JOURNAL OF STUDENT RESEARCH ABSTRACTS

Volume II, 1996

An annual journal for young investigators and their teachers.

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Photo of sea urchin embryo using a Meridian confocal microscope.
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About the journal and submission of abstracts

The Journal of Student Research Abstracts is published yearly on or about May 1 by Burgess International.

The journal is intended to provide students and teachers with:

1. a vehicle to honor young investigators and their teachers by showcasing their work, motivating them to continue their involvement in research science,
2. a sourcebook for both students and teachers who are looking for ideas for research projects,
3. a volume to disseminate student research discoveries, and
4. an exercise in analysis of good science versus science that could be improved. Many abstracts included in the journal demonstrate good science, i.e., clear introductions describing hypothesis to be tested, methods, results and conclusion statements, and most important, sufficient numbers of appropriate control and experimental samples and repetitions of experiments. Other abstracts do not display one or more of the principles of good science. Students and teachers, therefore, could use these abstracts to learn about the right and wrong ways to approach scientific experiments. For this reason, we do not eliminate abstracts that do not demonstrate perfect science. The editor, however, reserves the right not to publish abstracts that are seriously flawed. Those abstracts were deleted from this issue. Any opinions, findings, and conclusions or recommendations are those of the individual authors of the abstracts presented in the journal, and do not necessarily reflect the views of the National Science Foundation, the other sponsoring agencies, the university or the journal staff.

Submission Of Abstracts

Any science teacher may submit student abstracts following the exact format given in the abstracts in this volume. After the title (in caps), followed by student author names and teacher name (Teacher), school and school street address, city, state and zip, abstracts should begin (after a 3 space indentation) with the purpose of the study, followed by how it was done, the results and conclusions. All abstracts must be typed (no dot matrix printer) neatly, error free, in a rectangle 6 3/8 inches wide by 4 1/8 inch long. If the abstract is typed in a drawn rectangle, leave about 1/8 inch margins next to all boundary lines. Typing must not touch boundary lines. Messy abstracts and those not following proper format will be discarded. The journal is not responsible for any abstracts received or for publication errors. Students and teachers are advised to photocopy abstracts before mailing.

Only teachers may submit their students' abstracts to the journal. They should be mailed along with a cover letter on school letterhead to: Dr. Steven Oppenheimer, Editor, Journal of Student Research Abstracts, Center for Cancer & Developmental Biology, California State University, Northridge, 18111 Nordhoff Street, Northridge, CA 91330-8303. Deadline for receipt of abstracts for each annual volume is Feb 20. Abstracts received after the deadline or those accepted after the volume fills will be held for the next annual issue. Supplies permitting, a complimentary copy of the journal and certificates of recognition will be sent to teachers whose students' abstracts are published in that volume.
About the Editor

Steven B. Oppenheimer received the Ph.D. degree from Johns Hopkins University and is currently Professor of Biology and Director of the Center for Cancer and Developmental Biology at California State University, Northridge. He is author or co-author, mostly with his Cal State students, of 97 publications including 12 books, was awarded over $4 million in research and science education grants serving as Principal Investigator, and served on National Institutes of Health and National Science Foundation grant review panels. He is recipient of 21 distinguished teaching awards, distinguished research awards, outstanding professor awards and other honors from local, statewide and national organizations. In 1984, he was named statewide Trustees Outstanding Professor of the California State University system (the system's highest honor), and in 1992 he was elected Fellow of the American Association for the Advancement of Science (AAAS). The AAAS defines a Fellow as "a member whose efforts on behalf of the advancement of science or its applications are scientifically or socially distinguished."
TEACHER AND MENTOR INDEX

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M.W. Allen
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J. Brogan
J.E. Buikstra
A. Cobry
P. Cross
M. Miller
H. Murphy
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J. Pomfret
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PLANT PHYSIOLOGY (ENVIRONMENTAL)
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INDOLE ACETIC ACID ON PLANT STEM THICKNESS.
Randy Lee and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

The purpose of this study is to test if Indole Acetic Acid increases the diameter of California Blackeye Cowpea Plant stems. I applied Indole Acetic Acid to a one inch section in the center of the stems of 24 Cowpea plant stems as the experimental. I then applied Lanolin as the control to a one inch section of another set of 24 Cowpea plant stems. The results were recorded one week after the application of the chemicals. The results of the experiment showed that indole acetic acid almost doubled the diameter of the pea plant stems, with swelling in the section where indole acetic acid was applied. Based on these results, indole acetic acid does increase the diameter of California Blackeye Cowpea plants stems by swelling the plant tissue of the applied section.

THE EFFECTS OF CAFFEINE ON THE GROWTH OF SUGAR ANN(R) SNAP PEA PLANTS.

Experiments that deal with the effects of caffeine on people and animals have been well researched and thoroughly debated; experiments that deal with the effects of caffeine on plant life are virtually nonexistent. This experiment gauged the differences in growth of snap pea plants watered with a solution of caffeine (1 molality and 2 molality) in respect to a control group of plants given distilled water. The height of each plant in each group was recorded. After nearly three weeks of watering the plants with their respective solutions, the data was compiled as per standard statistics. Subsequent calculations of probability level and t-value statistics showed that caffeine was a significant factor in decreasing the growth of Sugar Ann(R) snap pea plants.

EFFECTS OF CAFFEINE ON THE DEVELOPMENT OF MEALWORMS.
Seulgey Kim, Mrs. Simonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This project studied what would happen to mealworms when exposed to large quantities of caffeine and other stimulant pills. Two teaspoons of instant coffee were added to 4 ounces of water and then added to a mixture of food for the mealworms. In a different container, 400 milligram caffeine pills were added to 4 ounces of water and mixed in with the food. The third container was used as the control and only water was mixed with the food. They were watched and information was recorded on their death rate, growth, and rate of pupating. The results showed that the control had the least dead and the instant coffee mixture had the most dead. The pills had the worms moving about the most in the beginning but still, the control developed the quickest. This suggests that though the caffeine keeps humans going, it does have a harmful long term affect.
FUZZ BALLS.

The purpose of this project was to determine the best way to grow penicillin mold. One lemon, one orange, and a wet cotton ball were placed in two ziplock bags each. One bag was kept in the refrigerator and the other one in a warm dark place, and observed for two weeks. Green-blue fuzzy balls were growing on the fruits kept in the warm dark place. The ones in the refrigerator did not have any growth. When compared to pictures the fuzzy balls looked like penicillin fungus growth. To get more accurate results and to determine the temperature most favorable for the growth of penicillin fungus on citrus fruits, more extensive studies should be designed to grow the fungus at different temperatures set in temperature control incubator.

THE EFFECTS OF WATER WHEN SALT IS PUT INTO WATER.
Hee Jin Lee and Mrs. Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, California 91356

This study examines the effect on water when salt is put into it. This is one way of finding out if the water is more dense if salt is added. First, you get a tall glass of water. Second, you drop a carrot (for example) in the water. The carrot will sink. Different liquids have different densities, so as you add salt into the water, the carrot begins to rise. If you add enough salt, the carrot will float onto the top of the water. In conclusion, salt affects the density in water.

EFFECTS OF CAFFEINE ON THE REGENERATION OF PLANARIANS.

The purpose of this study was to observe the effects of caffeine on the regeneration of planarians. Caffeine is suspected to stunt growth processes and cause growth retardation. A sample size of 40 planarians were used. Twenty for control and the other 20 for experimental. Each planarian was placed in its own petri dish. All planarians were carefully cut in half horizontally. The control group was cultured in dechlorinized water, while the experimental group was exposed in a culture of 200mg/1000ml caffeine solution. The lengths of the planarians were recorded and compared daily. The control group had appeared to regenerate faster than that of the experimental. Caffeine had stunted the regeneration of planarians.

HUNGRY FUNGUS. N. Arakelian and M. Altibarmakian (teacher).
Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

The purpose of this experiment was to find out whether yeast cells can use sugar or salt as food. In one bottle a warm solution of sugar, yeast, and water is filled to the half. To the second bottle a warm solution of salt, yeast, and water was added. A balloon is fastened to each bottle and both are kept in a warm, dark place. Both are observed for three hours. Bubbles of gas were formed in
the sugar solution and the balloon inflated. The salt solution did not form any bubbles and the balloon did not inflate. This result showed that yeast cells feed on sugar and not on salt.

EFFECTS OF METHODS OF STORAGE AND AGE OF CATALASE ON CATALYTIC ABILITY AS A HYDROXIDASE.
J.P. Nogues III and M.L. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

This study investigated the possibility of storing catalase for later use in experiments without it losing any of its catalytic ability. Catalase was obtained from bovine liver and stored in 3 different ways. The first set of samples was simply stored as fresh liver, and catalase was extracted after storage. The second set was stored as pieces of liver in a bath of 3% hydrogen peroxide, after which the catalase was extracted. In the third set, catalase was extracted immediately and stored. The sets were stored in the refrigerator for between 0-5 days. Catalytic activity was tested by diluting the catalase to .125 ml per 42 ml of phosphate buffer and mixing 2 ml with 1 ml of 30 mM hydrogen peroxide and putting the mixture in a spectrophotometer, which measured the amount of 240 nm wavelength light the substance absorbed. As the peroxide was broken down by the catalase, the mixture absorbed less light, showing the activity of the catalase over a period of 1 minute. Each experiment was repeated. The older catalase samples were less active than the fresh. The catalase extracted from old liver was more active, but still not as active as the fresh, and the catalase extracted from the liver stored in peroxide acted in the same way. The most significant finding was that the activity of the catalase depended more on the characteristics of the liver it was extracted from than on its age.

PARENTHOOD.
Angela Monterrubio and Steve DeGusta (teacher). John F. Kennedy High School 6715 Gloria Drive, Sacramento, CA, 95831.

The answer to the question: Do parent hamsters exhibit certain routine behavior in raising their children, is yes. To procure these results, female hamsters were placed in cages with their newly born young, separate from their mates. Yabuyakker (female hamster #1) was observed for 10 days over a period of 1-2 hours. It was observed that Yabuyakker, upon realizing that she was pregnant, began to store food and prepare a nest for her young ones so that she would be prepared for them when they arrived. Then after they arrived she kept a protective watch over her children, making sure that none of them strayed too far, and that no protruding objects would come near them. Yabuyakker also made sure that the children were always warm and well fed, as well as clean. Once the little ones began to age, she began to distance herself from them more and more, regressing back to her old ideas of thinking about herself. She soon taught them how to eat the normal "grown up" food, and drink from the water bottle. Through observation of her interaction with her young, it can be deduced that Yabuyakker exhibits specific behaviors. These procedures resulted in her young repeating the same procedures and, henceforth, learning from them. With the observation of Pepita (female hamster #2) these finding were confirmed with the viewing of the same routines performed by her towards her young during the first stages of mother hood.
THE EFFECTS OF BABY FISH'S GROWTH TO CERTAIN FOODS.  
T.W. Chang and D. Shah (teacher). Gaspar de Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study helped to determine which food helps in which way of a baby fish's growth. For this research babies from Xiphophorus macolatus of eight days of age were used. Three pairs of babies were chosen, and each pair was isolated from others except for his or her partner. Each pair was feed a certain kind of food. The pairs were feed Brine Shrimp, Flakes, or Pellets (crushed into a smaller form). This lasted up to 30 days. The results were that the Brine Shrimp help increase the growth of size. The Pellets helps increase the growth of color. And the Flakes help the growth of both size and color.

SEVEN DAY CHRONIC TOXICITY TEST FOR CERIODAPHNIA DUBIA.  

This experiment takes the small aquatic invertebrate, Ceriodaphnia dubia and subjects them to local areas of urban runoff to be tested for potential toxicity. The test observes the strict criteria set by the E.P.A. for effluent toxicity testing. The test was used to observe the subtle effects of toxicants on ceriodaphnia's growth and reproduction rates. These characteristics are used as means for comparison with the control animals to determine if the water being tested has any toxicity. It concluded comparing the data from both control and test waters that no detectable levels of toxicity were present in Sacramento, California's Greenhaven Lake.

ESTERASE FOUND IN COW LIVER.  

I set out to find if esterase existed in liver and if so could I devise a method of monitoring it activity. I discovered that the enzyme needed to catalyze the ester hydrolysis reaction was present in cow liver. I successfully monitored the productivity of this reaction by testing the pH at various points in time. When combined with a cow liver enzyme, esters, Ethyl acetate, Methyl acetate, and Propyl propanoate yield a carboxylic acid, as well as an alcohol. My results indicated that Propyl propanoate mixed with a cow liver solution, experienced a drop in pH of 3 levels, when let stand for a 24 hour period. This states a significant amount of carboxylic acid was produced over a short amount of time, which leads me to the conclusion that esterase is found in liver in a significant concentration. Therefore possessing the ability to catalyze a hydrolysis reaction to occur at the rate displayed, by the results I obtained.

MAGNETO COWPEA.  
Tom Kuang and Steve DeGusta (teacher). 6715 Gloria Drive, Sacramento, CA 95831.

Since magnetic forces indirectly affect our daily life, in this experiment, I will attempt to investigate the relationship between magnetic energy and plant growth rate. Three sets of 24 cowpea (1...
Mississippi and 12 California)* will be established. One set will be the control where neither positive nor negative magnetic energy is exposed. Another set of seeds will be exposed to 400 gauss of positive magnetic energy for 23 hours. The last set will be exposed 400 gauss of negative magnetic energy for 23 hours. Thereafter, the seeds are planted and its height daily recorded. After a period of 16 days the results came to be that the average growth rate of the positive and control has a meager difference of .01 cm/day; the average growth rate of the negatively exposed seeds and the control has a .14 difference. Such minute difference is insignificant to reject the null hypothesis; therefore, I conclude that magnetic energy exposed to the seeds has no significant influence on the average growth rate of the plant.

*Mississippi silver crowder cowpea; California blackeye #5

1395

WHICH FORM OF INSULATION IS MOST EFFECTIVE?
Brian Park and Mrs. Simonds (teacher). Portola Highly Gifted Magnet, 18720 Linnet Street, Tarzana, CA 91356.

This experiment examined the best form of insulation for the human body. Five different materials were being used for the experiment. The insulating materials included wool, flannel, human hair, cotton, and thermal insulation. Six canning jars were filled with water at the temperature of 70°C Celsius. A thermometer was then dropped into each one of the jars. The jars were then placed into six resealable bags, with each bag filled with an insulating material. The sixth bag was used as a control. All six bags were placed into a refrigerator for 2 hours. The temperatures were taken every 15 minutes and recorded. The thermal insulation was found to be the warmest with human hair and wool following. These findings suggest that to keep the body warm, the best form of insulation would be thermal insulation.

1396

DETERMINING THE VALIDITY OF EFFERDENT’S ANTIBACTERIAL CLAIM.

This experiment verifies Efferdent’s antibacterial claim. Plain paper disks and paper disks soaked in Efferdent, a denture cleanser, were placed on nutrient agar contaminated with Bacillus cereus. Colonies of B. cereus grew on the nutrient agar under and around the plain paper disks but not under and around the Efferdent disks. The areas around the Efferdent disks were cleared of bacteria. According to the results of the T-test, the average distance cleared by the Efferdent disks is significantly different than the average distance cleared by the plain disks. This means that the experimental variable caused the difference. The Efferdent prevented B. cereus from growing around the Efferdent disks.

1397

WHAT LIQUID CONDUCTS ELECTRICITY THE BEST?
Alex Song and D. Shah (teacher). Portola Middle School Highly Gifted Center, 18720 Linnet Street, Tarzana, CA 91356.

This study examined which-liquid could conduct electricity the best. The purpose of this experiment was to help me acknowledge what liquid conducts electricity the best. I connected two wires to a light bulb and a battery. I took the two ends of the wires and I put them in the liquid making sure that the ends in the liquid, touching each other, were placed in the liquid completely.
If the light went on then the liquid I was testing conducted electricity from the battery. If the light did not go on when I was testing a liquid then the liquid did not conduct the electricity from the battery. The results suggested that salt water conducted electricity the best out of the liquids that were tested. In conclusion, I found that a liquid that had electrolysis conducted electricity well. The liquids that did not have electrolysis did not conduct electricity at all.

