

FINAL REGISTRATION LIST
February 25, 2005
Project Descriptions for Judges

BIOCHEMISTRY

BC.01: Michael Joseph Caffarelli

What is the Difference between Music and Noise?

I will produce different frequencies using my alto saxophone, analyze their difference using an oscilloscope computer, and present my findings.

BC.02: Divya Gupta

Link Between The Nematodes

With the completing of the Human Genome project, there has been increased interest in sequencing many other organisms such as *C. remanei* being one. The genes of the nematode have never been determined before; the researcher dedicated her skills to sequencing *C. remanei*'s DNA. This researcher sequenced the genome of *C. remanei* and attempted to examine the causes of coding introns in a non coding region. The research used various techniques from *C. remanei* gene in order to isolate and then sequencing those genes. Programs such as BLAST was used to link the acquired DNA of *C. remanei* to closely related worms such as *C. elegans* and *C. Briggsae*. RNAi was used in order to interfere with gene expression. As a result the genes that code for basic functions for survival development and reproduction will be affected. The results showed that scientists could in turn investigate the many essential biological characteristics that are central problem of human biology and evolution and create new databases.

BC.03: David Rodriguez, and Joseph Burke

Isolation of C.remanei Genes for Comparative Genomic Analysis

The genomic sequencing of *C. elegans* proved to a powerful tool for learning about human health and basic biological processes. More recently, the genomic sequencing of a related worm, *C. briggsae*, and comparative genomic analysis with *C. elegans*. Sequencing the genome of a third worm, *C. remanei*, for a three way comparison could further enhance our understanding of *C. elegans* and thus improve our knowledge of basic biologic functions. In this project, we will be isolating and analyzing *C.remanei* cDNA and comparing it to higher eukaryotes.

BC.04: Emi Ling

Effects of EIPA and EGTA on Glutamate-Exposed Fibroblasts: A Model of Alzheimers Disease

To identify a potential protective agent against apoptosis induced by excess glutamate, the effects of EIPA (a Na⁺/H⁺ exchanger inhibitor) and EGTA (a Ca²⁺ chelator) were observed on glutamate-exposed fibroblast cells in vitro.

BC.05: Mary Germino

Multiplex Tagging to Understand Ribosomal Biogenesis

Multiple genes that are involved in ribosomal biogenesis were tagged with two epitopes, one general and one specific, to enable their detection during the cell cycle.

BC.06: LeeYun Kim, and Eunice Jihyun Nam

Determining the factors which affect Thiocyanate Level in Human Saliva

We are investigating the various factors that may lead to change in thiocyanate level in human saliva. We are focusing on the vitamin B12 aspect.

BC.07: Lina N Zamamiri, and Daria Nicole Bialik

Catch Me if You Can

Using chromatography with plant pigments and fibers,also rhodamine and lasers with fingerprinting to go about solving a crime using the science of forensics.

- BC.08: Hua Chai
PDE2 Acts Downstream of NGF to Regulate PC12 Cell Neuritogenesis
This work studied the regulation of cAMP in PC12 cells, especially cAMP degradation by phosphodiesterases (PDEs), during NGF induced neurite outgrowth and determined that PDE2 is the primary enzyme that degrades the cAMP generated by NGF treatment.
- BC.09: Denise Marie Ichinco
Rheumatoid Arthritis
Further investigations into the nature of Rheumatoid Arthritis with a focus on Rheumatoid Factors.
- BC.10: Abraham Rashin
Lattice Studies of Protein Structure, Folding, and Stability
We elucidate the contributions of various factors to protein structure, folding, and stability through computations on protein lattice models.
- BC.11: Victoria Ann Wells
Analysis of 5' Hox Gene Expression in Pbx1/Pbx2 Mutant Mice Embryos
I analyzed the relationship between Hox and the homeodomain Pbx1 and Pbx2 by performing numerous in situ hybridizations and other methods. By analyzing the fore and hindlimbs of mutant Pbx1^{-/-}; Pbx2^{+/-} mice, I was able to see the effects of the lack of Pbx2 alleles on Hoxd 5' gene expression.
- BC.12: Young-Bin Won
The Effect of Sodium Pyruvate on Mouse Fibroblast Cells
Sodium pyruvate was added to mouse fibroblast cells to see if the cells would go into cellular senescence at a higher rate. The increased concentration of sodium pyruvate accelerates mitochondrial behavior so more intracellular oxidants will be produced. The cells were observed to see if the intracellular oxidants led to an accelerated rate of cellular senescence.
- BC.13: James Darwin OBrien
Safer Toys Through Biochemistry
I seek to find out if alternative materials can take advantage of enzymes found in the human mouth or if the moisture of the mouth is a more advantageous element in preventing choking on small toy parts.
- BC.14: Michael Kortrey, and Amit Kumar Bedi
Can the Health Benefits of Oatmeal be Undone?
Mixing a variety of oatmeal products with bovine serum cholesterol to determine whether there is significant absorption or binding on the part of the oatmeal fibers. A cholesterol assay kit will be used in combination with a spectrophotometer to ascertain the total reduction of LDL and HDL lipids.
- BC.15: Christopher Kyle Kitajewski
Generation of a Notch Signaling Transcriptional Reporter
I developed a luciferase transcriptional reporter that responds to the Notch signaling pathway and determined how well it functions in cultured rat cells, where Notch signaling is activated.

