa seed, or germination rate.

15. Kim Wodiska and Sally Mathew. Ultra-Elimination of Bacteria

This experiment was designed to test the synergistic effects of 43 kHz ultrasound and short wavelength ultraviolet radiation on the growth of Escherichia coli (K12 strain). In the food industry, both ultrasound and ultraviolet light have been found to significantly kill bacteria within food particles. UV radiation can be emitted naturally (sunlight) or by using electric arc lamps in which a current flows through ionized gas between two electrolytes; while ultrasound can be emitted naturally (bats, dolphins) or through the use of machines (jewelry cleaning ultrasonicator). It was predicted that the combined effects of ultraviolet light and ultrasound would be the most effective treatment for killing and/or inhibiting the growth of E. coli. The bactericidal effectiveness of each technique was tested at various time periods. Then the bacteria were exposed to 15' of UV and 9' of ultrasound followed by the same procedure in reverse order. Then experiments with a time interval between the ultraviolet and ultrasound were conducted along with experiments testing different exposure times of ultrasound after the UV. The results have shown that UV exposure alone is more successful in killing bacteria while the combined work with ultrasound exposure followed by UV exposure was the most significant. When the UV was followed by ultrasound, the bacterial colonies began to grow back. The different lengths of ultrasound exposure alone, however, were not effective at killing bacteria.

16. Sornanong Yaibuathes and Olivia Long. Legume–Rhizobium Symbiosis

Agricultural industries around the world, especially in countries where there is a shortage of crop supplies, are hoping to increase the world's food production. Often in agricultural practice synthetic fertilizers are added to fields. Legume plants contribute to soil fertility (by adding usable nitrates) due to their symbiotic relationship with Rhizobacterium. This study investigated the effects of excess nitrate (nitrate of soda) on the development of nodules in the roots of legumes. It was hypothesized that the best nitrate of soda concentration for nodule development would be the manufacturer's recommended dosage (medium concentration). Three concentrations of nitrate solution were made by diluting 3.3 grams of nitrate fertilizer in 2 liters of water (low concentration), 10 grams of nitrate fertilizer is dissolved in 2 liters of water (medium concentration), and 30 grams of nitrate fertilizer in 2 liters of water (high concentration). The two species of legume plants used were Trifolium repens (clover) and Pisum sativum ("Little Marvel" peas). The seeds were inoculated with Rhizobium leguminosarum and planted in commercial seed starter mix. Plant roots from each group were scrutinized periodically for the development of nodules, and the development and vigor of the plants were noted. After three months of growth, the sizes and frequencies of nodules were quantified using a digital stereomicroscope interfaced with a computer (Motic Image program). Results of this experiment indicate that the medium concentration of nitrate fertilizer developed more nodules, and healthier pea plants compared to the rest of the groups. .

SAYVILLE HIGH SCHOOL

17. Katie Banaszak and Bijal Desai . The Health of Green's Creek, West Sayville, New York

The objective of this study was to determine the approximate "health" of the mouth of Green's Creek. The correlation between the "health" of the creek and the water quality and macrobenthic community helped in assessing the "health" of Green Creek. The mouth of Green Creek should be "healthy" since it should have a diverse benthic community. The oxidation level in the water is high because of the tidal activity, causing a higher biodiversity of macroinvertebrates to survive in such an environment. Before any sample could be collected, a license from NYSDEC was necessary in order to collect macrobenthic samples at the mouth of Green Creek. Green Creek is approximately 10 560 feet in length, located in Sayville, New York and drains into the Great South Bay estuary. For the macrobenthic analysis, three samples were collected with a 0.025 meter–square petite ponar sample. Two of the three samples were chosen for analysis; while, the third sample was archived. The macroinvertebrates were removed from the samples and identified according to its species level when possible. The sample was also be sent to a certified laboratory for the water chemistry analysis and grain size analysis. After analyzing the macrobenthic samples and receiving the water chemistry data, it is possible to state that the hypothesis was accepted. The water chemistry parameters met its standards and the macrobenthic sample has shown a great diversity. Therefore, the "mouth" of Green Creek is approximately "healthy."

18. Dan Capurso. North American Avian Migratory Routes: Pathways for West Nile Encephalitis

The purpose of this study was to document a correlation between the outbreak of human, avian, and equine West Nile Encephalitis (WNE) cases and avian migratory routes. The substantial dispersal of WNE exemplifies the existence of a nonhuman vertebrate host, birds. Maps of the migratory routes present in the United States were superimposed on color–coded maps created to show the relative number of WNE cases. Examination of these maps, and a series of maps showing the progression of WNE for the year 2002, shows a strong correlation between the Southeastern US and Circum–Gulf Neotropical migratory routes and the geographical regions with a high concentration of WNE cases. States with a large number of human and avian cases aligned markedly with these routes. The data also suggests an underlying connection between these routes and areas relatively dense in equine cases. However, such factors as uneven distribution of horses and insufficient testing may have skewed the data. Further research of the circulation of WNE through equine populations may be beneficial. In total, twenty–two avian species that migrate via one of these two Neotropical routes have tested positively as carriers of the virus. Future analysis of breeding habitats and sociological patterns may provide evidence beyond topographical comparison that these species are in fact amplifying hosts.

19. Brian Dulmolvis, Tom Koentje and Joseph White. Depositional and Erosional Features Related to an Artificial Structure

The objective of this project is to study the effects of a tile structure in Greene's Creek. Our hypothesis was that a plunge pool will be located directly after the tile structure opening, and that deposition will occur on the walls of the tile structure upstream and downstream. Some of the steps that were taken to conduct the experiment were to take stream depths at two meter intervals at selected transects. Some of the effects that were observed was deposition and down cutting of the streambed. Also a plunge pool was formed directly downstream of the tile structure, also a sandbar continued to build up as time increased. It was also observed that sediment was deposited on the east bank, yet as time went on the sediment was deposited on the west bank of the creek.

20. Lori Hennemeier . Chemical and Biological Comparisons of Seasonal Fluctuations of Residential and Nonresidential Water Bodies of the Central Pine Barrens of Eastern Long Island

This study examined surface water quality comparing nonresidential and residential water bodies in the Central Pine Barrens of Eastern Long Island. Fox, Sandy, and Linus Ponds are "pristine" nonresidential, while Lake Panamoka is located in a residential area. Water quality tests/analyses included temperature, pH, dissolved oxygen, biochemical oxygen demand, salinity, copper, iron, free/total chlorine, nitrate, ortho-phosphate, and fecal coliform. Dragonflies, biological indicators, were counted to support the water quality results. Results were compared to NYSDEC's water quality standards to determine relative "health." The nonresidential ponds experienced degraded conditions, while Lake Panamoka met the standards throughout the sampling duration. Statistical analysis of dragonflies differed by location but did not support the water data. It was concluded that surrounding land use alone does not significantly affect the water quality of the nonresidential and residential waters. Other factors such as productivity of plants/organisms in the water, effects of wind barriers, and meteorological variations impact water quality as well. Further research may determine the degree of influence these factors have upon the water bodies.

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21. Tovah Markowitz . Are Salmonella From Turtles Really Salmonella?

Turtles are thought to harbor disease-causing Salmonella. The purpose of this study was to determine whether bacterial isolates from two wild species of turtles (wild strains) were Salmonella. Clinical isolates acted as reference collections. Salmonella Reference Collection C (SARC) was used as a control. Wild strains were obtained from Bronikowski at the Bennett Laboratory (University of California, Irvine) and from Feldgarden in the Dykhuizen Laboratory (State University of New York at Stony Brook). Each bacterial set was isolated using traditional methods selective for Salmonella. (Feldgarden, Dykhuizen, 2002) To determine if preliminary classification was correct, strains were plated on MacConkey Agar and Minimal Media (pH 7) with one of various sugars or organic acids; dulcitol, lactose, salicin, sorbitol, malonate, mucate, and d-tartarate. Bacteria were analyzed for phenotypic characteristics. A change in the pH on MacConkey agar showed the metabolic use of the sugar or acid by bacteria. On minimal media, plates were analyzed for presence/absence of colony growth. Wild strains were analyzed for genetic similarity to SARC controls. The data collected indicated that wild strains had little similarity to SARC strains. Phenotypic and genetic analyses determined most isolated strains in the Bronikowski and Feldgarden collections may not be Salmonella. Evolutionary clusters were created based on phenotypic results using Jump 4.0. Clusters compared similarities between SARC strains and wild strains. Selected strains were sequenced in the Dykhuizen laboratory.(Feldgarden e-mail) This sequencing does not support the cluster analyses. Further investigation may compare wild strains to SARC strains in a new fashion.