EFFECT OF SNUFF ON THE MASSES OF OFFSPRINGS.

This study is designed to determine whether or not snuff causes a lower birth mass to the offspring of its users. I exposed Drosophila melanogaster, or fruit flies, to a 6% solution of soaked snuff and water while the flies were in their larval stage. This solution was ingested by the flies through the culture medium. The parent flies were then allowed to breed. The offspring were not exposed to snuff in any form. However, the parent flies were neither able to produce larva or adult flies in a significant quantity as to show a significance in mass. I therefore concluded that snuff causes infertility in drosophila when it is at a concentration of 6%. A greater concentration could kill the drosophila because of its nicotine content. I also observed that the drosophila that had ingested the snuff took longer to develop into adults, and also had a shorter adult life that a fly that was not exposed to the snuff.

ALLELOPATHY OF CHRYSANTHEMUM TOXINS ON LETTUCE SEED GERMINATION.

In this experiment, I attempted to observe the allelopathic effects of chrysanthemum leaf toxins on the germination of lettuce seeds. When toxins are leached from the leaves of certain chrysanthemums (during such conditions as heavy rains), they have been shown to inhibit the germination of lettuce seeds (Rice, 1983). Lettuce seeds (evenly spaced) were placed on layered paper towel disks inside of a closed petri dish. The disks were kept saturated with water (so as to induce germination): the experimental group was kept moist by water which had been used to remove the toxins from chrysanthemum leaves and the control group was kept moist by plain water. Instead of preventing germination, the chrysanthemum toxins had no apparent effect on the lettuce seeds. Therefore, the toxins on chrysanthemum leaves are not allelopathic to the lettuce seeds, or there are no toxins that can be leached from the surface of the chrysanthemum leaves. In either case, only further testing can corroborate a definite conclusion.

THE EFFECTS OF MALATHION ON SOIL FERTILITY.

This experiment tested the consequences of overexposure to malathion, a commonly used pesticide, directly relating to height in California Blackeye Cowpeas. This lab had three distinct groups of plants: the control group, an experimental group that was exposed to twice the normal application dosage of malathion, and another experimental group with three times the normal application dosage of malathion. Each of the malathion groups had 10 ml of its respective malathion-water solution poured into the soil in each of the plant’s planter cup. The normal dosage
as indicated is two teaspoons of malathion to two gallons of water. Converting this to the metric system it is 1.42 ml of malathion per liter of water. Twice the normal application is 2.84 ml per liter of water and three times the normal dosage is 4.26 ml of malathion per liter. We have found that there is no significant difference between the control group and the experimental 2-times-the-normal dosage group due to a probability value greater than 0.10. But we have found a significant difference in height between the control group and the 3-times-normal dosage group. Using the t-test, we found the probability value to be less than 0.010. This data brings us to the conclusion that three times the normal application of malathion reduces the heights of pea plants. In comparing the two times group against the three times group, we found that there is a significant difference in heights. Therefore, California Blackeye Cowpeas grow less in soil that has been overexposed to malathion. This approximate concentration of malathion is between two and three times the normal application, with a closer inclination to the three times dosage.

THE EFFECTS OF CARBON FIBER ON VARIOUS WOODS.

The purpose of my experiment was to find out how much carbon fiber effects the tensile strength and elasticity of different woods. I found that Carbon fiber effects woods in various ways, both good and bad. When the pieces of wood were laminated with carbon fiber, their tensile strength increased between five and forty-seven percent. The problem with using the carbon fiber was its decreased flexibility and increased brittleness. In my experiment the elasticity of the wood decreased by as much as fifty percent when laminated with the carbon fiber. Through my testing of the materials, I found that Douglas Fir had the largest strength increase with approximately forty-seven percent; Heart Pine had the least, with five percent. In the area of elasticity, Red Oak and Western Red Cedar were tied for the largest decrease, fifty percent, and Redwood and Southern Yellow Pine were tied for the smallest decrease, zero percent.

DOES MUSICAL TASTE PLAY A ROLE IN POLITICAL VIEWS.
J. Stout, and M. Simmonds (teacher). Portola Highly Gifted Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study examined the question of a possible pattern between musical taste and political views. I surveyed 20 people-19 students and 1 adult- asking each one 6 questions. The questions I asked were the following: Age, Gender, Name, Science Period (for reference), Favorite Music, and Political View (graduated categorize: Very Liberal, Liberal, Moderate Liberal Moderate/ No view, Moderate Conservative, Conservative, Very Conservative). My Hypothesis was that the more liberal or conservative the music(typical volume, ideals, sophistication, etc.) the music the more liberal or conservative the respective political view. My results indicated that of those who had no view or moderate politically (45%-9 of 20) were liberal in music, those who were liberal politically were liberal in music, and those who were conservative politically were also liberal in music-all generally swaying to "Alternative" music. My conclusion is that next time I do a survey, I will choose a more diverse group. I believe that age may be a major factor in the results. Many were without a political view.
THE FROG'S ASSOCIATION NEURONS.
M. Meserlian and M. Alibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This project is done to show that association neurons are located in the spinal cord of a frog. A live frog was injected with anesthetic, after it was fully asleep it was fastened on a stand with a hook. When the frog's leg was dipped in a beaker with hydrochloric acid (HCL) solution, it lifted its leg up immediately. This was repeated a couple of times with the same results. Then a probe was inserted in the frogs spinal cord. When the same procedure was repeated, the frog did not lift its leg up. The association neurons in the spinal cord connect the sensory neurons with the motor neurons. When the association neurons were injured the message was not carried from the sensory to the motor neurons, and the frog could not respond.

WHICH DIAPERS HAVE THE BEST ABSORBENCY RATES.
C.J. Munson, M. Simonds (teacher). Gaspar de Portola H.G. Middle School, 18720 Linnet St., Tarzana, CA 91356.

This study examined the absorbency rates of five different kinds/brands of diapers. Baby's urine was replaced with 0.9% sodium chloride solution of the same concentration as urine. A hole was cut in the outer plastic covering of a diaper and the solution was poured into the diaper until it began to leak out of the hole. I measured how much solution the polymers had absorbed. The experiment was repeated on each of the five kinds of diapers three times to ensure accurateness. Of the five diapers tried (Pampers, Huggies, Luvs, Drypers, and cloth diapers) Huggies had the greatest absorption rate on the average. Pampers followed, and then Drypers. The top three were so close in absorption rates, it suggested that it isn't worth the money to buy the big name brands like Huggies when Drypers did almost the same job. It also proves that Huggies really has some accuracy behind their fancy TV commercials.

HOW DO DIFFERENT TYPES OF MOLLIES ADAPT TO SALT WATER?
Tyler Dersom, M. Weitkamp(teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

I am setting out to find how Black Mollies and Dalmatian or Salt and Pepper Mollies adapt to salt water. I am seeing if one type of mollies adapts better than the other. I am trying to identify the respiratory rate of the mollies before, during, and after salt was added to their tanks. Which mollie will breathe better after the salt is added, and what effects will the salt have on the fish? For two days, in the morning and evening I counted every fish's operculum rate in the fresh water; this is the control. Next, I added one fourth of a tablespoon of sea salt in the separate tanks for four days, once a day. Each day counting morning and evening the operculum rate of every fish, and after four days a total of 1 tablespoon of sea salt was in both tanks. I found that both mollies successfully adapted to the salt water. The Dalmatian adapted better to the salt, and the Black Mollies had more trouble breathing in the salt water. When the salt was added the operculum rate rose but then reverted to the same rate as in the fresh water after twelve hours.
WHAT PROPERTIES CAUSE CINNAMON TO BE BACTERIACIDAL?

This investigation originated as the search to find the potency at which cinnamon retained its bactericidal qualities, but due to additional results I discovered a possible cause for cinnamon's bactericidal properties. The process at which the discovery was made was with the introduction of cinnamon on to nutrient agar seeded with Bacillus cereus. Bacteria was found to grow on a control with the cinnamon on unseeded agar. After all contamination possibilities were eliminated it was concluded that the bacteria emanated from the ground cinnamon. The significantly small amounts (as compared with the bacteria on unseeded agar) of the cinnamon's bacteria found around the cinnamon and within the cinnamon's area of inhibition lead me to conclude that both types in some way inhibited the growth of the other. Since the cinnamon's bacteria survived while the B. cereus did not it was concluded that the cinnamon's bacteria produces a chemical lethal to B. cereus.

THE POSSIBLE USE OF GELATIN AS AN INDICATOR FOR BROKEN PROTEIN BONDS.
D.B. Zeehandelaar and M. Simonds (teacher). Portola Highly Gifted Magnet Center, 18702 Linnet Street, Tarzana, CA 91366

This experiment, based on protein and enzyme bonds, raised the question of the possibility of using gelatin, a known protein, to indicate the presence of broken, or stable, protein bonds. Pineapple, grape, and orange juices were all used freshly prepared and mixed with powdered gelatin as the first control group; heated juices were used as the second control group. For the experimental group, commercially prepared juices were mixed with powdered gelatin. The results were as follows, with each experiment repeated 3 times: pineapple-fresh did not solidify; heated and commercially prepared did. Grape-all groups solidified. Orange-all groups solidified. The results suggest that, although gelatin can be used as an indicator as shown by the pineapple juice tests, orange and grape juices did not contain a sufficient amount of protein to be indicated in the experiment.

DOES LISTENING TO CLASSICAL MUSIC WHILE STUDYING, INCREASE THE AMOUNT OF INFORMATION YOU LEARN?
Rachelle Tiongson, M. Weitkamp (teacher). Chaminade College Preparatory High School, 7500 Chaminade Avenue, West Hills, CA 91304.

Through this experiment, I am setting out to find if listening to classical music while studying increases the amount of information you learn. This will be performed by testing 70 students, each from the Freshmen and Sophomore classes. Questions, corresponding to a paragraph they have just read will be given to each student to be answered in an environment with classical music. Another set of questions, corresponding to a different paragraph of the same difficulty level as the previous will be answered in a silent environment. This resulted with the freshmen class scoring 16% higher on the test when the room was silent. When music was played, the scores of males from the Freshmen class decreased by 21%, the Freshmen females decreased by 11%, and the Freshmen with reading disabilities decreased by 13%. However, the Sophomore class scored 4% lower when the room was silent. When music was played, the scores of the males from the
Sophomore class increased by 6%, the Sophomore females by 3%, and the Sophomores with reading disabilities by 17%. Therefore, the results conclude that generally, classical music does not help you learn more, in fact you learn less.

HYDROPONICS VS. GEOPONICS.
Andrew Yue and Steve DeGusta (teacher). Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

This experiment was designed to test whether plants actually need soil to grow better than plants grown hydroponically. A sample of ten French Breakfast radish seeds were grown hydroponically in an inorganic media called rockwool. A second sample of ten seeds were grown in normal potting soil. Both systems were given the same nitrogen rich nutrient solution. The plants grew faster in soil after the first six days but the hydroponically grown plants ended up growing more at the end of the experiment. The difference between the growths was small and statistics show that the variation is highly due to chance. The experiment showed that there was no difference in growth between plants grown in soil and plants grown hydroponically.

PLANT MAZE.
Sarah van Daalen Wetters, Mrs. Simonds (teacher). Portola HG magnet 18720 Linnet St., Tarzana, CA 91356

I have chosen to experiment on how plants grow. Placing a bean sprout in soil and putting it in a shoebox, I wondered if it would grow towards the hole in the other end. I placed pieces of cardboard in the box and closed the lid. Since plants have light sensitive cells, the plant grew towards the light. However, the plant was quite pale because chlorophyll cannot be produced without sunlight.

WILL ACID RAIN CHANGE THE pH OF WATER AND SOIL?
B.J. Biegenzahn and M. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Ave., West Hills, CA 91304.

This experiment was set up to observe the effect of acid rain on two controlled water environments. In a 160 liter fish tank, I simulated a pond and a marsh environment, then I measured the acidity levels of the water and the soil in the two environments. I found that the introduction of acid rain will, over time, increase the acidity of both the environments. This effect was not obvious to the naked eye. The water never became cloudy or discolored and no particles were observed. This suggested that the process in nature takes quite a long time, and perhaps a very small change in acidity can have a serious and damaging effect.

WILL DIFFERENT TYPES OF WATER AFFECT THE GROWTH OF A CROWN BLUE?
E.R. Foreman, Portola Middle School, 18720 Linnet St., Tarzana, CA 91356.

This experiment tested whether or not the type of water used would affect a Crown Blue (F1 hybrid Pansy) 9 plants were separated into three groups of three each. One group was watered using rain water from the storms of early 1995 (pH of about 5) The second group was watered
with tap water from my home faucet (pH of about 7). The third set was watered using the tap water plus 2 tablespoons of table salt per 1.5 liters of water- (pH also 7). All three "salt" plants died about half-way through the experiment. Two "rain" and one "tap" plant were dying but they can be saved. These results may not be totally reliable, however, because I should have watered them every day, while on average I watered them about every second or third day.

REDUCED SEX APPEAL OF MALE DROSOPHILA WITH VESTIGIAL WINGS.

In order to test the hypothesis that wild male Drosophila are more likely to mate than vestigial (vg) male Drosophila, I put about 10 vg virgin female Drosophila, 2 wild male Drosophila, and 2 vg male Drosophila into each of three vials. Over the next nineteen days, the number of wild offspring and the number of vestigial offspring per vial were counted. The vg:wild ratios for the three vials was 15:157, 0:106, and 0:84, indicating that the true danger in having vestigial wings may not be in an inability to fly but in an inability to attract a mate. The reduced sex appeal of vg male Drosophila may be due to an inability of the vestigial wings to properly produce the "love song" that is one step of Drosophila courtship. Vestigial wingedness in Drosophila is an example of what I call an oysterism, a characteristic seemingly pertaining to subsistent selection but also significantly pertaining to sexual selection.

EXPERIMENT OF GASES IN SODA.

The purpose of this experiment is to see if gases in carbonated soda can fill up a balloon. The steps I took in order to perform this experiment involved pouring carbonated soda into an empty container. A balloon was placed over the top of the container. After shaking the container, I placed it in a pan filled with hot water. The balloon filled up with gases as a result of a chemical reaction. This experiment was repeated using a pan filled with cold water. The results were the same when using hot or cold water. My conclusion is that the balloon does fill up, but has no change when using the hot water or the cold water.

DOES ALCOHOL SLOW THE REGENERATION OF PLANARIANS?

In this study I used a solution of vodka and water to test if alcohol slowed the regeneration of planarians. I first measured the planarians in millimeters and then I cut off their tails. I then measured the planarians new length. Half of the planarians were in 30 ml. of a .0016% vodka solution and the other half were put in 30 ml. of distilled water. The planarians in the vodka solution did not grow back to their original length, but those placed in the distilled water did. Based on these results, I concluded that alcohol slowed the regeneration of planarians.
THE STRENGTH OF YOUR DOMINANT HAND.
Vivian Hernandez and D. Shah (teacher). Gaspar de Portola Middle School. 18720 Linnet Street Tarzana Ca 91356

This study examined the question of greater strength in one of your hands. People were told to squeeze a small bottle of white out very tightly for one second and let go. They were instructed to repeat this until they felt great fatigue. They did the same on the other hand and the time it took for the hand to get tired was recorded. The hand they wrote with was recorded as their dominant hand. People’s dominant hands tired slower than the other hand on average. The results conclude that the hand you write with is most likely stronger.

A COMPARISON OF PERCEIVED ATTRACTIVENESS AND TRUSTWORTHINESS.
D.F. Weinberg and (D. Shah). Gaspar de Portola Middle School, 18720 Linnet Street, Tarzana, CA. 91356.