BOTANY

- BO.01: Matthew Joseph Barringer
Effect of Tea Tree Oil on Fusarium Oxysporum in Plants
I am testing a natural herb on a fungus to see if it will deter the fungus from growing on tomato plants.
- BO.02: Emily Marie Novosedlik
The Effect of Cinnamon on Preserving the Lives of Cut Mums
This project will observe the effect of using cinnamon to preserve cut flowers in comparison to a control group with no added preservatives, as well as a group of flowers with a commercial preservative.
- BO.03: Joyce Kristin Salomon
The Effect of Colored Plastic Mulches on Bean and Tomato Plants
The project tested the effect of colored plastic mulches on the growth of bean and tomato plants.
- BO.04: Kruti Krishang Sanghavi
Effect of Magnetic Field on the Growth of Primary Carrot Roots.
The purpose is to see the positive and/or negative effects of the north and south poles of a magnet on the growth of carrot roots.
- BO.05: Sarah Sandrian
Nutrient Variations in Wild Multiflora Roses
Multiflora roses were observed for 8 weeks to determine the best combination of nitrogen, Phosphorus and potassium for successful growth.
- BO.06: Maria Raquel Baab, and Joanna Palma Ricciardi
The effects of vitamins on plants?
We water plants with 3 different concentrations of vitamins and water. There are 24 plants total (1 control and 3 concentrations per vitamin)
- BO.07: Waqar Tariq
The Allelopathic Effect of Kava on Plants
The effect of kava powder on the growth of radicles and hypocotyls of plants will be measured.
- BO.08: Arpan Himanshu Patel
Variations in Amyloplast Magnetophoresis under High Gradient Magnetic Fields
The ability of high gradient magnetic fields to induce shoot curvature was studied under different plant nutrients.
- BO.09: Mitesh Rajendra Patel
Helium: Effect on Wisconsin Fast Plants
The effect of atmospheric concentrations of helium on the growth of Wisconsin Fast Plants will be evaluated.
- BO.10: Jason Anthony Corbiere
Environmental Effects on Plant Growth and Health
Plants were grown in a set of controlled environments, each with different levels of humidity and temperature in order to measure the effects of temperature and humidity on plant growth and health.

BO.11: Nidhi Jain

The Effect of Emissions of Volatile Organic Compounds on Proximate Plants

This experiment looked at the effect of volatile organic compounds emitted from grass on the growth of nearby bean plants.

BO.12: Daniel Eric Miller, and Christine Josephine Bui

Organic Fertilizer or Commercial Fertilizer, Which is Better?

Three rectangular flower boxes will be set up in the greenhouse next to each other. Each will be filled with top soil. Various vegetable seeds will be planted, all at the same depth. The first box will be the control. No fertilizer will be added. The second box will be fed with commercial fertilizer, and the third box will be fed with an organic fertilizer.

The boxes will be given the same amount of water periodically. The soil will be monitored with a soil moisture meter. The growth of all plants will be carefully monitored for height, sizes of leaves and time for germination. The plants will be analyzed for chlorophyll content, as well as other tests.

BO.13: Vihar Patel

The Effect of Soil pH on Wisconsin Fast Plants

The growth and effect of various soil pHs will be tested on Wisconsin Fast Plants, which all Fast Plants will receive the same amount of sunlight, water, etc.; but different soil pHs will be present.

BO.14: Jennifer Mustillo

The Effects of Household Wastewater on Sunflower Growth

This project tests seven different mixtures of tap water and dishwasher water on sunflowers

BO.15: Joanna Shin Kong, and Mahak Jain

Effect of pH on mycorrhizal plant growth in two P concentrations

This experiment will test the effect of a lower pH level on the growth rate of mycorrhizal plants in low P concentration soil versus high P concentration soil.

BO.16: Apurva Bharat Sanghvi

The Effect of Music on Plants Infected with TMV

The purpose of this study is to examine the effect of different types of music on plants infected with Tobacco Mosaic Virus.

BO.17: Charmi Dinesh Shah

Various sound effects on Gavottes.

The various effect of Indian classical music and rock music on Gavottes will be observed.

BEHAVIORAL SCIENCE

- BS.01: Natalie Maria Stein
Cosmetology: A Science
This project studies the effect that cosmetics and personal appearance may have on evaluation of our impressions of a person. Experimental subjects are shown various photos of a woman, and then answer questions about their impressions of that person.
- BS.02: Kelly Brownett
The Effect of Gender on Perception of Optical Illusions
This project attempted to determine if gender affects perception through use of sets of specific illusions.
- BS.03: Hannah Marilyn Reitman, Kimberly Shiou-Wei Oo, and David Charles Kinskey-Lebeda
Effect of Different Colors on the Speed of Solving Mazes
The projects objective is to determine whether color of the sheet of paper affects the speed at which a maze can be solved.
- BS.04: Joseph Peter Harrison
Market Theories and their Practical Application
This project will examine major stock market theories and how they can be applied to more realistic situations encountered in everyday life.
- BS.05: Sarah Elmedani
The Effects of Thymoquinone, Carvol, Isopropyltoluene, and Beta-Pinene on Dugesia tigrina
Different chemical components of *Nigella sativa* were extracted. The repellent propities of these chemical cimponents was tested on planaria.
- BS.06: Anthony Warren Grand
Marketing to Your Nose
This project is designed to find out how certain odors can affect a potential customer, and which odors work best.
- BS.07: Jamie DeNizio, and Christie DeNizio
Preference Similarities Between Fraternal Twins and Siblings
The differences between common everyday preferences were studied with regard to fraternal twins and siblings
- BS.08: Nina Lee
The Effects of Ginkgo and Caffeine on Memory and Learning
Ginkgo and caffeine will be exposed to zebrafish and their effects on learning and remembering a simple spatial alternation paradigm will be assessed.
- BS.09: Richard Brian Lopez
A Contextual, Syntactic, and Semantic Analysis of Language
I will be examining how people construct sentences and how they derive meaning from them, as well as what variables will affect their construction and interpretation.
- BS.10: Vicky Du
The Effects of Various Types of Music on Mus Musculus
Mice will be exposed to various genres of music to see how it affects their maze-solving abilities.