22. Robert Paul and Roy Vespoor. The Effects of Obstructions on Dissolved Oxygen Levels at Green Creek, West Sayville, New York.

Five obstructions located in Green Creek; Sayville, New York, were examined. One of these obstructions, the weir, was expected to increase dissolved oxygen in the creek. The other obstructions were placed illegally with unknown effects on the river. The obstructions were given station numbers started with the weir, as station one, and moving south down the creek. The obstructions were tested three times during three different seasons. The obstructions dissolved oxygen levels and biological oxygen demands were taken each time. The weir proved to serve its purpose during each testing session, by having positive effects each time measurements were taken. It increased dissolved oxygen and lowered the biological oxygen demand in its area of the creek. The last obstruction located at station five was also consistently helpful in raising the dissolved oxygen because of its structural similarities to the weir. The remaining illegal structures had varying results. In some cases they were effective by increasing dissolved oxygen and lowering biological oxygen demand, however, in other instances they were detrimental. The illegal structures have proved to be harmful and risky additions to the creek, due to their unpredictable results. They have had negative effects on the creek environment. If the ecosystem of Green Creek is going to be improved, something must be done about these harmful obstructions.

Schreiber High School

23. Pamela Arnett. The Effects of Gibberellic Acid 3 on Growth and Development of the Landsberg erec~ta Arabidopsis thaliana

The Arabidopsis thaliana; like many crop plants; needs gibberellins to grow efficiently. Gibberellins are hormones that promote cell division and elongation. Using several Landsberg erecta Arabidopsis plants, the importance of gibberellins, such asGA~3, for Arabidopsis growth was shown. For the first experiment; the plants were placed into two control groups and two experimental groups. One control group consisted of Arabidopsis seeds soaked in water and then grown; and the second control group consisted of Arabidopsis seeds soaked in GA~3 and then grown. One of the experimental groups consisted of mutated GA~3 Arabidopsis seeds soaked in water and then grown; as the other experimental group consisted of mutated GA~3 Arabidopsis seeds that were soaked in GA~3 and then grown. It was found from observation that only the experimental group treated with water and without GA~3 did not grow. All other groups had plants that grew at similar lengths. Also, the addition of GA~3 to one control as opposed to the other control group did not result in any extra growth of the plants. Based on the observations from the first experiment that showed GA~3 promoted growth in mutated plants at early development, bolt growth of mutated plants would be observed next. For the second experiment, another experimental group consisting of mutated Arabidopsis plants was added. It had been previously researched that mutated GA~3 Arabidopsis plants, even if soaked prior in GA~3, would have bolts that did not elongate as they cannot produce and maintain their own GA~3. When GA~3 was added to the inflorescence of this new experimental group, the bolts of this group grew to similar lengths as its control group. This new experimental group was also compared to the bolt growth of the experimental group that had not been administered extra GA~3 at inflorescence and it was found that with no addition ofGA~3 the bolts of this experimental group did not elongate, as the experimental group given the GA~3 at inflorescence did. Therefore, GA~3 can help to promote normal bolt growth when GA~3 is added to the inflorescence of the mutated GA plants. Overall, since the Arabidopsis plant is similar to many crop plants, any information obtained through these experiments and others could help agriculturalists and scientists on new ways to produce the most efficient and useful crop plants to suit their needs in the future.

24. Adrienne Barasch and Melanie Maiman. The Phases of Outdoor Construction and their Effect on Particulate Matter Levels in Indoor Air

Construction in schools can often promote asthma and sinus infections in students and teachers. The cause of these health problems is the asbestos, dust and other particulate matter that arises from the construction. Different phases of construction entail different procedures, and therefore may promote different levels of particulate matter. Phase 1 involves clearing ground and building fences. Phase 2 involves breaking ground and the digging process. Phase 3 is the construction or renovation of the building. If a significant difference between phases is seen, more precautions may need to be taken during a certain phase of construction. Using a high-pressure vacuum pump, particulate matter levels were taken in various indoor areas near construction sites undergoing Phase 1 and Phase 2 with foot traffic. After comparing these levels with the levels of particulate matter brought about by construction off days plus foot traffic, it was expected that the levels during construction would be significantly higher than the combined levels of normal air near the construction and foot-traffic, while remaining within the air-quality guidelines provided by OSHA. (15mg/m3) It was found that all of the particulate matter levels taken with and without construction were underneath the detection limit of the scales used of 0.065mg/m3. Therefore, although it was impossible to perform a statistical analysis between levels, it was found that all of the air near construction was well within the safe levels.

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25. Dan Braman. The Effect of Iron on the Growth of Chlorella sphaerica

The increasing amount of CO2 in the atmosphere, which comes from the burning of natural gas, coal, and car emissions, is a major factor causing global warming. Scientists have studied various ways to decrease global warming through a reduction of atmospheric CO2. It has been shown that phytoplankton absorb more CO2 from the atmosphere than do land plants. Some experiments have shown that certain nutrients cause large increases in phytoplankton reproduction and thus CO2 absorption (Behrenfeld and Kolber, 1999) Iron is known to be a limiting factor of marine phytoplankton growth yet no studies have been done on whether it is a limiting nutrient of freshwater phytoplankton. If found to be a limiting factor, iron could be used to fertilize bodies of freshwater thereby decrease atmospheric CO2. This experiment tested whether or not iron is a limiting factor of the growth of Chlorella, a common freshwater phytoplankton. The algae were grown in filtered freshwater samples from various bodies of freshwater around Long Island. These samples contained different combinations of iron, phosphate, and nitrogen to test if iron is a limiting factor. Plankton growth in each sample was recorded daily using a hemocytometer. The experiment demonstrated that iron is not a limiting nutrient of freshwater Chlorella and that Baxter Pond contains lower levels of nutrients than the unnamed pond in William Cullen Bryant Preserve.

26. Greg Hiller. Determining the Optimal Conditions for the Thermal Depolymerization of Organic Waste

Thermal Depolymerization Process (TDP) is currently for the purpose of decomposing complex substances into their simpler components. Paper pulping is one industry that currently takes advantage of TDP. The process consists of heating materials to high temperatures in high-pressure aqueous solutions. After rapid decomposition occurs, the products are then cooled, separated, and collected. While this process is typically used for paper pulping, it can be expanded to other materials as well. By running turkey offal through a TDP reactor, it is possible to convert and extract usable oil and fatty acids. In order to optimize the amount of fatty acid produced (used for the creation of detergents and fertilizers) it was necessary to determine the most efficient and practical temperature, duration, and water-to-sample ratio for the hydrolysis of fats. Temperature, duration, and water-to-sample ratio all directly affected fat hydrolysis, while hydrochloric acid had no positive effect. In order to keep nitrogen out of the first stage product, the temperature was restricted to under 260° Celsius, the lowest tested decomposition temperature of amino acids.

27. Maiko Kume. The Utilization of pH as an External Control on Polhydroxybutyrate Production in Recombinant Escherichia coli

Some problematic outcomes of the influx of plastic products in modern society are the excessive accumulation of plastic wastes and increased dependence on petroleum, a finite substance. Poly-$-hydroxybutyrate (PHB), an intracellular carbon reserve produced under conditions of nutrient limitation in certain bacteria, has generated interest as a possible environmentally friendly replacement for current plastics, due to its property of biodegradability. It has already been established that inserting PHB biosynthesis genes into Escherichia coli and plants will cause PHB production in the transformed organism. The purpose of this experiment was to determine whether controlling the pH of the growth culture would affect, or specifically, restrict PHB production in transgenic E. coli. E. coli were transformed with plasmid pAeT41, containing the PHB biosynthesis genes of Ralstonia eutropha and the gene for ampicillin resistance, grown in Luria Broth (LB) medium with pH values ranging from 7.0 to 10.0, then plated on LB agar and ampicillin plates. Presence of PHB was examined by exposing the plates to ultraviolet light. Expression of phbC, the gene coding for PHB polymerase, the most crucial enzyme in PHB production, was determined by RT-PCR. It was found that E. coli growth diminished as the growth medium became more basic.