This study investigated the relationship between attractiveness and trustworthiness. 25 magazine photos of adults were shown to ten children and ten adults. The test subjects were asked to score each photo for attractiveness and for trustworthiness. Trust was measured with adults, by asking if each would buy a computer from this person, and, with children, by asking if each would want this person as a substitute teacher. Comments by the test subjects were recorded. The scores were graphed and compared with each other. Analysis of the results seemed to show that people trust a person whom they find attractive. They suggest, more specifically, that adults often would prefer to buy a computer from a man, and that men would prefer to buy a computer from a pretty woman. Young children preferred motherly women as substitutes, and older ones preferred a younger, more athletic substitute.

SEISMOMORPHOGENESIS: THE EFFECTS OF SHARING ON THE HEIGHT OF LITTLE MARVEL PEA PLANTS.
Daniel Kim and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Dr., Sacramento, CA 95831.

The purpose of this experiment was to determine if shaking would cause pea plants to grow shorter stems. Using a control group of 18 plants and an experimental group of 18 plants, little marvel pea plants, *Pisum sativum* were germinated and grown until their first true leaves sprouted. Then, using wind from a small fan as seismic stimulation, the experimental group underwent a ten day “shaking” treatment. After the ten days, it was determined that seismic stimulation of little marvel pea plants did not cause them to grow shorter stems. Because there was a p-value of .1, no significant difference between the change in height of pea plants that were shaken and those that weren’t shaken (control) could be found and the null hypothesis was accepted.
COYOTE SCAT STUDY.

Within a period of four months, the scat of coyotes, Canis latrans in the Griffith Park Area of Southern California was collected to determine whether the species consumed more floral or faunal matter. Based on previous studies, it was hypothesized that the coyotes consumed more animal material. After scat was collected and frozen for a week, they were set out to dry and then dissected. The dissected matter was separated into animal material, vegetation, and miscellaneous inorganic and organic matter. Of thirteen samples studied, all contained some animal matter. Seven of the samples were mainly composed of animal material, while the other six only possessed a few hairs and/or feathers. Five of the samples consisted of plant matter (dandelion, grass, and so on), but only in small proportions as compared to animal matter. This supports the hypothesis that more animals are consumed than vegetation by the coyotes.

WHAT ARE THE EFFECTS OF PROBUCOL AND ANTIOXIDANTS ON CVD?
Leo Feler and Ben Vallejo Jr. (teacher). Reseda Environmental/Physical Science, Medical Magnet. 18230 Kittridge, Reseda, CA, 91335.

This experiment was designed to show how the cholesterol in six rats labeled A, B, C, D, E, and F was effected by antioxidants, the drug probucol, and the combination of the two. Rat A was fed 75 mg of cholesterol. Rats B and C were fed 75 mg of cholesterol and antioxidants. Rats D and, E were fed 75 mg of cholesterol and given probucol, and rat F was also fed 75 mg of cholesterol butt given both probucol and antioxidants. Then they were all tested on a carotid ultrasound and rat A’s arteries were 46 percent blocked; rat B’s, 28 percent; rat C’s, 31 percent; rat D’s, 15 percent; rat E’s, 13 percent; and rat F’s, 8 percent. Thus it was found that the combination of antioxidants and probucol was the most effective method of preventing and treating CVD, however, due to probucol’s toxicity, it is also the most dangerous. Therefore, the most beneficial way of treating and preventing CVD would be through the consumption of antioxidants.

ULTRAVIOLET LIGHT VS. FERMENTATION BY YEAST.
C.A. Loehr and S. DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

In this experiment I was trying to see if ultraviolet light inhibited the fermentation process. To do this I exposed half of a yeast solution to ultraviolet light. The yeast solution was poured into 16 ml centrifuge tubes and mixed with a sugar solution. Then, after the yeast had fermented for a half hour in a water baths, I measured the amount of CO2 produced by the yeast during fermentation. I compared the amount of CO2 produced by the exposed yeast to the non-exposed yeast. My results showed that W light does not inhibit the fermentation process by yeast (p. = .1).
EFFECTS OF COLORS ON THE HUMAN EYE.
Daniel Chang and Mrs. Shah (teacher). Portola HG Magnet, 18720 Linnet Street, Tarzana, CA 91326

This study questions the cause of the effect on the eye which occurs after focusing on a certain color for a few seconds. The effect is that the opposite of the color that was focused on appears if you then focus on a large area of white. I tested this experiment on a randomly chosen group of eight people, and repeated the experiment three times. The results show that the color determining 'cones' in our eyes are tricked after being strained, which usually occurred in a short moment, causing the effect to occur. The effect worked on every color except the neutral colors (black, white, brown, and gray).

WHAT HELPS A BLOOM LAST?
Rosemary Cody, M. Simonds (teacher) Portola H. Gifted Magnet, 18720 Linnet Street, Tarzana, CA 91356

This experiment examined the effectiveness of Flower Fresh (c), a manufactured formula vs. household treatments sugar and aspirin in helping extend the life time of three kinds of flowers: roses, genus Rosa, tulips, species Tulipa gesneriana, and Chrysanthemums. Each kind of flower was paired with each variable, with clear water as a control. Each day observations were taken and these analyzed by means of a letter rating system. Aspirin was found to dry leaves, sugar to cause water bubbles to form on the petals of tulips, and Flower Fresh was found to increase the life of roses and tulips but not have any effect on chrysanthemums. These results suggest that aspirin is harmful rather than helpful, sugar is either harmful or has no effect, and Flower Fresh (c) is helpful for nearly every flower.

SOLAR ENERGY.
D. Choe and D. Shah (teacher). Gaspar de Portola Highly Gifted Magnet Middle School, 18720 Linnet Street, Tarzana CA 91356.

The purpose of this study was to find out which container would be the hottest. I got four 3L soda bottles and painted them black. I filled one with soil from my backyard, one with pebbles, one with water, and one just with air. I placed the containers in a sunny area. I then recorded the temperatures of each solar storage sample. I made a log to chart the temperatures. The results were that the sample with water was the warmest/hottest from the rest. I have come to a conclusion that the water was the hottest because when it absorbs heat, it stays in the water without spreading anywhere else.

WHO CAN COMPLETE A MAZE FASTEST?
Jessica Gottlieb, and Darshana Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 92365.

This science project tests different sex and age groups in their ability to complete a maze. The purpose of this study was to prove that although a child may complete a maze fastest the first trial,
and adult would decrease their score by a greater percentage the second time, showing that the
adult had a greater capacity to learn, or was more intelligent. An identical test was administered two
times in succession to each subject. The results are then compared and contrasted to show who can
complete a maze fastest on the first trial, and then who can improve their score most on the second
trial. There were fifty-two subjects all together. I administered the maze to thirteen girls, thirteen
boys, thirteen men, and thirteen women. The age range of the children was 8-14 years old, while
the adult ages ranged from 19-45 years old. I discovered that both age and sex affect your ability to
complete a maze. The average male child completed the maze fastest the first and second trial,
while the average female adult improved most.

WILL FROZEN SEEDS GERMINATE AS WELL AS NON-FROZEN SEEDS.
E. Manoukian and M. Altibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White
Oak Avenue, Encino, CA 91316.

The purpose of this project is to find out if frozen seeds will be able to germinate as well as non­
frozen seeds. First, 15 bean seeds were put in the freezer for ten days. As a control, 15 seeds were
planted in a container on a thick layer of moist paper towel. In another similar container the 15
frozen seeds were planted. The number of seeds germinated from both batches of seed were
recorded daily. Results showed that 86.6% (13 out of 15) of frozen seeds were germinated, and
96.6% (14 out of 15) non-frozen seeds were germinated. These results indicate that non-frozen
seeds germinate better than frozen seeds.

EFFECTS OF CONDIMENTS ON PLANTS GROWTH.
A. Ambrosio and D. Shah
(teacher). Portola Magnet, 18720 Linnet Street, Tarzana, CA 91356.

This experiment examined the question of the possibility of detergent, food coloring, or sugar
affecting the growth rate of any plant. I picked the cherry tomato plant. Pure sugar, "All"
detergent, and food coloring was added to the plant's daily diet. There were four plants watered for
each chosen variable. Four plants were also chosen for the control group. Height of each plant was
recorded at five day intervals. The experiment was started on February 25, and ended on March
22. The total length of the experiment was 25 days. Detergent lowered initial growth rate by 20%.
Food Coloring boosted the plant's growth rate by 25%. Out of the results collected, sugar had the
most effect on the selected plant. Sugar raised the plant's by over 30%.

HOW DOES SULFUR AFFECT METAL?
93534.

The purpose of this study is to see the effect sulfur has on copper, aluminum, silver, steel, and
iron. I polished the five types of metals, then placed them one by one into a bowl with a beaten
egg. I found that four of the five metals, which were copper, aluminum, silver, and steel, were
affected by sulfur. Copper had dark edges and white spots, the aluminum was brighter than before
the experiment, silver had dark spots, and the part of the steel that was dipped in the beaten egg
was brighter. I have learned that sulfur affects the appearance of certain metals.
SOIL VS. HYDROPONICS, WHICH IS THE NUTRIENT THAT PRODUCE EFFECTIVE RESULTS?
Lynn Lee, Mrs. Simonds (teacher). Portola Magnet Middle School, 19720 Linnet Street, Tarzana, CA 91356.

This study examined the difference between the growth of the viola family in soil and hydroponics solution. I used four kinds of plants. The Swiss Giant pansy, Yellow Giant, Blue Giant, and the Johnny Jump Up viola. I grew two of each in the hydroponics solution and two of each in the soil. The cultivated plants in the hydroponics solution have been placed in a box covered internally with foil to reflect light. A fluorescent light was hung from the top of the box 20 hours a day with 4 hours of rest. The soil has been put outside in the sun. Chemicals, insects are discarded because it would affect the plant growth of the soil plants. This experiment is specifically for the difference between soil, and hydroponics.

In the end I have found that the plants in the soil have grown longer roots, and the plants in the hydroponics solution have grown longer stems and leaves. So in this, I have deduced that the plants of the hydroponics solution do not need a numerous amount of roots because the nutrients are there. In the soil plants the roots need to find the nutrient. Therefore in future hydroponics might be a more convenient and less expensive way to grow at the least, violas.

WHICH TYPE OF FOOD GROW MOLD THE FASTEST?

This study examined how fast mold would grow on different types of food over a two (2) week period. What I did was take 3 jars and placed inside 3 different types of food in each. A piece of bread in one, a piece of cheese in one and a piece of an apple in one, covered each jar with saran wrap and placed in various places around the house. Over the course of the two weeks I recorded the results as they happened daily. Results showed that the apple because of is sugar content produced mold at a much faster rate than the other types of food. The cheese was next and the bread producing mold at the slowest rate.


The purpose of this project is to see where mold can grow faster and slower. I exposed all bread halves to the air for a few hours. Then I moistened all bread halves with a spray of clean water. Then I placed each piece of bread in a zip lock bag and saved it. Then I kept note of all the changes to the bread for about a week or so. The result of my project was that the bread in the area where the moisture was, grew the most mold. It also grew the most mold because in order to prevent mold it is best to have an environment with extremes of hot or cold, plenty of light, and a lack of moisture.
ALFALFA AS GREEN MANURE VS. NITROGEN FERTILIZER.

This study compared the heights of pinto bean plants (*Phaseolus vulgaris*) in a nitrogen deficient environment treated with alfalfa (*Medicago sativa*) used as green manure as opposed to nitrogen fertilizer. A hydroponic system was employed; the growth medium was Perlite. For a period of 7 days, pinto bean plants were watered twice a day with three different treatments--Hogland solution minus the nitrogen compounds, Hogland solution minus the nitrogen compounds plus ground alfalfa, and Hogland solution minus the nitrogen compounds plus diluted nitrogen fertilizer. The control plants were small with lighter color leaves and had an extensive root system. Trends emerged from the data--most plants treated with the control, alfalfa, and nitrogen fertilizer solutions were between 11.0 and 12.9 cm, 16.0 and 17.9 cm, 15.0 and 16.9 cm high, respectively. Generally, the plants treated with the alfalfa solution grew taller than the plants treated with nitrogen fertilizer solution. The addition of alfalfa enriched the growth medium with nitrogen, achieving the same purpose as the nitrogen fertilizer. Thus, the use of alfalfa as green manure is comparable to the use of nitrogen fertilizer when growing pinto bean plants. Yet, the fact that I am not sure what other compounds alfalfa is composed of, besides nitrogen must be taken into account.

IS VINEGAR NECESSARY TO DYE EGGS?

This experiment was set up to discover whether vinegar is needed to color eggs. First four teaspoons of blue food coloring were added to two cups of hot water. Then the water was divided equally into four different cups. Next one teaspoon of vinegar was added to the first cup, 1/2 teaspoon to the second cup, 1/4 teaspoon to the third cup, and the last cup was left without vinegar. A hard boiled egg was placed in each cup and left for fifteen minutes. When the eggs were removed, the egg that had 1 teaspoon vinegar was the darkest blue, the egg that had 1/2 teaspoon was the next darkest, the egg that had 1/4 teaspoon was the next darkest, and the egg without vinegar was the lightest shade of blue. The food coloring bonds to the outside layer of the eggshell which is made up of protein. The vinegar causes the protein to become positively charged. The food coloring molecules are negatively charged. Molecules with opposite charges attract each other. This causes the food coloring to chemically bond to the egg.

IS THERE A CHANGE IN TEMPERATURE WHEN YOU SHAKE AND OPEN A CAN OF SODA?
A. A. Rowe and M. Simonds (teacher). Portola Junior High School, 18720 Linnet Street, Tarzana CA 91356.

My study's purpose was to see if the temperature of the soda in a can changes when you shake the can before opening it. I used an immersion thermometer to measure temperature. I set out two cans of soda. I measured the temperature of the soda with the thermometer just after opening it. I shook the other can violently before opening it. Then after opening it, I measured its temperature. There was a slight change in temperature between the two cans with the can that was shaken being slightly higher in temperature (20.68°C) than the other can (20.65°C). This may indicate that as the molecules violently collided they warmed the liquid in the can as heat was produced by the
molecular collisions.

PLANT GROWTH RESPONSES TO TOUCH

I conducted this experiment to observe the effects of mechanical stimulation on Blackeye Cowpea plants. The two experimental groups "Experimental 1" and "Experimental 2" plants were rubbed ten and twenty times respectively, daily. This experiment was conducted on the basis of Jaffe's hypothesis of Thigmomorphogenisis, mechanical stimulation such as rubbing a plant's stem retards stem elongation in certain plants. This was found to be true with Blackeye Cowpeas. The experimental groups yielded plants with shorter thicker stems. The statistics resulted in a p value of $p < 0.001$ between the plants with no mechanical stimulation and plants which were rubbed ten times daily. A value of $0.05 < p < 0.01$ between plants that were rubbed ten times daily and plants that were rubbed twenty times daily suggests an indirectly proportional relationship between the amount of mechanical stimulation and stem length.

TESTING FOR PRESENCE OF PROTEINS IN DAILY FOODS.
A. Akaragian and H. Gaboudian, and M. Altibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This project was done to find out which of the daily foods we eat contain protein. When nitric acid is added to a food, the color change to yellow indicates the presence of protein. First, two different dilutions of nitric acid were used to determine the presence of protein. The diluted nitric acids were too weak and did not cause any color change. Later, when concentrated nitric acid was added to a food product the color turned yellow in foods that contain protein. The results show that concentrated nitric acid needs to be used as an indicator to test for the presence of proteins in our daily foods.

THE DIET OF A CALIFORNIA SPOTTED OWL IN AN URBAN ENVIRONMENT.