- BS.11: Zain Paracha
Human Perception of Visual Weather Forecast Icons
Peoples perception of weather icons was evaluated by distributing surveys asking participants to choose activities based on forecasts.
- BS.12: Christa Marie Frodella
Cerebral Dominance and Handedness
The purpose of this study is to determine effects of cerebral dominance. I plan to conduct an extensive research study, survey human subjects, and interview the subjects. Through this process, I plan to conclude other traits of left handed individuals and the genetic or outside influence of determining handedness.
- BS.13: Barry Philip Shifrin
Traumatic Recall and Concentration in Adolescents
This study will use a verbal learning test and an inventory of traumatic personal events to assess the effect that remembering these emotions will have on academic concentration.
- BS.14: Stanley Okoye
The Prevalence of Common Polite Behavior in Public Settings
Polite behavior (holding doors, stepping aside to someone else pass, etc) was observed to determine if it was more prevalent among males or females.
- BS.15: Anny Okrainets
Synesthesia
The project will consist of researching the phenomenon of synesthesia and understanding the effects of it on society.
- BS.16: Meredith Lynn Bayley
The Process of Perception in Children
An investigation of how children perceive the world.
- BS.17: Katherine Garceau
Variations in Perceptions of Attractiveness
A survey was done to determine if attractiveness in males and females had any basis in ethnicity.
- BS.18: Brian Ortiz, and Sean Patrick Bailey
A Study Of The Subconscious Through Lucid Dreaming and Meditation
A focused study of the meaning, nature, and power of the human subconscious through research and experimentation in the fields of lucid dreaming and alterative meditation.

CHEMISTRY

- CH.01: Scott Matthew Kaufman
Formation and Combustion of Acetylene
I will study the reaction of calcium carbide and a proton source to form acetylene and the combustion of the gas.
- CH.02: Beverly Rose Thompson
Unlocking the Mysteries of Petrification
The goal of this project is to see if wood can petrified in a short period of time by increasing the concentration of available minerals and by increasing surface area and temperature of the process.
- CH.03: Emily Ghods, Samantha Dolph, and Rebecca Claire Rothkopf
The Effects of Concentration on the Mechanisms of Chemical Reactions
Using a Genysis Spec-20 and Spectra Pro software, two chemical reactions will be studied using the kinetics mode. The Absorbance will be measured every second, and the software will be used to generate kinetics curves (Absorbance vs Time) and determine the slope of the curve at various points. The First reaction studied will be the iodation of acetone using an acid catalyst. The solutions involved are a .02M iodine solution, acetone, 6M and 3M hydrochloric acid. The second reaction is between iodine and iron II ions. The chemicals are .02 potassium iodine and .02 M iron III chloride. After a rate equation is determined, the concentration of the reactants will be varied to see if there is a change in the rate equation. In the first reaction this will be accomplished by various dilutions. In the second reaction the concentration of the solutions will be changed.
- CH.04: Erica Rachel Greene
Building a thermo-optic spectrometer and determining iron detection limits
I built a thermo-optic spectrometer and used it to explore the limits for iron detection
- CH.05: Robert Ngenzi
Parameters Affecting the Chemiluminescence of Luminol and Hydrogen Peroxide
Various factors in the reaction between luminol and hydrogen peroxide are varied, including the viscosities, concentrations, and temperatures of the solutions. How these variations affect the induction time, duration of the reaction, and intensity of the light emitted are then explored.
- CH.06: Sonia Sharma
Degradation of Polyacrylamide-Polyvinylacetate Composite Under Simulated Human Stomach Conditions.
The ability of a polyacrylamide-polyvinylacetate composite to degrade under simulated human stomach conditions was tested.
- CH.07: Victoria Elizabeth Lee
Copper Binding And Its Possible Link To Disease
Copper is suspected to play a key role in Alzheimers, Mad Cow, and tumor growth. This study explores factors affecting the binding and removal of copper from proteins.
- CH.08: Yushen Qian
Catalytic Decomposition of Hydrogen Peroxide - Spirit of Chemistry
The effects on temperature and reaction time of the decomposition reaction of hydrogen peroxide through variations in identity and amount of catalyst and concentrations of hydrogen peroxide.

CH.09: Christopher Alexander Kennedy

Micellar Effects on Hydrolysis Kinetics

A study of the effects of varying concentrations of micelles around the CMC on the speed of a reaction.

CH.10: Simranjeet Singh Sran

The Chemistry of Oscillating Clock Reactions

Variation in concentration of single reactants and groups of reactants to study the effects on the length of periods, number of periods, length of reaction, and induction time.