28. Steven Otterman. The Efficacy of 2-Thienyl-4, 5-Difurylimidazole as a Photopesticide

Mosquitoes are a type of insect that cause harm to humans and other animals by spreading diseases. Pesticides used to exterminate mosquitoes and other harmful insects contain chemicals that often have an adverse effect the environment or other organisms. Photopesticides are chemicals that are activated by the sun or incandescent light to produce singlet oxygen, which is toxic to insects but relatively harmless to larger animals. In time this singlet oxygen will turn back into atmospheric oxygen therefore making it an excellent candidate for a pesticide. An environmentally safe compound, 2-thienyl-4, 5-difurylimidazole, was synthesized and tested as a photopesticide on Artemia salinas (brine shrimp) which show similar responses to those of mosquitoes. Two groups of brine shrimp were made. The first group was exposed to the photopesticide at 5 ppm while the second group, the control group, was not exposed to the photopesticide. Both groups were put under a grow light for 30 hours and periodically observed after 4, 6, and 30 hours. After being exposed to the photopesticide, 88% of the target species (brine shrimp) were killed, while only 3% of the control group was killed in the first 4 hours. At the end of 30 hours, 96% of the brine shrimp that were exposed to the photopesticide were killed and the few that survived were severely disabled and most likely unable to reproduce. Data collected from this experiment suggests that this pesticide would be effective in killing harmful insects.

29. Adam Silbert. The Effect of Ultraviolet Radiation (UVB) on the lifespan of Caenorhabditis elegans

Understanding the aging process, regulation of life span, and the environmental effects on aging are fundamental problems in science. The deleterious effects in humans to overexposures of specific wavelengths of ultraviolet radiation manifests itself in skin cancers, cataract formation and suppression of immune responses. Whether this specific environmental stress alters the lifespan of humans or human cells has yet to be definitively determined. C. elegans is an extensively researched primitive nematode that shares essential biological characteristics to problems in human biology. Various experimental studies on the lifespan of C. elegans have been conducted on environmental stress factors such as concentration of food, low temperature, ethanol and oxidative metabolic protein buildup. This research project investigated the effects of UVB induced stress on the lifespan of C. elegans by exposing experimental groups of C. elegans eggs to 15 seconds of UVB radiation at a distance of 10cm and compared the average lifespan of these organisms to that of control groups which developed from eggs not the exposed to UVB radiation. The results indicated no detrimental effect to the experimental group and even increased lifespan and maturation rates.

30. Hillary Wool. The Effect of Di-(2-ethylhexyl Phthalate on Maturation and Longevity in Drosophila melanogaster

Di-(2-ethylhexyl) Pthalate (DEHP) is one of many phthalates present in the environment. The compound has been clinically shown to have adverse effects on test organisms. However, the effects of this pthalate have been surrounded by much controversy, as some studies have determined that DEHP does not induce any adverse effects. The studies that have been conducted have been focused on determining whether amounts of DEHP that humans undergoing medical procedures are exposed to, are harmful. One study reported that girls who exhibited premature thelarche (breast development) had a significantly increased DEHP concentration in their blood serum. However, the study did not determine that DEHP was the actual cause of this phenomenon. The current study was conducted to determine whether or not DEHP would induce premature development, or induce decreased longevity. The experiment consisted of three groups of Drosophila melanogaster, a control group, a group with a 0.1% concentration of DEHP, and a group with a 10% concentration of DEHP. The adults and the offspring were examined and counted daily. The P-value from a 2-proportional Z-test of the first part of the trial was 0.0009. The second part of the study involved a 2-Sample T-test. The P-value determined was 0.02. The impact is twofold. First, the results indicate that DEHP can lead to premature development in organisms, which may include premature thelarche in humans. Also, since this study was unique in that it focused on an insect, it shows that DEHP in high concentrations can have significant effects on lower organisms in the environment. Even if DEHP does not have adverse effects on humans in these concentrations, the snowball effect could occur, and concentrations could accumulate as larger organisms consume smaller organisms.

Smithtown High School

31. Matthew Cons, J. Maxwell Gutman, and Charles Macanka. The Effect of Deer Browse on Forest Structure in the Upton Reserve at Brookhaven National Lab

To assess the effect of deer browse on forest structure, a series of four deer exclosures and adjacent control plots were established at different locations in the Upton Reserve at Brookhaven National Laboratory. Four one meter by one meter quadrats were centered within each exclosure and control plot. A complete vegetational analysis of each exclosure and control plot was carried out. The percent ground cover and deer browse estimate was calculated for each quadrat in each exclosure and control. Rapid environmental assessments were used to determine estimates of oak/pine ratios at each site. GIS maps were derived from these data. It was found that in many cases that, rather than deer browse, sunlight competition is the primary factor in oak recruitment specifically and forest structure in general.

32. Megan Farley. Analysis of Dwarfism of Pinus rigida in the Dwarf Pine Barrens of Westhampton Beach, Long Island

This research was performed on the dwarf pitch pine (Pinus rigida) in the Pine Barrens of Westhampton Beach, Long Island. Many factors that could possibly contribute to dwarfism have been researched using soil analysis, common garden experiments, and genetic testing. These procedures were able to eliminate some of the possible causes for dwarfism, but there are still many factors that need to be investigated. The purpose of this experiment was to develop a rubric that would establish a method to determine the degree of dwarfism in pitch pines. Results to date show that dwarfism among pines is not caused primarily by the amount of shade or sunlight they receive in competition with other plant species around them.

33. Kate Gromatsky. What Causes Acidity in Our Streams?

Acid rain is a major issue in the present environment. It destroys life everywhere and causes damage to man-made structures. Acid rain isn't the only thing that kills life in our bodies of water (streams, ponds, lakes, etc). The way that the pollutants get into the water is through our sewers. The water traveling down to the sewer during storms picks up chemicals that run right into the sewers and storm drains and eventually into our water bodies. Along side of my house I have a highly polluted stream. The street runs over it and there are 2 storm drains on either side of this street, causing the chemicals and other pollutants to flow right into the stream. My theory was that downstream would have a high acidy level. The combination of the acid rain and the runoff into the stream would cause this. I had four test points where I collected water samples (upstream, run off right before it runs into the drain, downstream, and a container set out when it rained/snowed to catch the straight precipitation). Using the PASPort Xplorer, a probe that measures the pH levels of different liquids, I recorded the pH levels of each spot into a data table over several weeks (I took samples daily). So far my hypothesis has been fairly correct. Downstream had a higher acidity level than upstream. But the rainwater is neutral, there fore I can conclude that the rainwater isn't polluting the stream. It is the runoff alone that is making the stream so acidic. To improve my experiment and make it more accurate, I am going to start taking more samples at each test point daily.

34. Victoria Koke. Is Bluff Erosion on Long Island Contributing to the Shrinking of Long Island

My goal was to observe erosion occurring on the bluffs that are located on the shores near my home. I closely observed the bluffs located between Long Beach and Short Beach of Smithtown, Long Island. I cut wooden stakes that were all 16 inches long. I then marked the stakes at various locations, more specifically, 5 inches up from the bottom and then once again 11 inches up from the bottom. I chose five different locations to observe and placed 2 stakes at each to avoid error. I observed a bluff near the pavilion at Long Beach, a bluff located near the beach that is part of the David Wells Nature Conservancy, a bluff located on Richards path, a bluff located on Bluff Road, and another bluff located off of Long Beach Road. I then placed two stakes into the ground (3 inches) from the bluff's edge. I planted the stakes 5 inches into the ground; this was done to observe horizontal erosion and was the purposes of making the stakes have 5-inch marks from the bottom. My research has taught me that though Long Island does appear to be shrinking, the amount of shrinking that occurs annually is minimal and very hard to view in only a 15-week period. In the first couple of weeks of my collected date no change was apparent in the bluffs. My results are now starting to show very minimal change, but they do show some change of only a few millimeters. My conclusions cannot fully be made due to the fact that I am still currently observing my locations and collecting data. However, I can draw the conclusion that Long Island's bluffs are becoming eroded away slowly. Also due to this, I can infer that long Island is shrinking however the loss of land annually is very minimal.