As the rate of urbanization continues to swell, the boundary between man and beast becomes more blurred. This study focused on the dietary changes of one California Spotted Owl (Strix occidentalis occidentalis) when it left its forest home for the chaparral of Sierra Madre, California, and how this occurrence pertains to the future of this species of owl and its relation to man. Three days' worth of the subject's pellets were dissected and leaned, the bones then analyzed and identified using key guides to mammal structure and rodent skeletons of species common as the owl's prey, and those of species common to urban areas. Results showed the California Spotted Owl to be an opportunistic species, while at the same time not undergoing any drastic changes in diet. the main staple of its diet, the Dusky Footed Woodrat (Neotoma fuscipes) was mainly replaced by the Norway Rat (Rattus norvegicus) and the Roof Rat (Rattus rattus), common urban dwellers. We cannot speculate at this point as to the chances for survival of the California Spotted Owl in an urban environment, however our results provided baseline data and a starting point for any and all future studies regarding this matter.
THE EFFECTS OF NEW LIGHTWEIGHT CONSTRUCTION ON FIREFIGHTER SAFETY.
A.P. Engel and M.L. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

With this study I set out to determine which type of roof construction held up longer under fire conditions, standard roof construction or lightweight roof construction, and how that affected firefighter safety. Three models of four different types of roof constructions (two standard and two lightweight) were built. All of them were subjected to equal bearing loads. Then, under the same weather conditions, the models were subjected to an equal temperature and amount of fire in a gas fireplace. The results show that standard construction holds up three to five times longer than lightweight construction, therefore giving firefighters much more time and safety when battling fires.

DOES GOLDFISH WASTE INCREASE ONION PLANT GROWTH?

In this experiment an integrated fish-culture hydroponics system was established to test the relationship between the number of goldfish and yellow onion plant growth. This is a set-up in which the waste of common goldfish provides onion plants with the nutrients necessary for growth. There was no significant difference among the plants grown in the tanks with zero fish, one fish, or five fish. (p value 0.1) However, the plants in the tank with zero fish grew the tallest; the plants in the tank with five fish had the least growth.

NATURAL AND MAN-MADE ANTIOXIDANTS.
L. Ghasabi and M. Simonds (teacher). Portola HG Magnet Middle School, 18720 Linnet Street, Tarzana, CA 91356.

The purpose of this study was to find out whether natural or man-made antioxidants work better in food preservation. Several different natural antioxidants were used on food (that becomes oxidated easily) and their results were compared to those of leading man-made antioxidants. The food was covered by the antioxidants for several days and observations were recorded daily. The experiment was repeated 3 times. Overall, the man-made antioxidants seemed to slow down the oxidation process much more than the natural antioxidants. The results show that although nature is full of many antioxidants, man-made, chemical antioxidants still work better when it comes to food preservation.

THE HYPERACTIVE TOMATO.

This experiment was conducted to see if tomato plants would grow faster if caffeine was added to their water supply and to see if this process could be used in farming as a way to speed up the time it takes for a tomato plant to grow and produce market-ready tomatoes. 18 Beefmaster tomato plants were used, each approximately 20 cm ± 1 cm in height; 9 were used as a control and 9 as an
experiment. All plants were labeled accordingly and placed in separate pots, outdoors, where they received adequate sunlight. The control plants were given only distilled water, while the experimental plants were given a solution of distilled water and caffeine. Each plant was watered 20ml of the corresponding solution once a day for two weeks. After 15 days the plants that received the caffeinated solution grew 30cm ± 1 cm (on avg.) and the controls grew 22 cm ± 1 cm (on avg.). Based on the data gathered from the experiment, it was easy to observe that if caffeine was added to a tomato plant's water supply, it grew much more rapidly than plants which had received only distilled water. Although adding caffeine to a tomato plant might have been a good way of speeding up its growth, it proved to be costly.

MATERNAL AND PATERNAL BEHAVIOR IN CICHLID FISH.

Human beings have long believed that the female of a species possessed a stronger maternal instinct than the male. This instinct led her to vigorously protect her young from harm. To prove this theory true I set up a 20 gallon aquarium with mating a pair of Convict Chichlids. For a half an hour session three times a week, I alternately presented a mirror on each side of the tank for 2 minutes. The fish view the reflection as an intruder fish, so they "lash out" in defense of their young brood. The data that I kept was the number of open mouthed bites at the side of the tank made by the male and the female. After four days, the pair had spawned, and after three days the eggs had hatched. Experimentation was done during the three different stages of the parental cycle: (1) care of the spawn or eggs, (2) care of the wriggles or young fry, and (3) care of the free-swimming older fry. Using the T-Test and analyzing my data I found that there was no significant difference in the number of quantifiable bites by the female.

THE EFFECT OF MICROWAVES ON THE GERMINATION OF LIMA BEANS.
Adam Lim, Steve De Gusta (teacher). John F. Kennedy, 6715 Gloria Drive, Sacramento, CA 95831.

The height of lima beans are effected by microwaves. Therefore the germination process must be increased or decreased by the microwaves. This lab was designed to find out the lethal dosage of microwaves in the germination process of lima beans. Lima beans were microwaved at 5 second increments starting with 10 seconds and ending with 30 seconds. The lima beans were then left to grow for one week or 7 days. The results came out to be inconclusive. Possible errors were the techniques that I used and the equipment. The results of the experiment were sporadic and not connecting.

BODY WEIGHT AND SEED CONSUMPTION IN THE HETEROMYIDAE RODENTS IN A CONTROLLED ENVIRONMENT, AND SOIL RESEARCH.

This study was an observation of Heteromyidae rodents and the amount of foraging required to maintain a stable body weight. Two animal subjects were observed daily, *Perognathus baileyi* (pocket mouse) and *Dipodomys merriami* (kangaroo rat), each in a separate ten gallon aquarium. Both animals were given a set amount of unhusked millet, (3.5 grams for the pocket mouse, 5.5
grams for the kangaroo rat), after access to the food for a 24 hour period, the uneaten seeds and remaining shells were sieved out, weighed, and recorded. Each experiment was conducted in two sections, for approximately 8 days each. After determining the amount of seeds needed to be given to the rodents to maintain their body weight, the amount of seeds per m$^2$ was determined by sorting, then weighing seeds collected in Frisbees 30.48 cm in diameter and found in the Arizona Desert. The results seem to suggest that *Perognathus baileyi* needs to forage over an area of 1.8 m$^2$ daily, while *Dipodomys merriami* needs to forage over an area of 3.01 m$^2$ daily in order to maintain their body weight.

### TOBACCO PRODUCTS VS. BRINE SHRIMP.
S.M. Mendes, S. DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

In this investigation I tested cigarettes on brine shrimp. I made tobacco solutions out of Marlboro Reds, Camel Filters, Winston Lights, and Benson and Hedges cigarettes. I used the tobacco from one of the cigarettes and boiled it in 200 ml of a salt solution. I then added it to a petri dish containing two brine shrimp in intervals of 20 drops at a time. I then recorded any change in swimming behavior or curling. From my results I found that Camel Filters killed the fastest and Winston lights killed the slowest. It lead me to conclude that different name brands of cigarettes have different concentrations of tar and nicotine in them. Some types of cigarettes will kill you faster than others.

### WHAT ENVIRONMENT IS PREFERRED BY SNAILS TO EAT, WARM OR COOL?

This study examined whether the temperature conditions of the eating environment of a land snail, or *Helix*, will affect the snail's eating habits. Six snails, group A (3 snails) and group B (3 snails) were used. The preferred food was determined by using all snails and feeding them different foods at room temperature. Apple, lettuce, and dried cat food were used; results of this experiment tend to conclude that the snails preferred apple in small portions and lettuce in big portions. For this experiment, apple will be used. In two days of a consecutive heat wave averaging at 90 degrees, group A was fed apple bits at the middle of the day. The snails (in all four tests) were let out one hour before so containment would not be a factor. The snails did seem to eat the apple very quickly. The following weekend the temperature was averaging at 65 degrees. Group B was fed and the snails were not as active to eat as group A. This procedure was done twice, when conditions were similar as the first test, but used group B in the warm conditions and group A in the cool conditions. The results seem to conclude that snails prefer warmer conditions than cool conditions for their eating environment.
DOES GUIDED IMAGERY ACCOMPLISH BETTER RESULTS THAN THE ACTUAL, PHYSICAL PROCESS?
E. M. Vallejo and M. L. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

This experiment was conducted to find if practicing guided imagery can accomplish better results than the actual, physical process. I tested twenty female basketball players to see how much improvement occurred on their three-point baseline shot. Half practiced the actual shot (team A), and the other half of the females used guided imagery (Team B). After fourteen consecutive days, I discovered that the group using guided imagery increased 20.4% and the group that actually practiced the baseline shot increased only 10.6%.

COLD WATER FACTS.
Gregorio Campos, Mrs. Shah (teacher). Gaspar De Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study is to find out which temperature water is to freeze fastest. There were three types of water, tap, filtered, and refrigerator water. The water was poured into nine different cups, 3 which were at boiling temperature, 3 that were at room temperature, and 3 cups of melted ice. The water was placed in the freezer and was checked upon at regular intervals of 6 minutes. Through this experiment it is learned that the water at boiling temperature froze first and is the best one to make ice cubes out of.

WHAT IS THE MOST EFFICIENT SUBSTANCE FOR MELTING ICE?
Junie Dahn and M. Simonds (teacher). Portola Middle School, 18270 Linnet Street, Tarzana, CA 91356.

This study examined which substance melted ice most quickly and efficiently. I froze water and placed it in containers. Then salt, rock salt, hydrogen peroxide, sand and water were poured on the individual ice trays. The ice containers were observed in half hour intervals to see which substance was melting the ice the fastest. This experiment was repeated four times. Then comparisons were made to see the amount of damage done to sidewalks by the substances. Water and rock salt melted the ice the fastest and had nominal damaging effects on the sidewalk. Thus, water and rock salt are the best for melting snow or ice.

DENTAL HEALTH IN SMOKERS AND NON-SMOKERS.
M.L. Chew and M.L. Weitkamp (teacher). Chaminade College Preparatory 7500 Chaminade Avenue, West Hills, CA 91304.

This experiment tested whether leukoplakia, missing teeth, and restorations occur more frequently in smokers or non-smokers. One-hundred patients from a dental office in Tarzana, California were studied. Fifty of the patients were smokers and fifty were non-smokers. Each patient's dental history was observed for leukoplakia, number of missing teeth, and number of restorations. The data showed that leukoplakia and missing teeth occurred more frequently in smokers than non-
smokers, while restorations occurred more frequently in non-smokers than smokers.

1451

CHAPARRAL DISTURBANCE AFFECT ON QUAIL NEST PREDATION.

This study examined the relationship between the frequency of quail nest predation in Griffith Park, California and the level of disturbance of chaparral in which the nests are placed. Six artificial nests were placed at 2 chaparral sites. One site was moderately disturbed and the other lightly disturbed. The nests were checked for predation after two days, the predated nests were removed, and the remaining nests were checked five days later. The data shows that the more moderately disturbed site was more heavily predated than was the lightly disturbed site. It can be concluded from these results that the frequency of nest predation was directly proportional to the level of disturbance in the chaparral.

1452

BLEACH AND PINE CLEANER VS. B. CEREUS.

In this experiment I was trying to see if certain household cleaners killed B. cereus. To do this I infected 50 ml of agar with B. cereus and poured the agar into five petri dishes. On the agar I placed filter paper soaked in either bleach, pine cleaner, or water. Then, after twenty four hours, I compared the amount of bacteria killed by each liquid. I measured the amount of bacteria killed by measuring the radii of the circles of dead bacteria that surrounded the filter paper. My results showed that both bleach and pine cleaner were effective against B. cereus (p=.001), but the pine cleaner killed more (p=.001).

1453

EFFECT OF COLOR ON THE ABILITY TO COMPREHEND.
I.P. Garrett and Darshana Shah (teacher). Portola Middle School Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This study was to see if different colors effects a person's ability to comprehend. Many people of different age and I.Q. level were given as much time as they heeded to read 10 pages from a book. Every 2 pages they had different colored goggles placed on them. After they were done reading they were questioned with prepared questions and asked on a chart which questions were right and wrong. The results of testing have been that most have not been as able to answer the questions as well while wearing the yellow or red while the opposite is true of green and blue and regular vision seems to come out in the middle. I have drawn the conclusion that it is easier to comprehend while seeing a relaxing color (blue or green than a color that makes you feel tense (red or yellow).

1454

TESTING CRYSTALLIZATION.

I chose this experiment for my own personal knowledge. I began by placing a piece of rock salt in
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a loop of string. I then tied the other end of the string to a pencil. I did this six times. Next, I put each in a separate bottle. Three bottles had boiled water in them, and three more had rubbing alcohol inside. I filled two bottles, an alcohol and a water filled one, with salt. I did the same, but added sugar instead. I then set them aside for a month, and observed their progress. The bottle containing salt in alcohol, had the only piece of rock salt, that didn’t dissolve. The sugar in water container, grew mold on it’s surface, after the sugar had dissolved. The salt in alcohol and the sugar in alcohol, both developed layers of film over the solute. The solutions that contained the water, dissolved because the water was too hot. The sugar in alcohol dissolved, I believe, because the alcohol reacted with the sugar and the salt piece.

EFFECTS OF COLOR ON BLOOD PRESSURE.
J. A. Kiljian, M. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA. 91304

This study examined the question of whether color would affect blood pressure, and whether color would be an effective method of treating the disorders of blood pressure. I conducted this experiment by testing the blood pressure of 50 people, each at separate times, using a digital sphygmomanometer. The colors I used were red, orange, yellow, green, blue, purple, black, pink, white, and rainbow, in that order. Each test began by determining the person’s resting blood pressure. Afterwards, the first color carrel was displayed in front of the person for 5 minutes. When the time had elapsed, their blood pressure was re-determined. They were then allowed to rest for 5 minutes. This procedure was repeated with 10 different colored carrels. Red lowered blood pressure 47:50 times, orange lowered blood pressure 29:50 times green lowered blood pressure 30:50 times, blue elevated blood pressure 41:50 times, purple lowered blood pressure 42:50 times, black elevated blood pressure 50:50 times, pink lowered blood pressure 49:50 times, white elevated blood pressure 42:50 times, and rainbow elevated blood pressure 40:50 times. The results suggest that the colors red, yellow, greed, purple, pink, and white could be used to treat hypertension, while blue, orange, and black could be used to treat hypertension.

THE EFFECT OF HEAT AND LIGHT ON GERMINATION OF LENTIL SEEDS.
V. Turbendian and M. Altibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

The main purpose of doing this project was to find out if seeds germinate faster in the dark or light, at warm or cold temperatures. Four dishes were covered with cotton and twelve lentil seeds were arranged on them. One dish was placed in a pan of ice, another in a warm place, one on a sunny window, and the other in a closed dark cabinet. For two weeks, they were all watered with the same amount of water. Each day the growth was observed and the length recorded. The results showed that the seeds in the warm and light place grew much faster and taller. The seeds grown in the dark grew slower and had white stems and leaves. These results indicated that seeds will grow faster and look healthier in light and warm places.

DOES GARLIC PRODUCE ANTIBIOTIC EFFECTS?
M. Jadav and B. Vallejo (teacher), Reseda High School, 18230 Kittridge St., Reseda, CA 91335.

Garlic has been known to produce antibiotic effects. The antibacterial and antifungal activity of garlic, Allium sativum which is its botanical name, was investigated in this experiment. Pure
crushed garlic; was tested for such activity against 3 strains of bacteria and 2 strains of fungi that
were extracted and cultured in 5 agar plates, respectively, for approximately 48 hours. The crushed
herb was incorporated and tested in the experiment for 3 days. The effects of temperature and pH
on the (crushed) herb on its antibiotic activity were also examined. Also part of the experiment was
to determine the approximate range of the herb's bactericidal activity (by comparing to 2
commercial antibiotics). As results served, the pure crushed garlic inhibited bacterial growth very
effectively for approximately 50 to 60 hours. The antibiotic effect was equivalent for the fungi. The
antibacterial activity of the medicinal plant was almost destroyed by heating at 100 degree C for 5
minutes. The activity was stable at pH 7, but decreased at less than pH 3.0 and also above pH 1
1.0. The antibiotic effects ranged between those of the 2 antibiotics. It is speculated that the
antibacterial activity in the herb is mainly promoted by a chemical called allicin, where the plant's
antifungal activity is primarily produced by ajoene, an allicin derivative. The vast content of the
highly reactive sulfur in these complex compounds provides for the externally effective bactericidal
and antifungal activity. To this end, it is speculated that the high temperature and extreme pH
destroyed the antibiotic activity by affecting the sensitive sulfur modules.