COMPUTER SCIENCE

- CS.01: Jason Donal Pearson
Coding Data
This projects goal is to develop an efficient way to communicate across the internet and perform basic operations using programming languages open to the public.
- CS.02: Gloria Wu
Graphic Animation
A study of the development and use of graphic animation in movies.
- CS.03: Yasha Okshtein
Depth Estimation via Computer Stereo Vision
The goal of this project is to create a dense depth estimation map using two computer cameras by detecting minute differences in the stereoscopic pictures.
- CS.04: Jessica Kailey Virdo
A Study in Website Design and Visual Appeal
Using HTML, I plan to design a website that is not only functional but is visually appealing. The site will be used in my science research class to put information about competitions and other school related events.
- CS.05: Samar S. Kamat
Comparison of Different Data Mining Algorithms in Relation to Performance
Compares the efficiency and accuracy of two data mining algorithms, Apriori, and K-means.
- CS.06: Alexander George Bick
Live Long and Prosper: PDA Genetics Participatory Simulation
Personal Digital Assistants enable users to simulate Mendelian genetic principles teaching genetics in an inquiry based science-learning environment.
- CS.07: Andrew James Ragone
DTMF Remote Control
This project uses a computer to analyze the input of a radio in order to start or stop a function assigned by the user. It uses an FFT algorithm to decode the DTMF tones and has a voice confirmation feature to make sure the correct number sequence was entered. The project can allow a computer to start a particular program at a certain time, communicate with an external piece of hardware through the parallel port and allow remote input, remotely control an electrical socket which may have a light or other appliance connected to it, and similar types of functions.
- CS.08: Anand Nagaraj
Single Button Mouse
A computer mouse that can be operated with a single button.
- CS.09: Linda G. Cai
Glove Keyboard
A one-hand multifunctional cording keyboard sends "typed" text to a device which will convert it to speech, i.e. say it out loud. Text will be typed using finger combinations.

CS.10: Ozan Can Yilmaz

Remote Text Display over Internet

This project utilizes a liquid crystal display (LCD) connected to the serial port of a computer to display messages sent over the Internet. Software to establish the communication between the units was developed by Visual Basic 6.0.

CS.11: Marc Jonathan Sweetgall

Object-Oriented Programming with Real Objects

This project brings real objects into the object-oriented programming environment using ActiveX objects.

CS.12: Chaitanya Rastogi

Evolutionary Computing

The Java programming language is used to write a program that develops its own algorithm to accomplish simple tasks.

ENGINEERING

- EN.01: Henry Thomas Lajoie
An oscilloscope for the rest of us
A digital oscilloscope that sends data to the computer to be plotted. Intended to be inexpensive so that all school labs can afford it.
- EN.02: Corbin Michael Dean
Wind Power Generator Blade Design
This project will compare the different blade designs used by wind-powered generators by comparing each blade's power output.
- EN.03: Palak Kundu
Gaze Control
Controlling appliances through webcam technology and infrared modules.
- EN.04: Abigail Leigh Bricker
Audio Directional Device for Academy of Math, Science, & Engineering
An audio directional device will be designed and created for use in the Academy of Math, Science, and Engineering building through extensive research and survey.
- EN.05: Brett Michael Fowler
The Applications of Nitinol Wire on Latex Hand Prosthetics
The attributes of Nitinol memory wire were investigated and applied to a human hand prosthetic. A mold and cast of a human hand will be made to act as the structure of a Nitinol actuated prosthetic made of latex.
- EN.06: Swati Bhandari, and Young Bin Won
Flexinol-Controlled Puppeteering
Flexinol memory wire is used to control the movements of a puppet's limbs in a traditional Korean fan dance. The shape memory wire expands when heated with an electric current and contracts when cooled, allowing for quick, fluid movement.
- EN.07: Amanda Lynn Sexton, and Amanda Ingibjorg Karlsson
The Solar Powered Assistant Bike
A bike designed to utilize solar charged batteries to assist in making transportation easier.
- EN.08: Anna Obee Giarratana
Touch
This project will be able to score touches in a fencing match by putting two fencers on different frequencies; when the tip of a fencer's foil hits the opponent, the signal will be transmitted to the receiver and this information will be communicated to the LCD.
- EN.09: Zain Boghani, Jimmy Huang, and Scott Bennett Shapiro
Extreme Solar Vehicle
Our project is the complete transformation of a unproductive gas-driven vehicle into a powerful and efficient solar electric vehicle. Thank you.
- EN.10: Oren Levi
Too Close For Comfort
An electronic device to indicate to drivers how far they should be from the car in front of them using eye resolution.

- EN.11: Jay R. Deshmukh
Biodiesel
This project deals with biodiesel fuel made from new and waste oil and the differences in performance of the fuels.
- EN.12: Matthew Rosoff
Direction Finding via Radio Waves
This robot will find and home in on a stationary or moving radio transmitter.
- EN.13: Michael St. Angelo, and Zachary Keator
The Yellow Submarine
The project is to design a submarine that regulates buoyancy through compression and decompression of oil.
- EN.14: Peter David Koch
A Tracking Robot and Its Uses
This robot tracks a line and stops at programmed checkpoints, allowing it to perform certain tasks.
- EN.15: Simona Saracco
The Ideal City
Design a city that is environmentally safe and has good methods of transportation
- EN.16: Christine Yuan-ling Paxson
Three-Dimensional Photography and Surface Analysis Using Moire Interference Patterns
Projected line patterns and Moire interference patterns can be used to capture more three-dimensional information about an object being photographed than would otherwise be obtained under normal, uniform lighting conditions.
- EN.17: April Marie Thompson
The Autobrush
The Autobrush is a machine which was built to brush your hair as you pedal.
- EN.18: Shoubhik Roy
Double Reverse Delta Winged Lippisch WIGE
A Ground Effect Craft is able to maintain flight a few feet above the water because the lift over drag ratio is highly improved. This study was concerned with a certain type of a W Wing-In-Ground (WIG) craft known as Lippisch. The primary concern with the Lippisch design is that the speed needed to take off is considerably higher than the cruising speed. If this type of WIG craft needs 100% of the engine power to take off, it only uses 50% to cruise. Lift on an aircraft and the surface area are directly proportional. If one is increased, so is the other. Thus it was hypothesized that if the surface area on the WIG craft is increased, the lift will also increase reducing the take off speed required to take off. Thus, adding an extra reverse delta wing to the Lippisch WIG craft will help it overcome the take off drag. To test this, two of models were made for the two designs. They were then tested for the proper variables in an emulated wind tunnel. As hypothesized, the experimental group proved to be better in all aspects and the research was accepted with a 95% confidence.
- EN.19: George Francis Hotz
The Googler
A robot that uses a GPS, camera, and onboard computer to seek out targets.