35. Christiana Marullo and Traci Novak. Is Chlorine a Factor in the Cause of Breast Cancer?

Our experiment sought to determine if the level of chlorine in a community's water supply correlates to the number of breast cancer cases in that community. We tested the municipal water for chlorine in four Long Island communities, St. James, Centerport, Port Jefferson, and Melville, and compared the chlorine levels to the breast cancer levels in those areas. We believed that the higher the chlorination in a community's water, the greater the number of breast cancer cases in that community. We used a chlorine testing kit to test the four municipal water samples, and a map of breast cancer zones on Long Island. We compared levels of chlorine to the levels of breast cancer in the areas from which the water was collected. Due to the lack of sensitivity, the chlorine test kit was unable to detect different levels of chlorine in the water. Nevertheless, research indicated that the amount of chlorine in municipal water correlates to the rate of breast cancer. A more sensitive test kit must be obtained.

36. Joe Pawluk . Analysis of Nitrate Levels of Long Island

How do nitrate levels in public water differ in Nassau and Suffolk County and in the North and South shore? Nitrates are a form of groundwater pollution. They are elevated due to agriculture and fertilizers. Also, Nitrate levels run higher in the north versus the south. This is due to extensive farming during the pre WWII era and over fertilization in residential areas. I used the Red Sea® Nitrate Marine and Fresh Water Test Lab (12-ml vial w/stopper, test chemicals A, B and C, color chart with ppm ranges and directions). The results for Nassau County's North Shore's nitrate levels are much higher than the South. However, Suffolk County follows a different pattern. I found that test sites that run high in nitrate levels were once, or still are, major sites of agriculture. Nitrates are appearing now due to aquifer retention. The water retention of the Magothy Aquifer is about 400 years. That means it takes 400 years for absorbed rain water to resurface as ground water. Because Long Island has been farmed for centuries, fertilizers have polluted century's worth of groundwater. Sadly, there are no cost effective ways to treat this problem. Only time will reverse the damage that has been done. Engineers around the globe are searching for new ways to treat nitrate pollution. A search and comparison of different ways to improve a preserve our water would be an appropriate continuation.

37. Jonathan Ravin. Landfills: Are They Hazardous?

My hypothesis was that eventually all landfills would leak because the main safety precautions taken are a thick double-liner of plastic on the bottom that is covered with a layer of clay. Over time the plastic, as well as the clay will deteriorate and will allow leachate into the groundwater. My research included the building of simulated landfills with different safety measures incorporated to see if liquid can make it past and become hazardous to humans. I built six landfills, to see how some of the different precautions taken can prevent leaching. I built a control in 7 oz plastic cups one with just soil, one with one layer of plastic and one with 2-layers of plastic, one with a clay liner, one with clay and one layer of plastic, and one with clay and two layers of plastic. Each week I added a quarter cup of water to simulate possible rainfall and liquids traveling through and observe if particulates and/or liquid make it through the entire landfill. My results showed that the landfills that consistently allowed leaching were the ones without clay. Also in the first two weeks of testing the clay and one layer of plastic allowed some leaching. Therefore my conclusion thus far into testing is that the plastic alone cannot prevent leaching, and the clay can prevent leaching for some amounts of time, but can sometimes allows material through.

38. Elicia Selvaggio. The Design and Development of an Apparatus and Method to Quantify Rooted Submergent Vegetation

In the pursuit of determining the invasibility (Davis, 2000) of the submerged aquatic plant Myriophyllum heterophyllum, a method to quantify and track its actual growth was developed. Previous to this, there was no documentation of an existing apparatus designed to quantify aquatic plants, specifically rooted submergent species. A three-dimensional adjustable, portable grid was constructed to measure a variety of aquatic species. In addition to the grid, the application of photography and computer enhancement creates an accurate representation of plant population. Data can be analyzed for future mapping of aquatic vegetation in lakes and ponds.

39. Lauren Anne Sosulski. Disturbance and Succession in the Long Island Pine Barrens: The Ecological Role of Arctostaphylos Uva-ursi

The purpose of this study was to determine whether disturbance effects Mycorrhizae growth in Arctostaphylos uva-ursi (Bearberry). This study was performed in three uniquely diverse areas of the Pine Barren location in West Hampton Beach, Long Island. Mycorrhizae are the symbiotic association of the mycelium of a fungus with the roots of a seed plant. This mutualistic relationship is highly interdependent. The host plant receives mineral nutrients while the fungus obtains photosynthetically derived carbon compounds. Seven random samples were taken from these locations and classified by their presence of mycorrhizae. Along with classification, soil temperature, soil moisture, number of berries on the plants and pH of the soil, were also recorded. Results showed that the disturbed areas produced less mycorrhizae than when compared to the undisturbed samples. In the future the next step would be to observe the plantings of three seedlings. One seedling would be without any mycorrhizae, another with a little of mycorrhizae and the third with an abundance of mycorrhizae. This would have to be accomplished over a long period of time but will eventually tell science whether this Arctostaphylos Uva-ursi plant may revegitate a barren land without the presence of mycorrhizae.

40. Erica Thogersen and Rebecca Berger. Nitrate Levels in Local Wells

For our project, we are finding out if the age of a well affects the amount of nitrate found in the water. We think the age of wells does affect nitrate levels because we have found studies that show the older the well, the shallower the well resulting in higher nitrate levels. Septic systems and farms create nitrate, which seeps over the land and can get into wells. Therefore, the shallower the water in the well and the older the age, the higher nitrate concentration there is in the well. To test nitrate levels, we are using a nitrate testing kit, test tubes and stoppers, safety glasses, and a graduated cylinder. We have tested several houses in Nissequogue. We are testing homes that are on private wells before the water goes through a filtration process. For a known age of 40 years, the water nitrate level tested to be around 1 mg/L. For a known age of 15 years, the nitrate level tested to be around 3 mg/L. At the present time, there are several houses that we tested, that the age is unknown. For those houses, the nitrate levels are about 5 mg/L, 3 mg/L, 3 mg/L, and 4 mg/L. So far, the age has not had an effect on the nitrate level in the water. We are continually doing more testing to have more evidence and see if our hypothesis is true or not. If age does not have an effect on nitrate levels in the water, further testing could use other variables, such as location or how well kept the well is to see if that has an effect on the nitrate content.

41. Shawna Tonick and Christina Poggioli. The Effect of Local Urbanization on the Acidity pH) of Precipitation

The problem that we investigated was "What effect does local urbanization have on the acidity (pH) of precipitation?" We have been testing precipitation in Manhattan, an industrial area in Nesconset, a wooded area in St. James, and an area at Smithtown High School in Smithtown ever since February. We have been doing this by collecting precipitation in unused plastic containers and identifying the acidity with a universal pH indicator. We thought that in Manhattan, the most urbanized area, the rainwater would be more acidic. We also thought that in areas such as St. James and Smithtown, the rain would be less acidic. In Nesconset, we thought that the rain's acidity would be in between New York City and St. James' acidity. This is due to the fact that acid rain is rain or snow that is polluted by the acid in the atmosphere and damages the environment. Manhattan is a very urbanized area, and a lot of pollution happens there. With our testing so far, results have been mixed and definitely not what we expected. The precipitation in St. James and Smithtown has held relatively close to a pH around 6, and the precipitation in Manhattan has held close to a pH of 5. However, in Nesconset, results have been as low as a pH of 3 and also a pH of 7. We will continue testing and investigating how urbanization affects the acidity of precipitation.

42. Jake Woloschin and Matthew Schapiro. The Effect of Precipitation on the Nissequogue river

Our science experiment deals with the pH of precipitation and the effects of the precipitation on a river system. The river we picked was the Nissequogue River in Smithtown. In this experiment we expected to find out how the river is affected, by what amount it is affected and how much rain and the level of pH that is needed to affect the river.We needed a digital pH tester, an alcohol thermometer (°C), clean cans to collect water form precipitation, water bottles to collect river samples and waders. To carry out the experiment we selected three sites along the Nissequogue River for testing. Every other day we tested the water pH and the temperature of the water. Whenever there was precipitation, we collected it. The pH of this was measured as well as temperature. When we compared dates and saw what precipitation occurred and what the pH of the river turned to, we could determine how much the precipitation affected the river system. We feel that the more precipitation that occurs and the more of a change in pH, the more the river system will be affected. The precipitation will mostly be acidic and therefore the river will change slightly towards the acidic level. Our results have been mixed. Although there has been some correlation between the precipitation pH and the river pH, it is very inconsistent. Unless there is large difference between the precipitation pH and the river pH before the precipitation, no significant change occurs in the river. The pH of the river changes by a slight amount every other day without precipitation. Therefore when the river changes by a slight amount after precipitation it is not considered an important change. We also found no correlation between temperature changes and pH changes in the river. However we feel that our observations have the most effect on the pH of the Nissequogue River.