HOW TIME FLIES.
Melissa Tan and M. Simonds (teacher). Portola Middle School H. H.G. Magnet, 18720 Linnet
Street, Tarzana, CA. 91356.

Does time seem to go by faster when you are active and slow down when you are bored? Do
females think time goes by faster than males when they are active and slower when they are
bored? To answer these questions, 30 people (15 males and 15 females) were asked to tell when
they thought a minute was over while doing nothing. They were asked again the same question,
but this time they talked about what they were interested in. Their times were recorded and
compared. The results gave in general, time goes by slower when you are bored and faster when
you are active. Males think time goes by slower than females when they are bored. But when both
sexes are active, they think time goes by generally at the same rate. (The people who participated
in this experiment did not have a watch to look at nor did they count seconds. It was all from their
minds.)

HOMEMADE WEATHER FORECAST.
S. Der Ashodian and M. Altibarmakian (teacher). Holy Martyrs Ferrahian Armenian High School,
5300 White Oak Avenue, Encino, CA 91316.

This experiment is done to find out if color change with cobalt chloride solution can be used as a
good indicator of rain. 20 cm of crepe paper is dipped in 5% of fresh cobalt chloride solution, by
mixing 5 grams of cobalt chloride crystals in distilled water to make up 100 mL solution. The
treated crepe paper pieces were hung outside for seven consecutive days, and color change is
recorded daily. If the color turned blue it indicates high humidity and there might be a chance of
rain. If it turns pink it indicates low humidity with no chance of rain. Also the relative humidity of
the same seven days is recorded from the weather forecast for comparison. The results obtained
were comparable. This indicates that color change with crepe paper dipped in cobalt chloride
solution can be used as an indicator for change in humidity.
CAN VIDEO GAMES RAISE PULSE LEVELS?
Alec Johnson, Shah (teacher) Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This was to prove if video games can raise pulse levels. I would first have a volunteer sit for five minutes. Then I would take their pulse for one minute. Next, the volunteer would play a selected video game (Mortal Kombat II) for fifteen minutes. When the person is playing I would check their pulse again. I would then repeat this procedure for the other game (Sonic the Hedgehog) and the other volunteers. In the end it seemed as though the people who had hardly ever played had high pulse levels after playing each game.

POWER PLANTS.
Raymond Zimmer, Mary Simmonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet St., Tarzana CA 91356.

The purpose of this project was to find if giving a plant more carbon dioxide helps it grow better. I got one control plant and three variable plants. I kept the three variable plants in a plastic container. Every other day I watered all of the plants and fed dry ice (frozen carbon dioxide) to each of the three variable plants. I also counted the number of new leaves that sprouted every other day. This allowed me to calculate the growth rate of the plants and compare it to the growth rate of the control plant. The results of the experiment were that giving more carbon dioxide to the plants helped them grow slightly better. However, the results of this experiment are inconclusive because there are several factors which could have contributed to the slight rise in growth. There may have been extra carbon dioxide in the air, one plant may have accidentally gotten more carbon dioxide than the other, etc.

THE EFFECTIVENESS OF PENICILLIN FROM DIFFERENT SOURCES.
Knieeka Jake and Steve DeGusta (teacher), John F. Kennedy High School, 6715 Gloria Dr., Sacramento, CA 95831.

This study was conducted to determine if the penicillin within the mold on a fruit would be more effective at inhibiting the growth of Bacillus cereus bacteria than the mold on a grain. The mold on an orange and white bread were removed and made into 2-20% solutions. These solutions were then soaked up on paper disks and put onto Bacillus cereus bacterial cultures. These cultures were then incubated and results were recorded. The results displayed that the penicillin within neither of the molds were effective at inhibiting bacterial growth. I concluded that this was so because the concentration of penicillin within the molds was not large enough to be effective. Further study is necessary.

HOW COMPUTERS WORK.
Pedrum Parto, Darshana Shah (teacher) Gaspar De Portola Middle School, 18720 Linnet St, Tarzana CA

This study was to find how computers process information and then produce it on the monitor. The study was done using a programming language called BASIC. Commands pinpointing certain
pixels on the screen were used to see how the computer finds locations. Different locations were chosen to make sure the study was done correct. Results were that the computer uses an X,Y grid, and then binary code (a series of offs and ons) turns certain pixels on. In conclusion the computer just heats up pixels when told, not knowing what is on the screen.

1464

VITAMIN C AND ITS EFFECTS ON THE REGENERATING PLANARIAN.
Alex Kwong and Mr. DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

In this lab, vitamin C was used to test the planarian's regeneration rate. Vitamin C has the ability to lessen the time it takes to heal a wound. So a procedure was done by cutting the planarians in half and soaking them in vitamin C until they have fully regenerated a head or tail. When the experiment was done, the planarian's regeneration rate increased (less amount of days to heal) when the planarians were soaked in vitamin C. The average time it took for the planarians to regenerate in vitamin C was nine days and the average time without vitamin C was 9.6 days. The head end of the planarian regenerated the fastest compared to the tail end. But I came to a conclusion that there was no significant difference among the vitamin C and the planarian's regeneration rate, and that any difference was due to chance alone. So I accepted my null hypothesis at p<0.1.

1465

HOW DIFFERENT VARIABLES EFFECT THE LIFE SPAN OF FLOWERS.
Stephanie J. Kim and Mrs. Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This experiment was conducted to find out if something can increase the life span of flowers. To do this, I got five flowers of the same age, type, and size. I put them in identical glass cups and poured in the same amounts of water. Then I added the variables, aspirin, cough medicine, alcohol, and vitamin c into four of the glasses leaving one alone as the control. The alcohol withered first, followed by the cough medicine and control. Then the vitamin c withered followed by the aspirin. In conclusion, aspirin helps flowers last longer.

1466

DOES THE TIME OF DAY AFFECT A PERSON'S PULSE, RESPIRATIONS, AND TEMPERATURE?
C.M. Roll and D. Shah (teacher). Gaspar De Portola Middle School, 18720 Linnet Street, Tarzana CA 91356

This experiment was conducted to find out if your pulse, breathing and temperature are affected by what time in the day it is. I measured each of these functions of the body three times a day: in the morning, after school, and in the evening before I went to sleep. This was done every day for seven days straight. After having graphed my results and computed some averages, I found that the time of day does affect your pulse, temperature, and respiratory readings. The afternoon readout for each of these functions was almost always higher than that of the morning or night. I also found that the readings of the morning and evening were usually about the same. These results suggest that one has a higher stress, energy and awareness level in the day. The time may not, however, affect other parts of the human body.
CAN VIDEO GAMES RAISE PULSE LEVELS?
Alec Johnson, Shah (teacher) Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

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Raymond Zimmer, Mary Simmonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet St., Tarzana CA 91356.

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**HOW DIFFERENT VARIABLES EFFECT THE LIFE SPAN OF FLOWERS.**
Stephanie J. Kim and Mrs. Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

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C.M. Roll and D. Shah (teacher). Gaspar De Portola Middle School, 18720 Linnet Street, Tarzana CA 91356

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THE EFFECTS OF SALT AND VINEGAR ON RADISH GROWTH.

This study examined the effects, if any, of salt and vinegar, compared to water, on the growth of radishes. Four plants watered with 20mL of each solution; 100% water, 99% water and 1% salt, 99% water and 1% vinegar, and 98% water, 1% salt, and 1% vinegar; were watered every two days. The tallest sprout in each of the four plants per solution was measured daily, as well as the number of sprouts in each cup of plants which were thinned to four sprouts in each cup for optimal growing purposes. Finally, the radishes were dug up and the 100% water, and 99% water and 1% vinegar watered plants were the only plants that grew radishes after the twenty-four day germination period. The 100% water solution's tallest sprout measured 5 inches, all of the 99% water and 1% salt solution's sprouts died, the 99% water and 1% vinegar solution's tallest sprout measured 4 1/4 inches, and the 98% water and 1% salt and 1% vinegar solution's tallest sprout measured 2 3/4 inches. In conclusion, the 99% water and 1% vinegar solution grew the best as compared to the 100% water solution (the control).

EFFECT OF ULTRAVIOLET RADIATION ON PLANARIAN REGENERATION.
Todd Yee and Steve De Gusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

This experiment tested the effect of ultraviolet radiation on the rate of regeneration in planarians. A group of ten width-wise cut planarians (head and tail pieces) were exposed daily to a four-watt UV lamp for one minute over a twelve-day period. Another group of 10 width-wise cut planarians were used as a control. The control planarians grew at an average of 0.5mm per day. The experimental grew at an average of 0.1mm. Using the T-test, this difference was found to be significant, the probability of chance variation being less than 0.001. The control regenerated completely while the experimental regenerated incompletely with deformed heads and smaller tails. The results suggest that ultraviolet radiation slows the rate and prevents complete regeneration in planarians.

THE HUNT FOR VITAMIN C.
R.C. Tsai and M. Simonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This experiment was to determine the more abundant source of vitamin C between artificial and natural fruit juices. The experiment was conducted by measuring 10mL of all the different samples of fruit juices. Hydrochloric acid was then added to all the samples, around 1-3 drops. Next, I added 4mL of starch indicator, and finally iodine was added individually to test how much iodine it would take before the mixture turned purple. The larger the amount of iodine it took, the more vitamin C there is. There were nine juices tested: fresh orange juice, fresh lemon juice, fresh grapefruit juice, frozen concentrate for grapefruit, lemon and orange juices, 100% pure from concentrate for both lemon and orange juices, and powdered juices for lemon and orange. - The results were that for lemon and orange juice the fresh juice had more vitamin C content, but for grapefruit juice the frozen concentrate had more vitamin C content, but for grapefruit juice the frozen concentrate had more vitamin C content. Overall, orange juice had the most vitamin C, grapefruit not far behind, and lemon juice last because of a significant drop of the
vitamin between the fresh and the rest of the juices. The results show that every fruit has its own answer.

PLANT GROWTH IN DIFFERENT SOILS.
Mark Dunn, J.T Davis (teacher). Park View Intermediate, 808 W. Ave J. Lancaster, CA 93534

My purpose of this experiment is to find out which soils will make plants grow faster. I used potting soil from a nursery, plain dirt and compost. I used the 2 cups of soil in each container. I bought the same kind of seeds and planted them in three separate pots. Each pot got the same amount of water and sunlight. The results were that all seeds started sprouting at the same time, but the plant in the pot with dirt was not as healthy. My conclusion is that treated soils grow healthier plants.

CIGARETTE EXTRACT ON GROWTH OF PEA PLANTS.
Bryan Yamauchi and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

I mixed cigarette extract into potting soil and planted cowpea plants in it to see if it stunted their growth. I was also looking for any color differences. I grew a control group without the cigarette extract in the soil. Both groups had twelve seeds. Each day for two weeks, I measured and recorded their stem heights. It took 3 to 6 days longer for some of the experimental plants to germinate than the control plants. One of the experimental plants had only one leaf, while the others had two. Four of the experimental died. Other than this, there were no other differences. Both groups grew about 1 or 2cm each day. My t-test results showed the differences in the stem heights between the two groups were due to the cigarette extract at the p = 0.05 level of confidence. Cigarettes do not affect the growth rate of pea plants. However they can slow down the germination and cause them to die. Since my numbers were border-line, I will have to do this experiment over again. From future investigations I hope to observe if the littering of cigarette butts is a significant threat to plants.

THE EFFECTIVENESS OF ADHESIVES ON DIFFERENT SURFACES.
Haley M. Criss and Mrs. D. Shah (teacher). Portola Middle School (Highly Gifted Magnet), 18720 Linnet Street, Tarzana, CA 91356.

This experiment showed which types of glue work best on different surfaces. I used various glues, both natural and synthetic to glue wood, plastics, glass, leather, and paper together. Then I tried to pull the materials apart to see which glues held the strongest. My results showed that natural glues seemed to work best with the most absorbent materials (wood, paper, and leather). Synthetics worked well with all of the materials except for thermoplastic resin (hot glue) which didn't adhere well to glass and some types of plastic. Polyethylene was the exception, it could only be adhered with gum adhesives which can be either natural or synthetic.
GROWTH RATE OF BRINE SHRIMP EFFECTED BY DIFFERENT CONCENTRATION OF CHLORINE.
Alex Kwong, Tom J. Kuang, William Wong, and Steve DeGusta (teacher). 6715 Gloria Drive, Sacramento, CA 95831.

In this experiment, we will attempt to investigate the effect of chlorine water on brine shrimp survival rate. Four different concentrated sets of chlorine in water were established. One set being the control where "bottled" water was used (ideologically to contain the lowest level of chlorine, if any). The other sets were the school's tap water (1.0-2.0 ppm chlorine concentration), household water (2.0-4.0 ppm chlorine concentration), and river water (1 < ppm chlorine concentration with chlorine test kit)*. Each set contains 20 brine shrimp and was observed for the number of deaths within 24 hours. After a period of 24 hours the results came to be that five of the 20 brine shrimps died in the "bottled"** water, two died from the river water, four died from the household water, and six died from the school water. It was inconclusive to base on the above results alone; therefore we embarked upon another experiment where only school tap water (experimental, 1.0-2.0 ppm chlorine concentration) and "bottled"** water (control, no observable chlorine level) were tested. There were two sets of each type of water (total of four: two having school water and the other two containing "bottled" water), each containing ten brine shrimps. Likewise, there is no significant difference to reject the null hypothesis; therefore, I conclude that chlorine concentration of 1.0-2.0 ppm has no significant effect on the survival rate of brine shrimp.

* MYDOR Chlorine Test Kit
** Arrowhead Spring Bottled water

WHICH PENNY WILL CHANGE COLOR?
Peggy Hurd, F.A. Swensen (teacher). Park View School, 808 West Ave. J, Lancaster, CA 93534

This study examined the question of possible discoloration of pennies in water. I placed one 1964 penny and one 1994 penny in a plastic glass filled with water on top of foil. Second I took another 1964 penny and another 1994 penny and placed them in two glass glasses filled with water on top of foil. Two days later I checked the glasses and found that both 1964 pennies were discolored. The 1964 penny in the plastic glass discolored more than the other. Neither 1994 pennies were discolored. 75% of the 1964 penny in the plastic glass was discolored and 60% of the 1964 penny in the glass was discolored.

EFFECTS OF MICROWAVES ON DROSOPHILA MELANOGASTER.
Jeffrey Takahashi and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

For this experiment two different experiments were used on Drosophila melanogaster. The first detailed Drosophila melanogaster being microwaved in a microwave oven to find the lethal dosage. These Drosophila were then placed in small plastic vials and then microwaved at 6 different times at different levels until the L.D.50 was found to be 30 seconds at high power. For the second experiment the five groups from the previous experiment plus a control of Drosophila melanogaster were put into plastic vials which contained Drosophila medium and were allowed to mate. After the Drosophila's offspring had reached the adult stage I then looked to see if the microwaves affected...
the male to female ratio for each of the tubes. When I observed the flies in each of the tubes the numbers were inconclusive. The male to female ratio was basically the same in the control, 5, 10, and 25 second tubes, except in the 15 and 20 second tubes growth was inhibited and there were larva and pupa but there were no adult flies. These results were confusing and no conclusions were drawn.

EFFECTS OF DIFFERENT VARIABLES ON PLANT GROWTH.
Michelle Piccirillo, F.A. Swensen (teacher). Park View School, 808 West Avenue J, Lancaster, CA 93534

This experiment studied the effects of different water and light types on plant growth. The water types were tap water, distilled water and bottled drinking water. The light types were natural light and artificial light. For the water variable, each plant was grown in natural light, but each was given a different type of water (one ounce/day). Plant #1 received bottled drinking water, plant #2 received distilled water, and plant #3 received distilled water. For the light variable, each plant was given the same amount of water, but grown in a different type of light. One was grown in natural sunshine; the other in artificial lamp light. I recorded the growth and compared the results. The plant grown in artificial light grew the best and the plant that was given bottled drinking water grew the best. My conclusion is that plants that are given bottled drinking water and grown in artificial light will grow better than all other combinations of light and water.