EN.20: Vincent Edward Scarfo

Architectural Engineering: Residential, Industrial, and Corporate Safety Features

A comparison will be made of the trade-off between safety and cost when Building sky scrapers, and an effort will be made to try to optimize both.

EN.21: Justine Soo Yun Yoon

Echo Navigator

The Echo Navigator will aid the visually challenged to travel with ease, by measuring the distance between the person and the objects surrounding the person with accuracy, and indicating that measurement by tactile feedback.

EN.22: Jayanth Krishnamurthi

A Numerical Design Simulation of a Novel Notched Airfoil

A numerical simulation of a novel wing design based on an existing one.

EN.23: Bryan Horvath, and Michael Anthony Gianfrancesco

New Rollercoaster Design

A new type a roller coaster that is still safe to the human body. It will have new elements unlike another rollercoaster.

EN.24: Jason Andrew Johansen

The CNC Experience

The goal is to build and design a CNC machine. This experience is teach me about design, production, and electronics

ENVIRONMENTAL SCIENCE

- EV.01: Dion Fisco
The Effects of Various Earthworm Species on the Development of Compost
This project examined the effects of different earthworm species on composted soil and the composted soils effects on tomato plants.
- EV.02: Michael Charles Kreisel, and Rafay Abbasi
Water Quality Experiment
We are taking water samples from local areas and testing them for specific chemicals previously found in water supplies throughout America in a government study.
- EV.03: Huai-Ming Xu, and Vivek Shah
Grease Powered Motor
The purpose of this project is to compare the efficiencies of a motor running on propane and gasoline. The efficiency will be determined by analyzing emissions and waste heat.
- EV.04: Yves Andre Javier, and Katherine Wysoczanski
Grass Fights Back
Testing the resistance of different turfseed to an herbicide
- EV.05: Payal Patel
The Effect of Different Concentrations of Pesticides On Onion DNA
This project is set out to observe the effect of various concentrations of pesticides on the structure of Onion DNA.
- EV.06: Carol Poskay
Beach Erosion: Differences in New Jersey and Other East Coast States
A study of the erosion rates of the states along the East Coast was done to determine the percentage of coastal erosion in comparison to that of New Jersey
- EV.07: Kimberly Ann Boyko
Colonization of Artificial Microhabitats with Consideration of Inverse Elevation/Moisture Gradients
The moisture gradient of natural sphagnaceous hummocks and the primary succession on artificially constructed microhabitats in the Pine Barrens is observed and studied.
- EV.08: Steven Woltornist
Worms and Composting: Alteration of Soil pH
This project attempted to examine the effects of worms on the compost pH and growth of the plants on which the compost is used.
- EV.09: Arvind Srinivasan
The Effect of Nitrogen Fixing Bacteria on Light Absorption in Plants
The absorption of light shall be tested and compared between leguminous plants and Hydroponic plants with the variable as nitrogen fixing bacteria. This project will test the effect of nitrogen fixing bacteria on light absorption in plants.
- EV.10: Amanda Sachenski
The Effects of Weather Changes on the pH of a Swimming Pool
This project tested the effects of temperature and humidity on the pH of a family swimming pool

EV.11: Phillip Cunha

The Effects of Thermal Pollution on Plants Growing Along a Stream

Plants were tested with a variety of temperatures of water to determine the level of tolerance.

EV.12: Katelyn Mineo

The Effects of Lawn and Farm Runoff on Stream Macroinvertebrates

The effects of weather-caused runoff on the water quality and macroinvertebrates present in Royce Brook was observed.

EV.13: Matthew Wipperman

The Effect of High Level EMF on the Growth and Yield of Corn

This research measured the effects of high level EMF on the growth and yield of corn plants.

EV.14: Kristen Ligowitz

Temperature and Precipitation Trends in New Jersey

Data from the state climatology website was examined to determine the presence of trends in precipitation and/or temperature over an extended period of time.