South Side High School

43. David Randell. Free Choice Turning and Turn Alternation in Different Species of Isopods

An adaptive behavior used by organisms to limit the time spent in dry regions is known as turn alternation. It is when a forced turn is followed by a turn in the opposite direction. Turn alternation prevents organisms from continually turning in one direction and going around in a circle. In research performed by Tohru Moriyama (1999) turn alternation was found tonot only be an adaptive behavior but also performed because of the Isopods own decision making. The purpose of this study was to investigate turn alternation and the free choice response in different species of Isopods. Phase 2 of the study determined if Isopods of the same species when tested repetitively exhibit similar turning patterns as those tested just once per maze. Further experimentation conducted in Phase 3 determined whether the turn alternation pattern would be affected if several Isopods of the same species were placed in the maze on the non-alternation side. The species of Isopods used in this experiment were Armadillidium vulgare and Porcellio scaber. Two different mazes were constructed using clear Lucite. One maze
design tested for turn alternation while the other investigated the free turning choice response. The Chi ~ Square goodness of fit test was used to analyze the experimental data. When tested, the Armadillidium vulgare and Porcellio scaber exhibited turn alternation. The Armadillidium vulgare favored turning right in the free choice maze. However, the Porcellio scaber did not show a significant turning preference. Both species of Isopods when tested repeatedly in Phase 2, produced results similar to those Isopods tested once. The turn alternation patterns of the Isopods were notaffected by the presence of other Isopods in the maze. While both species showed turn alternation, the turning patterns of the Armadillidium vulgare deviated to a greater extent from the null hypothesis.

44. Philip-Edouard Shay. The Use of German cockroach (Blattella germanica) phermone extracts as a lure to a chosen food source

Cockroaches are amongst the most common pests around the world. The cockroach that does the most damage yearly is the German cockroach, Blatella germanica. This cockroach has pheromone secreting organs near their excretory tract. The purpose of this experiment was to test the strength of the odorous pheromones and their influence on the cockroaches' behavior. This could help cockroach bait effectiveness and therefore reduce German cockroach problems. A starting population of approximately 100 cockroaches was placed in a modified aquarium habitat that had symmetric sides to avoid the influence of objects and the location of food sources on their behavior. Pheromone extracts, obtained from the methanol extraction of the German cockroach's fecal matter, were placed around one of the food sources while a methanol control was placed around the other. The originally equal weights of the two food sources were compared after remaining in the habitat for 2 days. Thus far, the pheromones have been extracted from the clean fecal matter and preliminary test show that the cockroaches tend to have a slight attraction towards food sources that are accompanied by their pheromone extracts. When the data was analysed with a t-test, results ($p = 0.03$) indicated that there was a statistically significant difference between the weights showing that there was an influence of the pheromones on the feeding habits of the German cockroach population. This study will determine if cockroach pheromones could be used to attract these insects to poisonous bait for example. This would reduce the amount of toxic products needed to exterminate these insects. Pheromones could be the answer to a safer and more efficient way to lure insect pests to their death.

Uniondale High School

45. Tatiana Antoine. Analysis of Interspecific Variation in Plant Growth Responses to Nitrogen

This experiment studied the affects of plant growth variations to added nitrogen. The organism involved in the research is: Raphanus sativus. The purpose of the experiment was to find out the physiological and morphological factors that are responsible for their growth responses to nutrients. To find out the researcher recorded the unit leaf rate (ULR), specific leaf area (SLA), and leaf weight ratio (LWR), in response to added nitrogen. Such interspecific differences in growth response to nutrition are likely to be an important determinant of ability to respond to added nutrients with fertility gradients. An ability to respond to added nutrients with increase growth if often theorized to be an important component of success in fertile environments. (Taub 2002)

46. Erica Buddington. The Green Generation

Social research scientists have successfully developed research models to gauge people's attitudes towards their communities, cities or the world. These studies have concluded that a person's attitude towards the environment and the future of planet earth is directly related to their recycling and waste reduction habits. Although these studies have been used to successfully measure the recycling intentions of grown ups, little has been done to gauge how today's young people feel about saving the planet, and consequently predict recycling behaviors. This project is to determine whether survey tools used to measure adults' attitudes toward recycling can be used to measure teenagers' attitudes toward recycling and waste reduction. Using two popular research scales: Consideration of Future Consequences (CFC) and Likert, this study will administer a short survey to students attending Uniondale High School. To measure the differences in attitudes across groups, two groups of students, 9th and 12th graders will be asked to complete the surveys during their science or Social Studies classes.

47. Melissa Budhoo and Leslie ~ Ann Fletcher. Seedling Emergence vs. Soilborne Pathogens

Seedling emergence occurs when seeds germinate, starting at a pre-emergent stage. The quality of the seed planted in each individual seed lot influences the emergence of each seed. This occurs because of the conditions of the seedbed environment with the humidity of the soil, pathogens and temperature. Seed-vigor involves the seed properties that determine the ability to undergo development in stressful field conditions. The researchers placed the seeds in a range of different moderate temperatures. Some of these temperatures were 25 degrees Celsius and 10 degrees Celsius. In several tests that were performed the researchers identified the seeds in high, low or medium seed vigor to examine their resistance to outside pathogens such as fusarium, and phytoplatoria. Some of the tests performed were the Cold Test, the Respiration Test, the Germination Test, and the Saturated Cold Test. The results of the tests identified the seeds as high, low or medium seed vigor and their resistance towards pathogens.

48. Janalee Campbell. THE GREEN MACHINE !!: A New Method For Hydrogen Production from Chlamydomonas reinhardtii

It has been a long goal of researchers to develop a low cost method for producing hydrogen. This highly reactive element has many potential energy uses whether in a nuclear fuel cell, an electrolytic cell, a photovoltaic cell or in other environmental savvy fuel alternatives. The foremost drawback, however is that it is expensive to produce. It has been recently postulated that a low cost biological method can be utilized to produce high quality hydrogen. It is the purpose of this study to produce hydrogen by using genetically engineered micro-algae with enhanced photosynthetic activity to generate hydrogen under mass culture conditions. Through the use of micro-algae, Chlamydomonas reinhardtii, a system was developed to reduce the number of chlorophyll molecules that service Photosystem-II, in their photosynthetic processes. Hence, the micro- algae had truncated chlorophyll identifiers to be used in the photobiological production of hydrogen. The approach features a temporal separation of oxygen production and hydrogen evolution, the means by which substantial hydrogen was obtained. This researcher assembled a turbine model that was able to utilize the hydrogen manufactured in this small-scale environment of pond scum. It is anticipated that future designs can better modify this novel approach to establish a highly efficient hydrogen fuel cell.

49. Carol Anne Celestine and Tersha Griffith. Entering the Rhizosphere: How Beneficial are Mycorrizal Interactions?

Mycorrhizae are intimate interactions between a fungus and the roots of a photosynthetic organism. These interactions are present in an estimated 85% of terrestrial angiosperm species. It is a general supposition that relations between plants and my corrhizal fungi are beneficial in all instances. However, there is reason to believe that this is not necessarily true and that the nature of the associations tends to range from extremely beneficial for both fungus and host (i.e., mutualistic) to detrimental to the host. The purpose of this study was to assess the effects of these "symbiotic" interactions on individual plants and plant communities and determine whether or not new assumptions hold weight. Research was done using R. sativus, B. rapa, L. esculenta, O. basicilum and the endomycorrhizal fungi species G. intraradices, G. aggretagume, and G. mossea. It was determined that mycorrhizae benefit some plants while stunting or completely inhibiting the growth of others. In the absence of mycorrhizae, plants such as L. esculenta and R. sativus flourished while their inoculated counterparts were either stunted or failed to grow at all. The other two species, O. basilicum and B. rapa seemed to be highly mycotrophic, showing enhanced growth and vigor when compared to the non-inoculated control groups. Since the results of this research were so evenly distributed, it is difficult to say whether or not the effects of mycorrhizae are as beneficial as assumed. It is obvious that the application of mycorrhizae to certain plants can be detrimental to them. Until future research is performed, it will be concluded that the effect of mycorrhizae depends largely upon the species of plant.