PHOTOSYNTHESIS CYCLE AND PLANT GROWTH. Eugene Shih and Steven DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

The purpose of my experiment was to answer the question “Do clovers grow faster under a 6 hour day (3 hours light and 3 hours darkness) than under a 24 hour day (12 hours light and 12 hours darkness)?” I grew clovers under the two different light cycles and compared the length (measured from end of root to tip of plant) of the Clovers. I found from my results that there was a significant difference between the growth (plant length) of Clovers growing under a 6 hour day and clovers growing under a 24 hour day. My results showed that Clovers growing under a 24 hour day grow faster than Clovers growing under a 6 hour day.

DEGREE OF PERCEPTIVENESS OF HUMAN EYE PERTAINING TO OPTICAL ILLUSIONS.
D. Hong. (Ms. M. Simonds) Portola Highly Gifted Magnet. 18720 Linnet St., Tarzana, CA 91356

This study evaluated the human eye’s ability to correctly decipher optical illusions. Three categories were made: children nine and under, youths ten through seventeen, and adults eighteen and up. They were shown a series of misleading pictures during a period of five seconds and asked several questions concerning their impressions of each illusion. Data was recorded and converted into comprehensive graphs for the purpose of further analysis. Results of each test group were compared and contributed to the final production of a conclusion. I have found that the results are inconclusive. The three groups are fairly even in the results.
EFFECTS ON THE CHANGE OF THE PLANT DIONAEA MUSEIPULA'S DIET.

The purpose of this study was to determine the effect of different protein sources on the *Dionaea Museipula* (Venus-fly trap). Four different foods were given to the plant each week. The control ate insects, mostly ants, the rest were given Lentil beans, Tofu and ground 93% fat free hamburger meat. All aspects of the environment were kept constant. After the plants grew for two months they were measured in length, and in the amount of protein received. The plant fed the meat grew the largest with an intake of 1.3 grams of protein. The plant fed tofu received 1 gram of protein and grew the second largest. The plant fed Lentil beans received .71 grams of protein and grew the third largest. The control plant received .44 grams, and was the smallest out of the plants. *Dionaea museipula* grow in proportion to the amount of protein it is fed. No matter the source of the protein, it is essential to the development of the plant.

WHAT HAPPENS IN A LANDFILL?
Eric Slater and Mr. Swensen (teacher). Park View Junior High School, 808 West Ave. J, Lancaster, CA 93534.

This study examined the effect of chemicals and other variables in the decomposition of materials in a landfill. A one gallon jar is filled with sterile potting soil, and another gallon jar is filled with dirt. These jars are filled with different materials like plastic bags and banana peels. The potted soil jar then has bug spray and paint thinner added to it. The jars are left to sit in a dark area. In the end, the jar of dirt, most materials decomposed, while the sterile jar, chemicals helped in decomposition mildly. In the jar of dirt, most of the materials decomposed. This happens because of the abundance of living organisms. In the sterile jar though, the chemicals destroyed all possibility of decomposition.

THE EFFECTS OF GENDER IDENTITY ON SHORT-TERM MEMORY.
Betty Wong and Darshana Shah (teacher). Portola Highly Gifted Junior High, 13720 Linnet Street, Tarzana, CA 91356.

This study and experimentation of gender identity examined whether children of various ages are affected in their short term memory by this. A chart contained twenty gender-typed pictures placed in alternate spots. Each subject was given fifteen seconds to study the chart and was asked to recall the items that they remembered. After this experiment was done, the data was grouped and graphed by two different methods: by age and by gender. By this process, it was easier to tabulate the results and compare the memories and responses of each individual. The results suggest that when grouped by age and grade, older children were liable to recall both kinds of pictures, while younger children were liable to recall their own gender-typed pictures. Yet, when grouped by sex, both recalled their own gender-typed pictures. In conclusion, it is able to be said that children are partially affected by gender identity and it does influence their short-term memory.
ULTRAVIOLET RADATION AND E. COLI PAMP'S RESISTANCE TO AMPICILLIN.
Eugene Shih and Steven DeGusta (teacher). John F. Kennedy High School, 6715 Gloria I)rive, Sacramento, CA 95831.

The purpose of my experiment was to answer the question "Does ultraviolet radiation destroy the Ampicillin resistance of E. coli pAMP?" E. coli pAMP was irradiated by ultraviolet radiation from a 4-watt ultraviolet bulb and then plated onto Ampicillin agar. The E. coli pAMP were incubated at 37° C and the growth, or failure of growth, was recorded. Fifty samples were taken and growth occurred in all the samples. From my results I have to conclude that ultra violet radiation does not destroy the Ampicillin resistance of E. coli pAMP.

IS IT TASTE OR SMELL?

The purpose of this experiment would be to find out why, when you have a cold or your nose is plugged, why you can barely taste anything. Does your nose have anything to do with the way that you taste? If you didn't have your nose would you be able to enjoy the foods that you love? This experiment will help you find out the answer to these questions. You ask some volunteers to sit in a chair, you blindfold them, and have them plug their noses. Then have them taste the different pieces of food, try to identify them and you record the results. Next you so the same experiment, but without their noses plugged. Record.

From the recorded results, we have concluded that your nose has a lot to do with the way you taste. The volunteers that had the experiment done to them, had a hard time trying to identify the different kinds of food. It is taste and smell. So next time that you have a cold, or you have a plugged nose, you now know why you can barely taste anything.

EFFECTS OF VARYING THE TEMPERATURE OF THE WATER WHEN PRODUCING FOG IN A BOTTLE.
L.N. Dancel and D. Shah (teacher). Gaspar De Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study examined the question of whether varying the temperature of the water used would have any affect on the amount of fog produced in a bottle. A glass of hot water was poured into a bottle. An ice cube was balanced in the mouth of the bottle. The warm air rose and when it came in contact with the cooled air around the ice cube it turned into fog. This experiment was performed three times (once at 100° F, once at 150° F, and once at 21 2° F). When the experiment was conducted with the water at 100° F, a few droplets of condensation fell from the ice cube but no fog was visible. When the water was 150° F. several drops of condensation fell into the water and a small amount of fog was visible. When the water was boiled (212° F) there was a great deal of condensation accompanied by visible fog which was moving rapidly in a circular motion. The results of this experiment suggest that the amount of fog produced varies directly with the temperature of the water.
ALTERNATIVE FUELS.

I did this project to find out if people could use a different type of fuel. I wanted to find an alternative fuel instead of natural gas. If my project works, this would mean that the state could put covers over sewage dumps and use the emitted fuel to heat houses or possibly could be used for industrial purposes.

First, I bought three (3) Big Slam bottles and washed them thoroughly. Secondly, I purchased Fleischmann’s Rapid Rise yeast. Net weight per package was 1/4 ounce. The third item purchased was a bag of Alliance Rubber Bands and a package of round party balloons. I placed three medium sliced apples into one bottle. In the second bottle I placed two large bananas and lastly, in the third bottle, I placed a 1/2 liter of grass. I mixed in each of the bottles one package of yeast and 1/3 cup of tap water. I then placed a balloon over the neck of the bottle and sealed it with a rubber band.

My project did not work as I had expected. While each of the bottle produced some amount of unknown gas, the gases found in the bottles were not flammable. I found that gases in the container holding the bananas and the grass dissipated after a few days. The gas in the container with the apples did not dissipate but yet held a constant pressure in the balloon. I believe it did not work because either the balloons had holes in them or the seals on the containers were not sufficient.

DOES THE AMOUNT OF HELIUM IN A BALLOON AFFECT LIFT?
Chris J. Bersbach, Mary Simonds (Teacher). Portola Middle School, 18720 Linnet Street, Tarzana CA 91356.

My experiment tested whether two balloons filled with different amounts of helium, would lift the same object at the same speed. I took two helium balloons and hooked metal rods too them and let them go. The larger balloon rose considerably faster, proving my hypothesis. The amount of helium in a balloon displaces a certain amount of the objects mass and causes it to rise at a certain speed.

THE THEORY OF THE BIGON.
Vincent Gu & M. Simonds (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This project studied in depth geometry and the possibility of a two-sided polygon. I think the significance of this experiment is that it would create a whole new path for expansion in the study of mathematics. I went about my research by looking through assorted geometry books and other related sources to find the most precise definition of a polygon. From this I made many attempts to construct this the best I could. I discovered that the imaginary bigon fits many of the requirements of being classified as a polygon, but was very different in many ways. In conclusion I believe the bigon, a two-sided polygon, is a polygon in its own group and is very unique.
CAN WATER BE PURIFIED BY NATURAL MATERIALS.

This experiment examined the question of possible purification of contaminated water through a natural, underground water system. The model had a frame made up of 2 pieces of wood that were 1 centimeter by 3.81 centimeters by 55.88 centimeters each. Both of the pieces of wood were screwed to a single piece of wood that is 1 centimeter by 3.81 centimeters by 60.96 centimeters. On one side of the model, I drilled 3 holes and put a hose in each one that went 5.08 centimeters between the 2 lexan sheets that were 45.72 centimeters by 60.96 centimeters. I glued the lexan sheets on the frame and made it water-tight by surrounding the edges with silicone. In between the 2 lexan sheets, there were 2 layers of earth material, sand and charcoal. The charcoal was on the bottom and the sand was on top of the charcoal. The experiment required some water, with food coloring in it, to be poured from the top opening of the model. The food coloring symbolized the contamination in the water. The water then seeped through the top layer and did not stop until it had reached the bottom of the frame. From the 3 hoses, the water was sucked out, with some sand and charcoal with it, and emptied into 3 glasses. Some cotton balls were placed by the opening of each hose in the inside to prevent any sand or charcoal to come out with the water. The hose in the middle was the sand and charcoal met. The time for each experiment was 4 days. Each experiment was repeated 4 times. The results suggest that the water from the sand portion of the model did not absorb or filter the food coloring as well as the charcoal.

THE PHENOMENON OF SURFACE TENSION.

The purpose of this project is to study the phenomenon of surface tension as demonstrated by the effects of adding different concentrations of glycerin and dishwashing soap to a bubble solution to form bubbles.

I began by mixing dishwashing soap, water, and glycerin to make four different solutions. Solutions #1 and #2 contained an equal amount of soap and water, but Solution #2 contained three times as much glycerin as Solution #1. Solutions #3 and #4 contained an equal amount of water and glycerin, but Solution #4 contained twice as much soap as Solution #3.

I observed that the solution with a higher concentration of glycerin produced bubbles that were stronger and had a longer life span than bubbles that were created with the solution with a lower concentration of glycerin. This probably is because glycerin molecules decrease surface tension and surround the soap and water molecules and hold them together. So adding more glycerin makes the bubble stronger. When I added more soap to the bubble solution the percentage of glycerin was lowered and so was the strength of the bubble. After completing this project I have found that the percentages that make the best bubble is 45% soap, 45% glycerin, and 10% water.
DOES pH AFFECT RADISH GROWTH?

The purpose of the experiment was to determine the affects of solutions of varying pHs on radishes. This was done by feeding the radishes solutions of either pH 2, pH 4, pH 6, pH 7 (this was the control since a pH of 7 is neutral), pH 8, or pH 10. We hypothesized that the radishes fed only solutions of pH 6 or pH 7 would grow correctly. This hypothesis was proven correct due to the fact that the radishes fed with either a strong acid or base did not grow at all, while the radishes given a solution with pH 6 or pH 7 grew at a normal rate. We concluded that these results are caused by the strong acid or base's deadly affect on nutrient digesting bacteria. These bacteria synthesize the nutrients needed for growth and make them available to the radish. Therefore, soils in which these nutrients are killed do not allow for proper radish growth.

EFFECTS OF PRECONDITIONING ON THE WAY WE VIEW OPTICAL ILLUSIONS.
A. H. Bennett and D. Shah (teacher). Gaspar de Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

The purpose of this study was to examine the possible effects of preconditioning on the way we view optical illusions. The procedures used to conduct this investigation included selecting an optical illusion (in this case, an ambiguous figure depicting both an old woman and a young woman). The subjects were then divided into three groups: the control group had no preconditioning; variable group "A" received a preconditioning story regarding the young woman; variable group "B" received a preconditioning story regarding the old woman. The subjects were asked which woman they saw in the picture, and their responses were recorded. All three groups had an easier time identifying the young woman in the picture. These results suggest that preconditioning does not affect the way we view optical illusions.

DOES AGE DIFFER MEMORY?
J.C. Wong, D. Shah (teacher). Gaspar de Portola Highly Gifted Magnet, 18720 Linnet Street, Tarzana, CA 91356.

This research is to find out if the difference in age affects the quickness of the brain's memory. To find this out, I asked fifty people, ranging from five years through sixty years of age, to repeat a certain number, first regularly, as I have said it to him or her, and then in reverse. After I say the number once, he or she would be timed for how long he or she takes to repeat the number. Then, I would say the number again, and this time I would time him or her for the time to say the number in reverse. The results were best with the group ranging from their upper teens to their upper 20's. In conclusion, I found out that the younger the age is, the more underdeveloped the memory of their brain is. On the other hand, the older people had trouble remembering and reciting the numbers out, both forwards and backwards.
WHAT CONDITIONS AFFECT BACTERIAL GROWTH?
Victor Koopongsakorn and Ben Vallejo (teacher). Reseda Environmental/Physical Magnet High School. 18230 Kittridge, Reseda, CA 91335.

This experiment was designed to show where and under what conditions bacteria will grow better. Bacteria was obtained and put into 5 petri dishes. These dishes were put in various conditions. Dishes were introduced to temperatures of 100, 38, and 74 degrees Fahrenheit. The other dishes were introduced to an acid, vinegar, a base, baking soda, and a neutral at room temperature. The bacteria was observed for seven days. In the temperature experiment, the result was that the bacteria at room temperature had the most amount of growth. The bacteria in different pH levels that had the most growth was the neutral subject. The base dish had more growth than the acid but less than the neutral In conclusion the growth of bacteria is affected by different conditions.

THE EFFECTS OF REWARDS ON ANIMAL BEHAVIOR.

The purpose for this experiment was to find out if a reward at the opposite end of the maze motivates a hamster to go faster to receive the reward.

The procedures for this project were: tape up a box, glue sugar cubes inside the box, run hamster through the maze about 10 times, every two times block two different doors out of the four, record each time, record times on a graph. In conclusion, we found that a reward does motivate a hamster to go faster, and every time he went through the maze, he went out a door, though not all of the time was it the right door.

CAN YOU MAKE A SPECTRUM FROM WHITE LIGHT?
Sherrie Evans, Mr. Swenson (teacher) Park View Jr. High (Intermediate); 808 West Ave J, Lancaster CA 93534.

The purpose for me doing this spectrum report is to see if you can make a spectrum using different variables. Such as using a sun glass lens for one instead of a plain mirror, then using brown vinegar instead of water for another. By doing this you can use other methods to create a spectrum.

My procedure was to pour water or vinegar into large separate shallow container. Place a small mirror in water so that it rests against one side of the container. Then I put a small hole in a large sheet of cardboard. Place this over a window so that a narrow beam of sunlight passes through the hole. Then I position the container so that the beam passes through the water and onto the mirror.

My conclusion is that the regular project with no other added changes and the vinegar project worked out beautifully. The sun glass lens did not work because light can't reflect from it therefore light cannot be broken into different spectrums of light.
EFFECTS OF GROWTH HORMONES ON PEA PLANTS.