MICROBIOLOGY

- MB.01: Susan Geraldine Barringer, and Heather Nicole Ludlow
Hot Sauce: The Potential Killer of Bacteria
We are testing the antibacterial properties of unconventional household items, such as hot sauce, against Purell and a known antibiotic, ampicillin.
- MB.02: Aziza Hana
The Effects of Honey versus Soap on Staphylococcus epidermis
The use of honey and soap will be used to determine which is more efficient at inhibiting bacterial growth of Staph. epidermis.
- MB.03: Christina Louis
Herbs vs. Bacteria: Who Will Win the Battle to Maintaining Ones Health?
The goal of this project is to determine which herb has a greater effect on the Staph aureus and the E. coli bacterias in the human body.
- MB.04: Gregory Michael Baker
Disinfection/Sanitation Properties of Various Household Cleaners
To test the efficacy of cleaning agents on different bacterial species on various surfaces.
- MB.05: William Joseph Zupko
Cruciferous Vegetables and Thier Weapon Against Cancer: Indole - 3 - Carbinol
This project tests an anticarcinogen, Indole - 3 - Carbinol, that is commonly found in Cruciferous such as broccoli on abnormal yeast cells which resemble human cancer cells.
- MB.06: Laura Toth
The Effect of Different Bacterial Strains on the Lifespan of Wild-type and Mutant Nematodes
Wild type and mutant (age-1/age-2) nematodes will be exposed to four different strains of bacteria to see the effect on lifespan.
- MB.07: Jayme Figueroa
The Effect of Gentamicin Sulphate on Rotifer Reproduction Rates
The rates of asexual reproduction in philodina rotifers with and without the presence of gentamicin sulphate are compared.
- MB.08: Valerie Tice, and Andrij Olexander Kuzyszyn
Aloe Vera: The Green Wonder Plant
Our project is designed to test the effectiveness of aloe vera extracted from the plant on various forms of bacteria.
- MB.09: Mahmoud Atef Elmedani
The Effects of Dehydration and Salt on French Fry Decomposition
French fries were put under different concentrations of both water and salt. The data of the rate of decomposition was recorded from each concentration.
- MB.10: Andrew Han-qi Chong
Determining bacterial decomposition rates in Canada Goose droppings
E. coli and B. megaterium decomposition rates of Canada Goose droppings are determined by measuring carbon dioxide output levels over a 72-hour period.

MB.11: Lynna Bermudez

Herbs vs. Cancer: Who Will Win in the Battle for Survival?

The goal of this project is to determine which herb has a greater effect in reducing the number of cells of the mutant cdc-233 *S. pombe* yeast in relation to cancer.

MB.12: Kelly Ann Bramwell

The effect of Ginkgo Biloba on inhibiting the growth of bacteria (e.g. bacillus megaterium, bacillus subtilis)

Experiment on inhibiting the growth of said bacteria by using a ginkgo biloba extract on cultured bacteria.

MB.13: Andrea Hodgson

The Antibacterial Effect of Mimosa tenuiflora

This projects tests the antibacterial properties of antibacterial soap, containing triclosan, and a natural soap made from the plant *Mimosa tenuiflora*, against *E. coli* and *S. epidermis*.

MEDICINE and HEALTH

- MH.01: Bianca Nicole Iozzia
Amblyopia in Human Adults and Children
To explore current and new ways of correcting amblyopia in humans.
- MH.02: Janine Lin
Loss of the NF2 Tumor Suppressor Gene Product, Merlin, Increases Migration of Mesothelial Cell Lines
The NF2 (Neurofibromatosis type II) gene produces a protein referred to as Merlin. Functional NF2 genes are considered tumor suppressor genes and mutations in the NF2 genes are associated with increased cell proliferation and cell motility. Mutations in NF2 genes are associated with different types of Cancer. In order to evaluate the role of the Merlin protein, different cell lines were tested for migration and invasion. The LP9 cell line expresses normal Merlin protein while the meso-33 cell line does not express the Merlin protein. These different cell lines were incubated for four hours to determine their ability to migrate through 8nm filters in the cell chambers and were later stained and counted for results. The Meso-33 cell lines (with the functional Merlin protein) migrated slower and in smaller amounts compared to the LP9 cell lines (with a lack of the Merlin protein). This research further supports previous research showing that the loss of functional Merlin protein is associated with increased ability of cancer cells to migrate and become invasive. Future therapies for NF2 cancers may involve restoration of Merlin function.
- MH.03: Megan Marie McDonald, and Krysten Marie Thomas
A Scientific Way to Determine the Most Effective Suntan Lotion
With the use of a spectrophotometer, we will test the most popular suntan lotions at various wavelengths. From this we will be able to determine which suntan lotion is the most effective.
- MH.04: Qiaozi Yang
Anti-cancer activity of a Chinese herb, Coptis chinensis
This project looks for selective cancer-inhibiting effect in the herb Coptis chinensis and also explores the possible pathway for any such effect found.
- MH.05: Dina M. Alhelawe
Influence of Miswak on the Binding of Polyphenols to Protein Pellicle
The experiment deals with the influence of miswak (a part of a tree used as a toothbrush) and its whitening abilities on polyphenols, found in red wine and tea, that stain teeth. Hydraxapatite calcium discs were used as to mimic the enamel of a tooth (since this is what the enamel is made out of).
- MH.06: HyunSoo Cho
Scoliosis Prevention Device
Scoliosis Prevention device is for those who have been diagnosed with scoliosis, but have been told to do nothing and wait because their spinal curve is not drastic enough to require a brace or surgery. This device is a posture training apparatus that stresses body alignment to prevent further curvature of the spine.
- MH.07: Manalika Ringshia
The Effect of Grapejuice on the Adherence of Streptococcus mutans on tooth surfaces
Grape juice contain polyphenols that should help defend the teeth against tooth decay. Streptococcus mutans that cause the decay will adhere less to the tooth surfaces when exposed to the polyphenols in grape juice.