50. Jordan Crafton. The Truth About EMF: A Novel Method to Determine Species Mortality in the Presence of Electromagnetic Radiation

For the last, several years a great controversy has arisen in the form of debates focused on the adverse biological effects of electromagnetic radiation exposure. On Long Island, in particular, there has been increased documentation of breast cancer and many individuals have atttributed it to EMR, electromagnetic radiation. However there is little to no solid evidence proving these allegations correct. In fact very little is known about this topic and research is currently being done in order to establish a better understanding of EMF interactions with living systems. There have been considerable economic drawbacks because of the insecurity raised by this issue. People's apprehensions have caused many electrical utility companies to halt construction of necessary cell phone base stations and high voltage power lines around populated areas. It's estimated that the United States alone loses approximately one billion dollars annually because of this problem. This researcher documented EMF interactions with the cellular structure and function of Dermestidae sp. Measurement included their DNA structure over a period of time as well as more mundane measures. It is hoped that once an understanding of how beetles respond to the electromagnetic fields, it will be a closer understanding to the effects on human beings. In the present study, various controls and exposure to EMF were tabulated. It was determined that the cellular structure of Dermestidae beetles was slightly altered due to low frequency levels of electromagnetic radiation.

51. Malcolm Edwards and Ackley John. The Long and Short of It: A Study on Plant Stem Elongation

The purpose of this experimentation was to study the effects of water depth on submerged rice seedlings. This research also tested the effects of the appliance of plant growth regulators in comparison to the effects of other plant growth regulators. This experimentation consisted of two major experiments and one sub-experiment. For the first phase of this experiment we used different water levels on etiolated (to cause a plant to develop without chlorophyll by preventing exposure to sunlight) rice seedlings, also known as Oryza sativa L. Upon performing this experiment, we found out that the water level has little effect on the development of the seedlings' coleoptile growth. The sub-experiment was conducted between the first and second experiment. To perform the sub-experiment we cut three millimeters from the tip of the coleoptile of each of our seedlings. Then we let the amputated seedlings grow for a period of five days. The tip was cut so that the hormones could enter the plant and affect. In the second experiment, the plant growth regulators were also used on etiolated rice seedlings. The PGR's that we used are Gibberellic acid, humic acid, Seaweed extract, 2-4D, and indole-3-acetic acid. The results proved that Gibberellic acid produced the best results according to the plants growth rate.

52. Rhonda Gomez. The Effects of Ethyl-Alcohol on Drosophila melanogaster

The project is on the effects of Ethyl Alcohol on Drosophila, and how Drosophila reacts when exposed to the chemical agent ethyl alcohol. This research project has one control group of drosophila and two experimental groups of drosophila. The control group was not exposed to ethyl alcohol, but the two experimental groups were exposed to different treatments of ethyl alcohol. All three groups were given the same type of food, amount of food, and exposure to air. During my experiment I observed the death rate, rate of reproduction (or fertility rate) and the non-existing of mutation. At the end of the research project I came to the conclusion that were exposed once had a death rate of five hundred and forty-eight. The Drosophila that were exposed more than once had a death rate of one hundred and thirty- five. What do affect the death rate were the amount of food given, the space and the amount of times they were fly-napped.

53. Aquiera Halsey and Aisha Phillip. Feeling the Pressure: Plant Growth in Microgravity

The purpose of this study is to investigate the effects of microgravity on plants. The plant being used is daikon radishes that will be applied to a clinostat. The plants will be planted, grown, and observed. The radish plant belongs to the Brassicaaccae family. Its growth span is about two to three feet in height and one to two feet in width. A clinostat is a slow moving rotating device used to stimulate microgravity conditions. This means that plants can be grown in it as if it were in space. Microgravity is a small amount of gravity. There is a smaller gravitational pull than in regular gravity. Gravity is the force that governs motion throughout the universe.

54. Macha Jean Pierre and Brian Chavez. Will There Be Clean Water For Our Children?: A Modern Way To Alleviate Salt Water Intrusion

The project focuses on the problems with saltwater intrusion on Long Island. The project was based on a series of tests done with four different species of plants. Each species was placed under eight different chemical conditions. These conditions include; no chemicals at all, chemicals with the plant alone and the plant with salt and the chemical(s). The purpose of the project was to determine different effects of chemicals that are supposed to deal with soil reclamation and how they work. The chemicals used were NaCl(Salt), CaSO4 (Gypsum), and SiO2 (Silica). The plants that were used were lima beans, peas, and brassica. By applying these chemicals daily and watering them we can achieve desired results in plant growth and the effectiveness of soil reclamation, through daily observation we were able to prove that gypsum helped plant growth with those inflicted with salt and grew at a much faster rate than the plant alone. The gypsum applied with silica to one plant does not speed up the process but rather suppresses it. Our conclusions show that use of gypsum can be useful to reclaim soils that have been affected by this saltwater intrusion. This can aid in agricultural prosperity and perhaps help the environment on many levels.

55. Catherine Mariduena and Kricel Francis . Arbuscular Mycorrhiza on Root- Organ Cultures

The purpose of this study is to explain why fungus sporulaion is much more active in absence of the root, even if the fungus has an absolute need to be symbiotic with the root to live. The root being used is the Daucus carota L (carrots) as well as the fungus Glomus intraradices. The production of the spores are limted in the compartment where the root is growing along with the fungus, but when the fungus is allowed to jump over the separation of the bi-compartment petri dishes, the fungus is able to produce a very large number of spores. The reason why it is doing so has been satisfactorily explained up to now.

56. Tatianna Mott. Food Fights: Effects of Hunger Level and Body Size on the Aggressiveness Over Food in Acheta domesticus

Animals often compete directly with members of the same species for food resources. The ability of one member to be successful can be directly proportional to the member's relative resource-holding power (RHP) and relative resource-value (RRV). Most past studies have focused on male-male fighting in relation to getting the upper hand and access to mates. In the present study contests were developed over single food items and examine the first to acquire the food resource, their relative body mass, relative size and the level of food deprivation on competitive feeding ability of Acheta domesticus, the common house cricket. This researcher research and data conclude that the larger the cricket (greater mass and length), the more likely it is to succeed in a fight over food. This goes for males, as well as females. However, the males appeared to be more aggressive and insistent than the females when competing.

57. Gandhy Pierre-Louis. A Neighborhood War: A Unique Approach to Plant Species Competition via Allelopathy

It has become evident that no two organisms can coexist in the same niche. When organisms are in close proximity, they are inevitably going to interact. The interaction that was observed was plant competition. Within plant competition are several well-accepted hypotheses. These competition theories are still being tested for validity. Recently, the assemblage level-thinning hypothesis has grown more popular and is, by many people considered to explain diversity in ecological assemblages. The assemblage level-thinning hypothesis states that in an assemblage plants will become larger and the assemblage will become too crowded to support the plants. However, I planned on putting that hypothesis to the test when there is an introduction of an allelopathic plot. To test these hypotheses, a fertility gradient that consisted of twelve plots was created. Four plots were treated with 10g of fertilizer, another four plots were treated with 5g of fertilizer and the remaining four received 0g of fertilizer. Of each degree of treatments, two plots contained the allelopathic plant, sunflower (Helianthus annus). After ample time for growth, samples of aboveground biomass of each plant in the plots were collected. This researcher observed that Raphanus sativa and Brassica rapa generally did better in times when sunflower was absence thus, supporting my hypothesis that there would be growth inhibitions due to an allelopathic plant.