The purpose of this study was to determine the effects of a growth hormone called Super-Thrive on 2 types of pea plants. Both normal and dwarf plants were used in case one type of plant reacted in an abnormal way to the hormone. Four flower pots were used with each containing 8 seeds, 2 pots for normal seeds and 2 for dwarf. Each pot was placed in an airtight bag for 4 days after which the pots were removed and placed in sunlight for several days until the seedlings reached about 3cm in height. In each pot, the best 5 seedlings were chosen and the remainder were removed. After this, one pot each of the 2 types were coated on the stems with hormone solution while the other 2 only received water. Growth was recorded over an 8 day period and results showed that seeds treated with a growth hormone grew at a faster rate than ones treated with water. In conclusion, growth hormones proved to be very beneficial to developing plants.

WHICH MATERIAL HOLDS SOLAR HEAT THE BEST?
Alexandra Hisserich and Ms. Simonds (teacher). Portola Middle School, 18720 Linnet St., Tarzana, CA 91356.

This study was to examine which different elements absorb and store the sun's heat the best. Five opaque, plastic 2-liter soda bottles were filled with one of the following: air; water; soil; gravel; and a combination of water and gravel. Thermometers and rubber stoppers were placed in the neck of each bottle. The bottles were placed in an area exposed to sunlight and air. Temperatures were recorded 3 times a day for 8 days in both degrees Celsius and Fahrenheit. On average, the bottle containing all gravel gained more heat from the sun, but the one with all water seemed to radiate the heat more slowly. It appears that water would make the best material to store and provide radiant heat.

TO FIND OUT HOW WELL SNAILS TRAVEL ON DIFFERENT SURFACES.

This study examines how well snails travel on different surfaces. I used terry cloth, vinyl, glass, wood, grass, composting material, metal, styrofoam, dirt, cardboard, and cement. I put a snail on each surface, measuring how far it traveled in five minutes. I measured the distances in millimeters. I repeated the study three times and averaged the distances. The snails traveled the best on glass and traveled very little on dirt. My conclusion is that the snails traveled farther on smooth surfaces than rough.

RECYCLING PAPER.

This study was designed to observe the procedure of converting used paper into that which is functional and the effect thereof. Three centimeter strips of newspaper were placed in a blender
with water. Fifty milliliters of water should be added for every page of newspaper. The mixture was blended until the newspaper strips and water blended to make a moist substance. After the blender was emptied, leftover strips excluded from the mixture were disposed of and the contents of the blender were flattened with a rolling pin. The remains were then placed on a cookie sheet and put in the yard for the air to dry it. In conclusion, once the paper had dried, the newspaper seemed smooth and can be used once again to be written on. This proves that paper can be recycled successfully in the home.

FOOD FINDING FRUIT FLY FLIGHT.
Jennifer Tokuyama and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

This experiment was conducted in order to determine if Drosophila melanogaster cultured in banana mixed media have a tendency, when given a choice of two fruits (apple and banana), to locate and eat the food in which they were bred. The Drosophila melanogaster that were cultured in banana mixed media were hypothesized to locate and eat the banana rather than the apple, when faced with the choice of the two fruits. 16 control Drosophila melanogaster (cultured in regular media) and 16 experimental Drosophila melanogaster (cultured in banana mixed media) were chosen at random and one at a time were let loose and observed in a 30" x 15" x 15" plexiglass wind tunnel. A slice of apple and a slice of banana were placed at one end of the wind tunnel (closest to the wind source - a fan). As the fan aerated the fruit smell through the tunnel, the Drosophila melanogaster were observed as they traveled on to either the apple or banana. As expected, most of the banana cultured Drosophila melanogaster traveled on to the banana rather than to the apple.

WHICH TYPE OF ORANGE JUICE HAS THE MOST ASCORBIC ACID?
Oliver Wang and Mrs. Simonds (teacher). Portola Magnet Middle School, 1870 Linnet St., Tarzana Ca, 91356.

This study tests which brand of orange juice contains the most ascorbic acid, or vitamin C. A computer program was made to calculate the milligrams of ascorbic acid in each serving. Then DichloroIndophenol (.1%) was added to a test tube until it rose to a marked amount. The orange juice was added drop by drop until it turned the normally blue dichloroIndophenol into a clear liquid. Then, the result was compared to the vitamin C standard. Another method was also used, a solution of Iodine, (.001%) was added drop by drop to a solution of the orange juice and (.1%) starch until the normally orange solution turned into a dark blue liquid. Most orange juices have around the same amount of ascorbic acid, but the Tropicana Vitamin Rich had around twice as much as the others. Also, the artificial orange juice, Sunny Delight had around the same amount as the rest, that probably means the manufactures add Vitamin C to the orange juice until it gets to the desired amount.

HOW DO YOU MEASURE VISCOSITY?
D.M. Broerman, F.A. Swensen (teacher). Park View School, 808 West Ave J., Lancaster, CA 93534

The purpose of my project is to find the viscosity of normal household liquids. By using four different test liquids and four marbles, testing for viscosity is easy. First I took four jelly jars and
filled them with water, cooking oil, milk, and kool-aid. Then you take four marbles, take two jelly jars and fill one with one liquid and one with another. I drop the marbles at the same time to see which one got to the bottom first. I found out that cooking oil is a lot thicker than milk and that water and kool-aid are almost the same except the kool-aid was a little bit thicker. So, I found out that all liquids are not the same.

REACTION TIME.
Keith Pochmara and Ben Vallejo (teacher). Reseda High School. 18230 Kittridge, Reseda, CA, 91335.

This experiment was designed to show the reaction time differences in people who are fully concentrated, and those who are preoccupied with another task. Each subject was tested with and without a question while performing the "ruler-drop," a make-shift reaction time device where a person catches a ruler when dropped between their fingers. Younger people had quicker initial times, but older people seemed to have a closer difference between with and without a question. All people showed an increase in reaction time with a question over without.

EFFECT OF ASPIRIN ON TOMATOES.

The purpose of this experiment is to test aspirin (Acetylasalic Acid) on tomatoes (Lycopersien esculentum). I planted two tomatoes each six to eight mm. deep. On the first tomato I used aspirin plus water (H20) combined. I repeated this process each week, using half an aspirin. On the second tomato I used only water. After two weeks the results started showing the first tomato reached a height of 3cm while the second one was only 2cm tall. I also noticed something else, the second tomatoes leaves were yellow and pale, much smaller than the second tomatoes leaves, because it had nitrogen (N), magnesium (MG), sulfur (S), boron (B), and calcium (CA) deficiency. Meaning that aspirin and water does help tomatoes grow faster and healthier.

THE EFFECTS OF ALCOHOL ON GRAM POSITIVE-BACTERIA.
L.Csontos, and M. Weitkamp (teacher). Chaminade College Prep High School, 7500 Chaminade Avenue, West Hills, CA 91304

The purpose of my experiment was to see how well different alcohols kill bacteria. I used two types of known bacteria, Staphylococcus epidermidis and Staphylococcus aureus. The S. epidermidis is a normal bacterium found on the skin, but the S. aureus is a pathogen that can cause a disease, called scalded skin syndrome. I also used five types of alcohol. They are 91% isopropyl, 70% isopropyl, 40% ethanol (whiskey) a 20% dilution of isopropyl alcohol, and methanol absolute. My hypothesis was that the stronger alcohols such as methanol, 91% isopropyl, and 70% isopropyl would kill 100% of the bacteria. My hypothesis however was only somewhat right. The results showed that only the 91% alcohol killed all of the bacteria. All of the other alcohols didn't kill the bacteria thoroughly since cloudiness had appeared in the media.
SEVEN DAY CHRONIC TOXICITY TEST FOR CERIODAPHNIA.
Trent Thomas and Steve DeGusta (teacher) John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

The purpose of this standardized test created by the EPA is to test effluent bodies of water for trace levels of toxicity. Using the microorganism known as Ceriodaphnia as an indicator, water from a drainage canal at the point immediately preceding its flow into the Sacramento River (Greenhaven Road) was tested. Using ten specimens for control and ten specimens for the experimental group, each individual specimen was tested for the total brood produced. A reduced production of broods would show trace levels of toxicity. The experiment showed no significant difference in the total brood produced by the experimental specimens than the control specimens; therefore, there is no toxicity in the canal at the time of testing.

A. Chow¹ and K. Fitzhugh². Alhambra High School, Alhambra CA 91801 and ²Section of Invertebrate Zoology, Natural History Museum of Los Angeles County, Los Angeles CA 90007.

A systematic analysis was performed with taxa of the Family Nereididae. The goals of the project involved (1) revising the relationships and definitions of subfamilies that were recognized by Fitzhugh (1987) and Glasby (1991) and (2) evaluate and revise the status of genera defined by Fauchald (1977). The study included 27 of the 40 known Nereididae genera, represented by 53 species. Forty morphological characters were examined from each specimen. Character information was obtained from the proboscis, head region, parapodia, and setae. Genera from the Family Hesionidae, Hesione, Nereimyra, Ophiodromus, and Podarke were used in separate analyses as outgroup taxa to determine character state polarities. Two types of analyses were performed using each outgroup taxon. In one analysis, patterns of relationship among genera were determined using a single species to represent each genus, whereas the second type of analysis included all species examined from each genus for the project. For relationships among genera, the most striking result using each outgroup is that while the Namanereidinae remain monophyletic, the Nereidinae are consistently paraphyletic relative to the Gymnonereidinae. In instances where genera are represented by multiple species, several trees were obtained in which these genera are paraphyletic. Given the present results, the most informative systematic arrangement of nereidid subfamilies would be to maintain the Namanereidinae, and place the Gymnonereidinae into synonymy with the Nereidinae. Preliminary results regarding the possible paraphyletic status of some genera points to the need for more extensive research on relationships among species as well as further assessments of criteria currently used to define genera.

WHAT COLORED DYES ARE FOUND IN POWDERED DRINK MIX AND COLORED MARKERS?
Gabriel Schwartz, and Mary Simonds (teacher). Portola Middle School, 18720 Linnet St., Tarzana, CA 91356.

This experiment determined which colored dyes are used in different flavors of powdered drink mix and in different colors of colored markers. The experiment also showed the differences between the pigments found in drink mix and markers of the same color. Water was added to
powdered drink mix and a drop of the mixture for each flavor was placed on a different strip of filter paper. The filter paper was then placed in a jar filled with 1 cm of rubbing alcohol. The rubbing alcohol separated each flavor into its component pigments, creating a chromatogram. This was repeated for the colored markers. The powdered drink mix generally contained more pigments than the markers. Darker colors contained more pigments in both the drink mix and the markers. The pigments in the drink mix and markers of the same color were slightly different. The results suggest that the dyes found in powdered drink mix and colored markers are made up of different pigments.

CHEMICAL BREATH.
S.M. Groman and J.T. Davis (teacher). Park View Intermediate, 808 West Avenue J, Lancaster, Ca. 93534

This study examined the presence of carbon dioxide in the exhaled breath of a homo sapien, or human. First, I obtained three glass jars with lids and filled one jar full of tap water. I then added one tablespoon of lime to the jar full of water. I let the jar sit overnight undisturbed on a counter by a window. In the morning I emptied one half of the lime water into one of the jars and then the other half into the second jar. I was careful not to pour any of the lime that had settled on the bottom of the jar into the water. I then had a male and female, child and adult, a female who had exercised for 15 minutes and another female who had exercised for 30 minutes take a straw and breathe into the lime water. I counted how many breaths it took each person to make the lime water turn into a milky white substance. I concluded that a male has more carbon dioxide than a woman, an adult has more carbon dioxide than a child, and a female who has been exercising for 15 minutes has more carbon dioxide in their breath than the female who has been exercising for 30 minutes.

THE CLARINET REED STRENGTHS THAT ARE THE BEST FOR PLAYING LOW/MIDDLE/HIGH NOTES ON THE CLARINET.
Young-Jin Moon and Darshana Shah (Teacher) Gaspar De Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356

My science project examined the question of which Clarinet Reeds have the best blowing ease and sound quality for low, middle, and high notes. Most of the basic reed strengths were tested for a day of playing on a Bb Clarinet, and the rating of the blowing ease and sound quality was rated from 1 (lowest) to 10 (highest). The low reed strengths received high blowing ease but low sound quality, the middle strengths received average ratings, and the high reed strengths got an average rating on the blowing ease. but got a high rating on the sound quality. I have concluded that low reed strengths are recommended for beginners, middle for intermediate, and high for advanced players.

EFFECTS OF NUTRIENTS ON SEED GERMINATION.
F.W. Kwong, B.C. Roe, and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302

This study examined the possible effects of nutrients in the germination of seeds. After overnight, refrigerated soaking in distilled water, we placed five pinto beans each into three different environments; distilled water, 15-30-15 concentrate liquid plant fertilizer solution, and a sugar-
water solution, all without light, and observed growth. After seven days, all the specimens had been properly germinated. Although growth rates varied slightly, there were no major differences in the germination time with and without nutrients. We repeated the experiments and received the same results. This led us to believe that nutrients have no effect upon the germination of seeds.

1512

HOW FAST DO OBJECTS ACCELERATE TO EARTH?

This experiment involved measuring acceleration due to gravity. Calculated bundles of pennies were dropped from a predetermined height. The distance of the fall was noted. The rate (time) of the fall was recorded, with the use of a stopwatch. Eight drops were made for each bundle of pennies, 50 & 150 respectively. Four trials were recorded. It was determined that the smaller bundle had a faster rate of acceleration. Analysis was also done to calculate the rate of acceleration for each of the time trials. Once the times of the falls and the distance of the falls were found, the acceleration due to gravity was found using the following formula: \( g=\frac{2d}{t^2} \) where \( g \) = acceleration, \( d \) = distance, \( t \) = time. The accepted value of \( g \) has been calculated as 980 cm/sec. This compared to our findings resulted in a 35.5% error rate. By increasing our predetermined height, the error rate would have been decreased.

1513

DOES GENDER AFFECT A PERSON'S STEREOGRAPHIC VISION?
Dianna Woolsey and M. Simonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This project tested whether a person's gender makes them more or less able to see "3-dimensional" stereograms. 10 boys and 10 girls of approximately the same age were each given the same 4 stereograms to look at, and I recorded which ones they could see. I discovered that while 8-9 of the girls could see them, only 5-6 of the boys could see them (I also noticed that most of the people who could not see them wore eyeglasses or contact lenses). Therefore, my conclusion is that girls have better stereographic vision that boys of the same age.

1514

WHY PLANTS HAVE HOLES IN LEAVES?

The purpose of my project is to see if the two plants with Vaseline on the top of its leaves will die or will the two plants with Vaseline on the bottom of its leaves will die. For my project I brought four plants that were in the ivy family. The procedure I used was to put Vaseline on the top of the leaves of two plants, and on the other two plants I put Vaseline on the undersides of its leaves. Then I observed which two plants lived and which two plants died. After observing the plants for a week and a half the results showed me that the two plants with Vaseline on the top of its leaves lived, the other two plants with Vaseline on the bottom of its leaves died. The openings of the plant that died were being plugged up by the Vaseline so it did not survive long.
WHICH IS BETTER FOR MEMORIZATION, STUDYING WITH OR WITHOUT BREAKS?

This study examined how 30 second breaks within a 6 minute period affected a student's performance. A total of twenty people read five different materials with breaks and five different materials without breaks. When reading the material with breaks, the participants, ages 14-17 years, read for 2 minutes followed by a 30 second break. This pattern continued for 6 minutes. When reading without breaks the participants read for 6 minutes straight. Each person then took a ten question multiple choice and true/false test. The results show that on average each person's score was improved when the person took breaks. Each group performed better when taking breaks. Also, on average the group taking breaks had a 12% increase in their scores.

DOES AGE AFFECT A PERSON'S SENSORY REACTION TIME?

Three subjects were put into each one of the following age groups of 0-15, 16-30, 31-45, and 46-60. Using the reactions of touch, sight, and hearing, each group was tested against each other five times. Each group being tested was placed next to each other and when they saw the flash of a flashlight they had to press a button on the multiple response device which recorded who had hit the button first. Their hearing and touch was also tested this same way. Hearing was controlled by a sound of a click and touch by each subject having a string tied to their finger which were pulled at the same exact time. The results show that the youngest age group had the fastest reaction time and the oldest group the slowest reaction time. There did not seem to be any difference when testing touch, sight and hearing. Overall the youngest group had 67% of the fastest reaction times while the oldest group only had 36% of the fastest reaction times.