- MH.08: Rajesh Ramakrishnan
Automated Electrocardiograph Diagnosing
We construct a system to record and analyze an electrocardiograph autonomously
- MH.09: Nina Elizabeth Babeu
The Effects of Bathroom Cleaners on Mold
The purpose of this project is to see which bathroom cleaner, without bleach, works best on killing mold since asthmatics are highly prone to getting attacks when around bleach.
- MH.10: Megan Marie Blewett
Multiple Sclerosis: Geographic Clustering
I obtained information from the NARCOMS database regarding zip codes of multiple sclerosis patients across the country. I then used geographic information systems (GIS) to map out clusters. I also mapped out male/female ratios and tested a number of common hypotheses about the distribution of the disease.
- MH.11: Ekaterina (Katya) Pak
Effect of Ascorbic Acid on Mitotic Rate of White Blood Cells Exposed to Mitomycin C
Mitomycin C can be used during cancer treatment to inhibit the reproduction of tumor cells. Studies show that antioxidants like ascorbic acid may interact with such chemotherapy treatment. The purpose of this project is to determine if ascorbic acid decreases the frequency of chromosomal aberrations during mitotic division when added to white blood cells exposed to Mitomycin C.
- MH.12: Sarah Heitmeyer
Nutritional Basis of School Lunches Based on Present and Proposed Requirements.
Observing and recording the nutritional benefits of school lunches, actual servings, and choices by students, and evaluating whether they meet health requirements. Comparing student meal choices to present governmental requirements will be evaluated.
- MH.13: Veena Venkatachalam
Saccadic Inhibition Deficits in Schizophrenia: An MEG-Based Study
An antisaccade is a rapid eye movement away from a target; making an antisaccade requires inhibition of the reflexive impulse to look towards a target. Those with schizophrenia have trouble inhibiting this reflexive impulse, so I wanted to look for differences between subjects with schizophrenia and normal subjects with respect to when each activates the region of his/her brain that controls this inhibition while performing an antisaccadic task. Using magnetoencephalography and computing models, we found that those with schizophrenia activate this inhibition-controlling region earlier than healthy subjects do.
- MH.14: Aakruti Bhalja
Effects of Weather and Air Pollutants on Stroke Death and Occurrence
Data will be obtained and correlated to investigate whether or not weather and air pollutants effect the frequency of stroke and death due to stroke.
- MH.15: Yuchen Zhang, and Lysa Chen
Effects of Microwaving on the Nutritional Content of Common Foods
The impact of microwave heating on vitamin C (ascorbic acid) will be determined by comparing the nutritional content of microwave-cooked foods, uncooked or raw foods, and stovetop cooked (steamed and boiled) foods.

MH.16: Kelley Morgan Bula

Stem Cells

The ethics and science of the development and use of stem cells.

MH.17: Ronald Joo

The Effects of Chocolate on Athletes.

Chocolate has been discovered to contain several different nutrients that can improve a persons help. This research investigates if chocolate can also improve the performance of an athlete.

MH.18: Aakash Kaushik Shah

Understanding Longevity from the Inside Out: The Anti-aging Effects of Mild Heat Shock

The effects of mild heat shock on the lifespan of fruit flies were investigated.

MH.19: Sarah Arshad

A possible role of bilirubin in inhibiting PKC induced Vasoconstriction

Antioxidants have gained a lot of respect in the scientific community. Recent research shows that a bile pigment produced by the liver- "Bilirubin" also has antioxidant properties. This research was based on using these antioxidant properties to inhibit vasoconstriction in bovine coronary arteries. Vasoconstriction was artificially induced in vessels using Protein Kinase C inducers (PKC). Results indicated a significant inhibition by Bilirubin and could possibly prevent vasoconstriction.

MH.20: Anna Vitalyevna Shneidman

Effects of Aging on Extracellular Matrix and Cytoskeleton Formation of Human Dermal Fibroblasts

The aging process results from an accumulation of metabolic wastes, which bind with molecules essential for cell processes. Understanding age-related physical modifications in human skin cells and associated proteins is crucial for tissue engineering, regeneration, and wound healing.

Internal (cytoskeleton), external (extracellular matrix; ECM), and global fibroblast arrangements and responses were studied with Inverted, Atomic Force, and Confocal Microscopies. Aged cells exhibited a delayed environmental response, reduced ability to secrete ECM proteins, and disorientation of actin microtubules in the cytoskeleton.

Further studies of cell-substrate interactions provided clues to the possibility to control fibroblast properties via variations in biocompatible scaffolding.

PHYSICS

- PH.01: Mikhail Almeida, and Nicholas Disney
Development of a Low-Budget Electro-Magnetic Propulsion Device
We will use the energy stored in capacitors to use EM forces to launch projectiles at our current low budget and school resources. Device will be maximized to the best of our ability.
- PH.02: Kristen Maryte Rimgail Bloschak
Determining Basic Stellar Characteristics From Eclipsing Binary Observations
I have been observing two sets of binary stars since November and collecting data.

I will be plotting the light-curves of the binary stars, then using the light-curves to determine some basic parameters of the binaries, such as their masses, distances, separations, star-types, etc.
- PH.03: Mary Kathryn Kelly
Variable Stars
Through simulated observations, as well as actual ones, a method for determining the period of a variable star will be made. This information will then be used to determine the type of star in question.
- PH.04: Daniel Zampini
An Analysis of the Effect of Mass, Shape and Firing Angle on Projectiles
This project attempted to determine the effect of mass, shape and firing angle on a series of projectiles (one control and five variables) and fired at 45, 60 and 180 degree angles
- PH.05: Noam Prywes
Experiments with Electromagnets
This project will involve building and utilizing electromagnets in order to levitate a permanent magnet or non-magnetic object.
- PH.06: Jessica Marie Evans, and Olympio Ndahiriwe
An Analysis of Galactic Clusters
We are analyzing x-ray data of various galactic clusters in order to study the nature of certain physical characteristics (mass, luminosity, temperature, morphology).
- PH.07: Derek Thomas Little, and Jose Leandro Sevilla
Maglev Trains
Test Maglev Trains. Show demonstration of how wheels levitate on the tracks.
- PH.08: Kishen Raghunath
Extinguishing Light using Low-Level Resources at a Secondary Institution
Light will be polarized using Brewsters Angle and various setups in order to extinguish its Intensity.