58. Khaivchandra Ramjeawan. ALL IN THE FAMILY: Using Phylogenetic Systematics to Develop a Family of Arsenic Hyperaccumulators

Arsenic is one of the most toxic substances in the world. It is extremely dangerous (even at low levels), and it is even documented as a human carcinogen. Arsenic in the soil and groundwater has been a problem for many years. Currently, it is plaguing countries like Bangladesh (which has over 25 million people at risk of infection) and Southern United States (Florida). Anecdotal evidence and extensive research has proven that the Chinese Brake Fern, Pteris vittata, can effectively remove arsenic from the soil. The population of this fern will eventually be stressed because it is the only fern being used as a hyperaccumulator. Therefore, through the use of Phylogenetic Systematics, and the current taxonomic keys, five other Pteris ferns were identified and purchased. These included Pteris cretica (Roweri, Albolineata, Mayi) and Pteris ensiformis (Evergemiensis). After a great deal of difficulty, Pteris vittata was obtained for comparison. In this experiment, these Pteris ferns were tested for their ability to remove arsenic from the soil. Arsenic trioxide was mixed in different concentrations with water, and the solution was then inoculated into each plant's soil. The concentrations of arsenic in the plants were monitored using a HACH testing kit to determine if the ferns were successful in removing the arsenic. The results showed that not only were the other ferns able to remove the arsenic from the soil.....they did it better than the Pteris vittata. Through the use of statistical analysis, I was able to obtain a p - value <.00001. Therefore, this proves that my research was significant. This is important because my research provides a cost effective and promising plan for those that are currently suffering.

59. Paul Richards and Rishaun English. The Effect of Two Commercial Surfactants on Water-Repellent Soil

Water repellency, which affects infiltration, evaporation, erosion, and other water transfer mechanisms through soil, has been observed under several natural conditions throughout the wotld. Surfactants can be used to mitigate the consequences of soil water repellency. The infiltration rates of two surfactants were applied. Drop Penetration Times (DTP) of these solutions were also measured for these solutions. An aqueous ethanol solution (ethyl alcohol) with identical surface tension as the surfactants solutions were used. The DTP decreased and the infiltration rate increased as the surfactant solution concentrated increased. These results are explained by an adsorption of surfactants, which caused an increase in surface tension of the solution.

60. Diana Ruano. Greener Than Green: A Novel Approach to the Use of Natural Substances as Plant Growth Regulators in the Family Poaceae

The purpose of this study was to investigate the effects of the application of traditional plant growth regulators (PGR) and compare them to the effects of organic PGRs. In this investigation, the PGRs were applied to three different species of turfgrass. The species that were utilized are penncross creeping bentgrass (Agrostis palustris), perennial ryegrass (Lolium perenne), and Kentucky tall fescue (Festuca arundinacra). The organic substances that were utilized are soluble seaweed extract and humic acid. The effects of these organic PGRs were correlated against a more traditional PGR, gibberellic acid. Turfgrasses were used due its potential for environmental buffer strips in the Long Island region where non-point source pollution and waste runoff continues to be a serious issue to the region's ecology. Through physical observations and biochemical testing, this study has determined that holistically, organic plant growth substances are more efficient in improving the quality of turfgrass. Expedited germination and superior growth patterns occurred in turfgrasses that were treated with either seaweed extract or humic acid. To support these results, statistical analysis was performed. It had to be determined if there was a correlation between the growth rate and the rate of photosynthesis. The various hypothesis testing showed that level of significance where $p = < 0.001$ in all cases. It was also discovered that Phylogenetic Systematics plays an integral role in foreshadowing the effects that a plant growth regulator will have on turfgrass species of common tribes. The main purpose of developing a better quality turfgrass lies in producing a better filter strip. This in turn will help areas in reducing water surface pollution caused by runoff.

61. Gopaul Singh. Empirical Evidence For Predator-Prey Source-Sink Dynamics

It is said that a source-sink structure for a prey species can promote the persistence of an otherwise non-persisting predator-prey interaction.The organisms that will be used to test this theory are, the helizoan protest predator, Actinosphaerium Nucleofilum and the ciliated protozoan prey species, Tetrahymena Pyriformis. I have used different sizes of polypropelene bottles, 30mL and 60mL, to also test this theory. These bottles were also connected, one side with predator-prey and the other preys only. Also it is to test the Rescue Effect, which is preventing a population from going extinct. Evidence suugests that continuous prey immigration into prey only bottles from predator-prey bottles have weakened the coupling between predator and prey dynamics and ncontributed to the increase in persistence.

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62. Caiti Caputo. The Effects of Metallic Solutions on Oat Plants.

The project was performed to test the effects of separate metals on oat plants. Acute doses would be assumed to have more of an effect on the plant, this proposal tested. There were eight groups of five tubes each. The eight groups represented eight metals: boron, sodium, potassium, zinc, copper, aluminum, magnesium, and iron. Different concentrations of the metals, from 0-20ppm, were added to the corresponding tube. The tubes were placed under 40-watt florescent lights. The plants were measured in centimeters. Magnesium and copper had no growth at concentrations of 20ppm. In addition, magnesium had the least root growth. All of the copper concentrations had large effects on the oat plants. The entire copper group germinated last, and had the least blade growth. These were the most significant outcomes. Based on the results, it is obvious that the effect on the oat plant depends on the metal. Aluminum stimulated growth whereas copper stunted it. Boron, sodium, zinc, potassium, and iron had no significant effect on the oat plants.

63. Brooke Engeldrum. Local Effects of Coral Reef Succession on Ocean Water Chemistry.

Marine organisms introduced into a salt-water aquarium will have an affect on the ammonia, nitrite, and nitrate levels. Marine organisms will have a greater effect on the water chemistry compared to the live rock are initial contemplations. Corals are small polyps that grow in colonies. Coral reefs play a significant role in marine ecology because they are home to many independent organisms. Live rock is fragments of stony reefs, which have broken off during storms, and is collected along the shoreline in shallow water. Living organisms attach to it, providing benefits to the reef aquarium. The nitrogen cycle is one of the most important nutrient cycles in the environment. Steps of this cycle include ammonia, nitrite, and nitrate. A 55-gallon Jewel Oceanic Tank with Instant Ocean was set up. Ammonia, nitrate, nitrite, pH, specific gravity, temperature, and dissolved oxygen were measured regularly to characterize the chemistry of the water. Live rock was introduced into the aquarium. Five Blue Damselfish, four Saltwater Snails, two Hermit Crabs, three Black Dominos, and three Striped Dominos were later introduced into the tank. Data was recorded at a consistent time and location in the tank to reduce variability. Ammonia, nitrite, temperature, pH, and specific gravity all remained consistent. Nitrate and dissolved oxygen had dramatic increases. There were low dissolved oxygen levels because at natural reefs, the churning of the ocean water, tides, and phytoplankton activity are able to maintain higher levels of oxygen.

64. Peter Hurley. Effects of Different Types of Water on the Growth of Brassica rapa.

The purpose of this experiment was to determine which types of commercially available water were best for the growth of plants, specifically Brassica rapa. It is possible with this information to determine the best water to use for controlled plant growth. The experiment was performed by growing the plants in Styrofoam quads, with the same type of soil, and no fertilizer. An automatic watering system was used to ensure constant and consistent watering. Four varieties of water were used. These are Suffolk County Water Authority water, Aquafina® brand water, Poland Spring® brand water, and water attained form Lake Capri in Suffolk County, NY. The results were: SCWA had a final average of 3.14 cm, Poland Spring® had a final average of 4.03 cm, Aquafina® had a final average of 4.01 cm, and water from Lake Capri had a final average of 4.92 cm. These results indicate that the SCWA water was the worst for the growth of plants, the Poland Spring® and Aquafina® waters were comparable, and between the SCWA and the Lake Capri water, and the Lake Capri water was the best. The exceptionally high height of the Capri group was possibly a result of the algae that grew in it, possibly adding nutrients. As a future experiment, the test could be repeated using hydroponics.