The purpose will be to develop a better type of "Sun-Glass."
- PH.09: Jennifer Lapicki
Magnus Force and its Effect on the Distance a Ball Travels
The research shows that ball rotation has an effect on the distance the ball travels at various rates of speed.

- PH.10: Alexander Lyman Piemont
Electronically Actuated Deformable Mirror
We have fabricated a deformable mirror out of a Si wafer and eight resistors.
- PH.11: Matthew Nicholas Tessier
Rail gun and the Physics Behind It
I am making a small scale rail gun and plan to use the data acquired from experiments to determine whether the physics match up with my results.
- PH.12: Jennifer Huereca
The Trebuchet as a Rescue Device
The trebuchet can be used to throw a light sturdy rope to persons trapped in broken ice
- PH.13: Viral Mundip Patel
The Difference Between the Standard and the Oversized Tennis Ball.
Tennis is a sport that has many aspects to it. The surface that you play on, the equipment that you use affects your play. In professional tennis, the ball is usually hit more than 100 M.P.H., which has made it difficult for the fans to follow the path of the ball. This had stimulated the International Tennis Federation to come up with the oversized tennis ball which is 6% larger than the standard sized. The complaint from the professional tennis players is that they aren't getting the same results with the oversized tennis ball. This research was set forth to show that the standard ball will travel farther, bounce higher, and will maintain more speed when both of them are hit with the same amount of energy and spin. Shots were ejected from the ball machine at a constant velocity and the displacement, height, and speed were measured. Data shows that the oversized ball had less displacement, bounce, and speed. Performance of the oversized ball was significantly reduced at a 95% level of significance. This research implies that the player using the oversized tennis ball requires more energy input in order to get the same results.
- PH.14: Steven James Hahn
Feasibility Study on using Wind Generated Energy for a Home Application
This is a feasibility study on using wind power generation to heat residential water pipes in order to prevent them from freezing. Local wind speed data will be collected and analyzed to determine how much energy can be collected. Analysis will be done to determine if enough electrical energy can be collected and stored to meet the energy demands to power a heating element to prevent the water in the pipes from freezing.
- PH.15: Deen Gu
Applications of Magnetic Braking
Examines the effect of magnetic braking by testing the influence of a stationary magnet upon a rotating disk.
- PH.16: Tiyts McGee
The Study of Collapsible Elastic Tubes
I observed many elastic collapsible tubes and their various pressures and things.
- PH.17: Michael Roger Baumstein
A study of the properties of helmholtz resonators.
A study of the variables that determined the frequency of the oscillations of air at the neck of a helmholtz resonator.

ZOOLOGY

- ZO.01: Katherine Elizabeth Barasch, and Karen Elizabeth Schroeder
The Chromosome Compliment of Planarian Blastemas
The chromosomes of planaria are examined to determine if cellular regeneration is a result of cell reparation and replication or cell fusion.
- ZO.02: Preeti Shenoy, Sagar Chokshi, and Ravi Upadhaya
Factors that Expedite Regeneration in Lumbriculus variegatus
This project will explore various methods to accelerate regeneration in the annelid Lumbriculus variegatus through exposure to stimuli.
- ZO.03: Matthew Gomez
Dog Dental Hygiene
This project will encompass the study of oral hygiene in dogs. It will be based on the trade off between having a dog with a clean and healthy oral hygiene history, and a dog that has had dental problems.
- ZO.04: Keith Hall
Seasonal Changes in Bird Populations in Northern New Jersey
This project involved the observation of birds in Northern New Jersey to determine the seasonal changes in the populations present in the area.
- ZO.05: Anna Tammy Lee
Genetic dissimilarity in mate selection in Poecilia reticulata (guppies)
Mating between two genetically dissimilar individuals generally results in the most viable offspring. Females in certain vertebrate species appear to exhibit the consideration of genetic dissimilarity in mate choice. This project aims to test whether female guppies actively choose their mates based on genetic dissimilarity. Firstly, the viability of offspring of genotypically similar fish is compared to the viability of offspring of dissimilar fish. Secondly, if there is a clear heightened viability of offspring of dissimilar fish, the correlation between mate choice and genetic dissimilarity will be tested.
- ZO.06: Rachael Sheridan
How Feeder Color Affects Food Choices in Common Backyard Birds
This project determined how the color of feeders affected the food choices in backyard birds over a two month period.
- ZO.07: Cole Jason Slutzky
Chemosensory System of Sharks
An exploration of the sharks sensory system, especially for feeding and defense.
- ZO.08: Neha Anil Deshpande
Genetic Analysis of Meiotic Mutants in Drosophila
This experiment uses the power of Drosophila melanogaster to develop mutants that contain a defective meiosis. The mutants are analyzed to identify new genes required in the process of meiotic recombination. By using a series of genetic and cytological tests, one can determine the location of the genes responsible in meiosis. The genetic tests will map the genes to a smaller region of DNA to facilitate a positional cloning approach.

ZO.09: Christopher DalCortivo

How Does Urbanization Affect the Local Deer Population

This study attempted to determine if towns with high urbanization rates have a higher rate of deer killed than towns with low urbanization rates.

ZO.10: DaYoung Lee

Effects of Tretinoin (Retinoic Acid) in Regeneration Rate of Planaria

This project serves to display the effects of tretinoin on the regeneration rates of planaria by comparing the planaria in a tretinoic solution and those not in the solution.