65. Jon McManus. The Effects of Dissolved Inorganic Nitrogen on Microspora galbama and Botrydiopsis turneri.

It is generally accepted that the addition of too much nitrogen into an estuary can lead to harmful algae blooms. Because of this concern, some estuarine management programs have succeeded in reducing dissolved inorganic nitrogen (DIN) to a level that supports only limited primary and secondary productivity. Several of the estuaries that have demonstrated significant nitrogen reductions have experienced algae blooms of Aureococcus anophagefferns (Brown Tide). What is known about brown tide algae is that it has a relatively small cell size of one micron. This is significant because certain species of shellfish cannot consume and gain ample nourishment from such a small species of algae. This experiment tested the effects of DIN on Microspora galbama and Botrydiopsis turneri, cultured individually and combined at DIN concentrations of 0.02, 0.15, and 0.3 mg/liter. The hypothesis was that higher levels of DIN would result in higher concentrations of M. galbama and B. turneri. Algae size was determined using a hemacytometer. The Fuchs-Rosenthal method was employed for determining cell concentrations and micron size. The experiment lasted four weeks. It was determined that high DIN levels resulted in an increase in b concentrations and a decrease in B. turneri concentrations. Low DIN levels increased B. turneri concentrations and reduced concentrations of M. galbama. Only under high DIN concentrations, M. galbama experienced an increase in average individual cell size.

66. Matthew Milligan. The Effects of Ultra Violet Light on Amphidinium carterae.

In recent years, formation of toxic algae blooms has become more common. A possible cause of this change in trend could be due to exposure to an increased level of ultraviolet light seeping through the ozone layer. To test this hypothesis, six cultures of Amphidinium carterae were exposed to different light conditions. Two cultures were placed in each group. The control group received only fluorescent light, while one group was exposed to short wave, or UVB ultraviolet radiation (254 nanometers) and the other was exposed to long wave, or UVA, radiation (365 nanometers). All other conditions remained constant and cell counts were taken every other day. After twenty days of recording data, the results showed that the algae exposed to ultraviolet light died more rapidly than the control group algae. The cells exposed to short wave radiation suffered the most dramatic drop-off, which is because short wave ultraviolet light is far more intense than long wave. These results prove that increasing ultraviolet light is the cause of a rise in toxic algae bloom growth to be false. A possible cause for the unexpected results could have been that the ultraviolet light source was placed too close to the algae cultures and this extreme intensity caused their quick decline. In future research, placing the lights farther away from the cultures could cause different results. In addition, another possible cause of the increase in toxic algae blooms could be the increase in nitrate-based pollutants into the environment.

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67. Katharine Olsen. Water Quality Study of the Connetquot River Estuary System.

Water is a staple of life and one of the most important resources we have on our planet. Many materials are water-soluble and can disperse, affecting large bodies of water. Water pollution is becoming a major problem. The hypothesis was that along the Connetquot River, areas upstream, with few contamination points, would show less signs of pollution than areas downstream, with more places for contamination. The river was tested every other Sunday, by taking a water sample, pH, temperature, electro conductivity, total dissolved solids, and salinity with Hanna instruments. The water samples were brought back to the lab, where they were tested for Coliform bacteria with a presence/absence test. The hypothesis is partly supported, that downstream areas contained higher electroconductivity and total dissolved solids than areas found upstream. No Coliform bacteria were found at the sampling sites, although the bacteria indicator did change after 48 hours, indicating the possible trace quantities of bacteria. Temperature increased during the weeks.

68. Michael Ruscito and Lindsay Paladino. The Effect of Nitrates and Phosphates on Cambarus Sp.

Nitrates and Phosphates are essential to the existence of plant life but are harmful to animals in high concentrations. High nitrate and phosphate levels can cause hypoxia, which depletes dissolved oxygen levels. This experiment will test different concentrations of nitrates and phosphates on crayfish. It is hypothesized that if the crayfish are introduced to increasing amounts of both nitrates and phosphates, then their body mass will decrease and there will an increase in deaths. Forty-nine crayfish will be introduced to seven tanks (seven per tank). A filter will be used for waste management and only the foam filter will be used to maintain the adequate ppm concentrations. Each of the seven tanks will have an increasing value of ppm of nitrates, phosphates, or a nitrate/phosphate mixture. The crayfish will be weighed every other day and the ppm measurements will be monitored every other day.

Special thanks to:

Dr. Albert E. Donor, President

Dr. Richard Resch, Provost

Mr. David Ring, Dean of Students

and

The Administrative Staff of Dowling College

for their continued support of the Annual Symposium

Varian Instruments

for their generous financial contribution to support the Annual Symposium

The Dorr Foundation

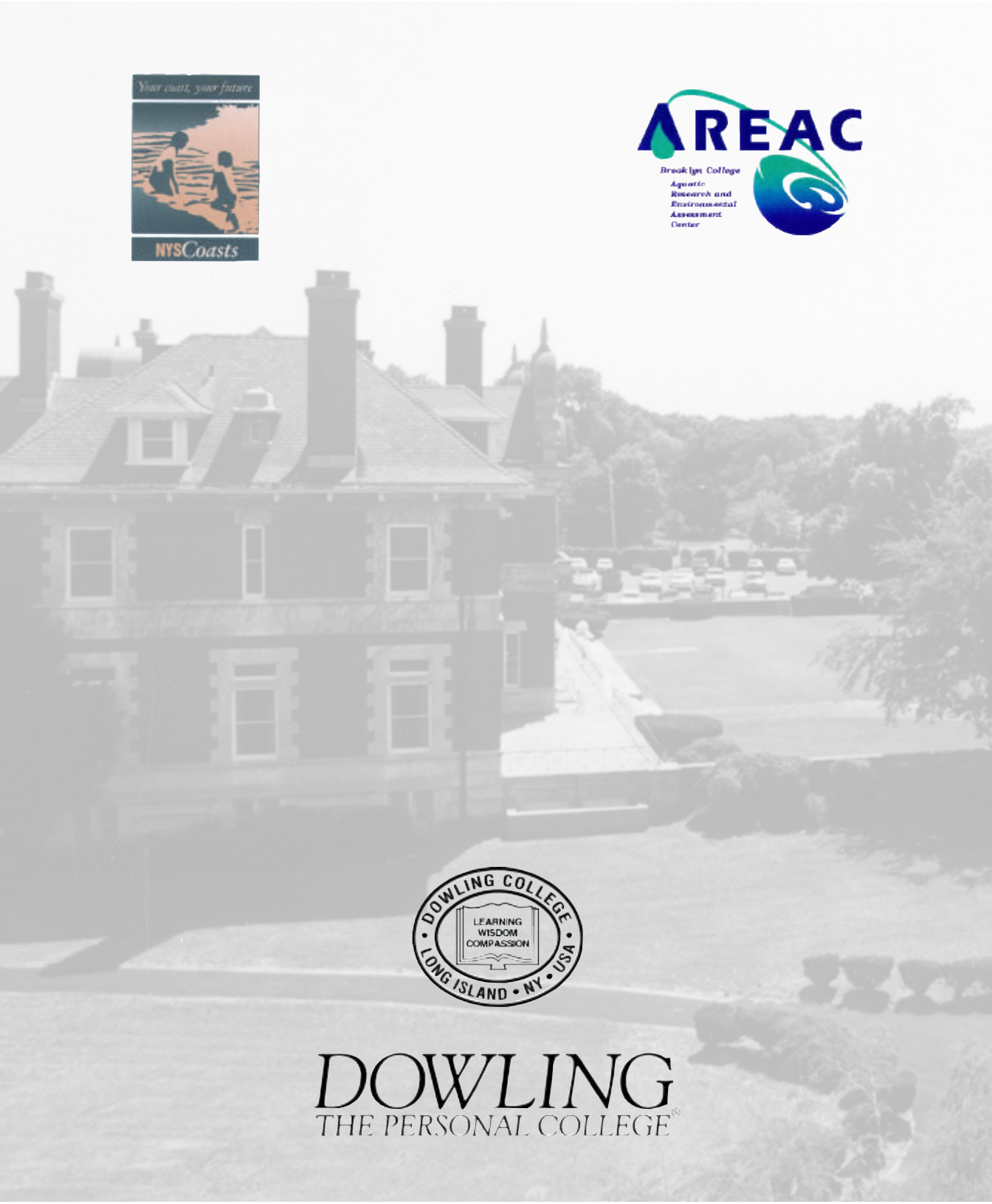
Seed Grant to initiate the Dowling College "Chemistry in Action"
Research Program on the South Shore Estuary

Idle Hour Flyfishers

Annual Fellowship to support a Dowling student in "Chemistry in Action"

Elaine MacLellan

Adjunct Instructor of Biology, Suffolk County Community College
for her dedication in helping to organize this year's event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