CHINESE WATER TORTURE.
N. Neri, D. Shah (teacher). Portola De Gaspar Middle School, 18720 Linnet St., Tarzana, CA 91356.

This study examined the question of just how long does an average size bar of soap last. It is done by putting a bar of soap under a dripping faucet and waiting for several hours to see just how deep the hole in the soap is and by comparing that when the bar of soap is left on the shower stall over night with water washing over it. There are approximately 88 drops of water per minute and the bar of soap was left under the faucet for 5 hours. The total drops of water on the soap are 26,400. The soap weighed .5 oz. and, after the experiment the bar of soap now weighs about .4 oz.. The results suggest that it is best for the bar of soap not to be left wet when it is not in use to save more soaps instead of buying so many that you just have to waste money and it's bad for something like that to happen to someone.
EFFECTS OF WORMS ON THE SPEED OF LIMA BEAN GROWTH.

This study examined the question of possible worm involvement in the growth speed of lima beans. 4 lima beans each were placed in two pots that had measurements of 18 centimeters in height and 16.5 centimeters in diameter. Three worms were placed in one of the two pots. The experiment took 18 days. This experiment was repeated twice. On the 18th day, the beans were checked. The beans with the worms showed faster growth on both of the experiments. The lima beans with the worms were taller and had more leaves than the one without worms. My conclusion is that worms help lima beans grow faster.

BLUE VERSUS ORANGE/RED LIGHT IN EUGLENA REPRODUCTION.
Brian Sakamoto and Steve DeGusta (teacher). John F. Kennedy High School 6715 Gloria Drive, Sacramento, CA 95831

The purpose of this investigation was to determine if the addition of orange/red, about 670 nanometers, was more effective than blue light, about 450 nanometers, in increasing the reproduction rate of *Euglena gracilis*. Three petri dished filled with spring water, each contained ten drops of a *Euglena gracilis* culture. One dish was placed under blue cellophane, another under orange/red cellophane, and the last one under black plastic as the control. A 1020 lumen light source was supplied in addition to this same light reflected off distant mirrors that shone directly on the dishes. The data obtained showed that orange/red light very significantly increased the reproduction rate of the *Euglena* faster than those placed under blue light. From the random samples, the resulting Chi-square value was 2159.5. Throughout the experiment, the number *Euglena* under the orange-red light increased by 2868% whereas the increase rate for the *Euglena* under blue light and under mirror light in the control were 470% and 366% respectively. My data strongly suggests that about 670 nanometer light significantly increased the metabolic rate of *Euglena* faster than those under 450 nanometer light.

EFFECT OF PLANT FOOD ON THE RATE OF GERMINATION OF SEEDS.

Plant food is commonly used to aid growing plants by providing them with extra chemicals needed to produce proteins. I designed this experiment to see if these extra nutrients were of assistance to the sprouting seed. I have defined germination as the forming of the primary root. I then grew pinto beans on wet paper towels, watering half of my seeds with a 2.2% solution of plant food and distilled water, and the other half with distilled water. After two days, the average sprouting time of pinto beans, I counted the number of seeds that had fully germinated and compared them with the number that did not fully germinate. I concluded that the plant food hindered the development of the seed into a plant. I have attributed this delay to a lack of water that the seeds need to develop. During imbibition, the seed takes in the surrounding liquid and uses the water that it has taken in to help in the seed’s further development. When the plant food is present, plant food is taken in instead of water, and so the seed is slower to develop.
EFFECTS OF ELECTROLYSIS ON TAP WATER.
John Brian Kirby, Ms. Simonds (teacher). Portola Highly Gifted Magnet, 18720 Linnet Street, Tarzana, CA 91356

This experiment was conducted to study the composition of tap water, using decomposition by electrolysis. Two strips of aluminum were placed on the inner edges of two test tubes. A jar was then filled with a mixture of tap water and sodium chloride. The test tubes were filled with the same solution and placed upside down inside the jar. The bare ends of the wires were attached to a 12 volt battery, and the entire apparatus was left for 1 1/2 hours. After the time had elapsed, bubbles had begun to form around the aluminum strips, and had filled part of the test tubes, half as much as in the other. When the gasses were tested using a flaming splint, one flared the splint's flame, while the other formed a small explosion. It was concluded that the two gasses were Hydrogen and Oxygen, which explains the amounts of gas in each test tube. The experiment was conducted twice, both producing the same result.

WHICH LAUNDRY DETERGENTS WORK BEST?
G.A. Copeland, F.A. Swensen. Park View Intermediate School, 808 West Avenue J, Lancaster, CA 93536

In this experiment I am trying to determine which laundry detergent works best. I am also testing to see if the temperature of water effects how well the detergents will work. In order to attempt this experiment I had to follow certain steps. I first made the stain which consists of Bull's Eye Barbecue Sauce, French's Mustard, and Hershey’s Chocolate Syrup. Then I had to pour one teaspoon of the stain onto each piece of cloth. There were six stained cloths altogether. I then washed each cloth with a different detergent. The detergents I used were Ultra Tide, Surf, and Cheer. Then I took the other three stained cloths and washed each one using the different detergents in hot water. The results of this project after washing each stained cloth in cold water was Surf worked best, then Tide, and then Cheer. The results of this experiment after using hot water with each detergent, helped the detergents bring out the stain more effectively, but Surf still worked best, followed by Tide, and then Cheer.

DOES AGE AFFECT COLOR PERCEPTION?
Farhat Yousufzai and Mary Simonds (teacher) Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356

The purpose of the study was to find out if the 6th, 7th, or 8th grade students could adjust to different colors faster. I took 14 children from each grade and timed them on how fast they could read cards that had the name of a color in a different color and on a different color background. The results were that the 8th grade were better at adjusting to various colors. Age does have an effect on color perception.
EFFECTS OF DIFFERENT WATER TYPES ON PLANTS.

This project examined the effects of different water types on plants. Two jalapeño plants of the same height were each watered for one week with different water types -- one with regular tap water and one with purified water. They were kept near a window where they received direct rays from the sun from sunrise until about 11:30am. During the week, I observed the two plants and noticed that the plant with the tap water was doing better than the one with the purified water. The tap water plant was 1/2 inch taller than the purified water plant which was also growing but wilting a little bit. The results were that the plant watered with the tap water survived longer than the one watered with purified water.

THE EFFECT OF ETHANOL ON THE GROWTH RATE OF LITTLE MARVEL PEA PLANTS.
M.C. Ng, and S. DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

In this investigation, I watered a group of 36 Little Marvel pea plants with a 5% ethanol solution and another group of 36 with distilled water to compare their growth rate. I found that the growth rate in respect to the height of the pea plants increased in the plants watered with a 5% solution after a three week period of time. Results show that a 55 ethanol solution significantly increases the growth rate of Little Marvel pea plants. There is a significant difference not due to chance. Using T-test the p-value is 0.01 between the control and experimental plants, the results had a less than 15 chance that it was due to chance.

ARE FEMALE OR MALE RATS SMARTER?
E.M. Yerke, D. Shah (teacher). Gaspar de Portola Middle School, 18720 Linnet St., Tarzana, CA 91356

This experiment dealt with the possibility of one gender being more intelligent than the other. Two female rats were put through a maze, one after another. They were both timed. Afterwards, two male rats were put through the same maze and timed. I then averaged the female’s time and the male’s time separately and then compared the two averages. In conclusion, the female rats were slightly faster, but that does not necessarily mean that they are smarter.

HYDROPONICS: TWO GOLDFISH VS. PLANT FOOD.

The purpose of this experiment was to answer the question of whether Yellow Onions grow faster in stem height if grown with nutrients obtained from goldfish excrement or plant food. Thirty onion bulbs were grown, ten in the control, ten with two goldfish, and ten with thirty-five drops of Shultz-Instant plant food. At the conclusion of the experiment I accepted my null hypothesis that there was no significant difference in the stem height of the onions grown with goldfish and those
grown with plant food.

ARE THERE SEPARATE SECTIONS IN THE BRAIN FOR MUSIC AND SPEECH?
Josh Saxe, Mrs. Simmonds (teacher). Portola Middle School 18720 Linnet, Tarzana, CA, 91256

My science project's title was, "Is there a separate section for music and speech in the brain?" To find an answer to this question, I tested people to see whether they could remember notes played in a music background and in a speech background. My hypothesis was that people would not be able to recognize notes as well with a music background, because the music would occupy the music section of the brain. My hypothesis was proved correct by the results. I found that people did worse when trying to remember a note if it had a music as contrasted with a speech background.

WHAT IS A CONDUCTOR?

My Science experiment was made to determine which items are conductors and which are insulators. To do this I bought a 1.5 volt battery and taped a piece of electrical wire to both the positive and negative sides. Then I bought a 1.5 watt light bulb and taped one of the ends of the wire to it. Next I taped another piece of wire to the light bulb. If an item is a conductor the light bulb will light up when the wires are pressed to the object. In conclusion I found that any metal object is a conductor, and any thing other than metal is an insulator.

A COMPARISON OF THE PERFORMANCE OF DIFFERENT PACKAGING MATERIALS.
Adam Siegel and Mrs. Shah (teacher). Gaspar de Portola Middle School, 18720 Linnet, Tarzana, CA.

This project examined the strengths of certain packaging materials. The packaging materials were an empty box, or a box filled with bubble paper, shredded paper, styrofoam peanuts, dirt, popcorn, rubber bands, or plaster. I did two tests. The first was a drop test in which I dropped the box off a ladder at a fixed height, with an egg and the packaging material in it. I increased the height until the egg broke then I found the height the packaging could protect an object at maximum. The second test was a crush test. I drilled four holes in each corner of two 60x60 cm pieces of particle board. I drilled two holes through the two ends of two 2x4s I had placed below them. I then inserted four 3/4 of an inch white PVC pipes into each hole I had made in them. I slid a particle board on the PVC pipes and then slid the other particle board on top of it. I tested the boxes by sticking the box with one of the eight packaging materials in it between the two particle boards. I put barbell weights weighing 4 kilograms and 6.5 kilograms on the top of the top boards as well as soda bottles filled with water weighing 1 and 2 kilograms. I then added weight until the box gave way and I logged it. I tested each material three times. The best over all material was styrofoam which scored highest in the crush test. Babble paper did the best in the drop test (it didn't break at all).
THE EFFECTS OF FLUCTUATING NOISE ON THE PERFORMANCE OF MICE.
Kristen B. Ong and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

In this experiment I tested the question: "Does fluctuating noise have a significant negative effect on the performance of mice running a learned "hallway"? Nine mice were trained to run a 1.5 ft. long hallway until they could do so in less than five seconds. The same nine mice were used for both the control and the experimental groups to ensure that the difference in their temperaments would not be a factor in their times. Each of the mice ran 12 trials for the control (in which there was no extraneous noise present) and 12 trials for the experimental (in which I subjected them to fluctuating noise). By testing the effect of noise pollution on performance, I hoped to find out if fluctuating noise really does bother the performer enough to cause them to perform significantly worse than they would have without the noise present. Since most people are able to perform simple tasks even under the possible stress of loud, unstable noise, I figured that the mice may be a little distracted but that the noise would not greatly hinder their performance. Using the test, I found that indeed there was only a small difference in their times; there is a 1 in 10 possibility that the difference was due to chance variation alone. These results support the idea that fluctuating noise does not significantly affect the performance of mice, and very possibly, the performance of people.

STEAM TURBINE.
S. Choulakian, C. Barsamian, and M. Altibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This experiment investigated the amount of mechanical work done with steam generated from different amounts of water. An aluminum pie dish was used to make a turbine that turns freely on a stand. With glass tubing, the steam was directed on the turbine. The number of times the 'pie dish turbine' turned per one minute was counted. The average from three trials with different amounts of water was compared. Steam from 100 mL of water made the 'pie dish turbine' to rotate 19 times per minute; from 200 mL, 23 times per minute; from 300 mL, 28 times per minute. These results indicate that with more water, more heat energy is generated and more work is being done.

WHICH DETERGENT WORKS BEST?
Erin Wade, M. Simonds (teacher). Portola Middle School, 18720 Linnet, Tarzana, CA 91356.

This experiment tested different detergents on stains to see which would work most efficiently. To do this I used four detergents (All, Cheer, Tide, & Wisk) on five different stains (cranberry, ketchup, wine, grease, and lipstick) to see which would remove stains the best. The stains were rubbed into sheets of white cloth and rinsed in warm water with the detergent then left out to dry in open air. The results were that Cheer works most effectively; followed by Tide, All, and Wisk (in that order).
DOES SHAPE AFFECT AERODYNAMICS?
Keola Ballungay, and Mrs. Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This experiment was a test to see if the shape of an object affected aerodynamics. Six sheets of aluminum foil, similar in size, were shaped differently. Three of them were folded in half with a flat bottom and configured top allowing air to be trapped. The remainder were shaped to allow air to flow through an opening in the middle of the sheet. A blow dryer was used for a count of two seconds to move the objects. In the initial trial the air source was twelve inches from the objects; the other trials had the blow dryer three inches away. The three with the flat bottoms were tested with the opening towards the air source then with the opening away from it. The sheets that allowed air to flow through had air blown through the opening, then to the side of the objects. The results showed that the most excellent shape was the one with a flat bottom and rounded top, with an opening 3 inches wide by 1 1/4 inches high and the closed end away from the air source of three inches from the object. The sheets that allowed air to flow through them moved the least but did better in the trial where the air was blown against their sides.

THE EFFECT OF DIFFERENT KINDS, OF PRESERVATIVES ON THE GROWTH OF FUNGUS.

This project examined the effect of 77 preservatives on the growth of fungus, both on bread and meat. Six pieces of American bread with no preservatives and six pieces of meat were taken. Two of each were sprinkled with the same amounts of Anhydrous Sodium Sulfite and Sodium Nitrite, the controls were left with no preservatives. One of each were put in the refrigerator, and one of each were left outside in a warm place. Fungus grew faster on the foods without the preservatives and even the ones with the preservatives, compared to the ones left in the refrigerator. Also the preservative Sodium Nitrite showed a different result with the meat left in the refrigerator and the meat left in a warm place. At cooler temperature Sodium Nitrite changed the color of the meat into a dark brownish color in a shorter time than the one left in a warm place. The results show that preservatives help slow down the growth of fungus on food, but different preservatives must be used to preserve different types of food at different temperatures.

GENETICS.
M.K. Song and Mrs. Simonds (teacher). Portola Highly Gifted Magnet Middle School, 18720 Linnet Street, Tarzana, CA 91356.

The basis of this study was the search for a pattern in a family line, of hereditary trait (or chromosomes or genes); with the studies I would determine my own traits. Two families (both from the same grandfather) were scrutinized, my uncle’s (control), and my father’s (variable) which included me. Tracing as far back as three generations before my own I began to search for a pattern; although a little off, the hereditary trait of the hitchhiker’s thumb seemed to skip every other generation, there was much confusion with the others; hairline, tongue rolling, complexion, nose shape, etc. Hairline seemed to be dominant in both my mother’s side and my father’s. The reason for all the confusion was the dominant traits in Asians. However, I proved 64% of my
WHAT ENVIRONMENTAL FACTORS AFFECT EARLY STAGES OF PLANT GROWTH MOST?

The purpose of this experiment is to find out what things affect plants the most. Two types of seeds (Bok Choy and Thumbelina Zinnia) were put in six environments each: control, bleach instead of water, bleach in the soil, bleach in the air, light all the time, and dark all the time. Their growth was tracked over one month and compared at the end. They all died, most before they sprouted, except the controls so, in conclusion, I think that plants should not be planted in any of these conditions because it is just a waste of time.

EEFECTS OF EMF RADIATION ON THE PRODUCTION OF CO2 IN YEAST.

This investigation probed the growing concerns of Electromagnetic Field (EMF) radiation. One gram of yeast was grown in 40 mL of Welch's grape juice at 40° Celsius. The experimental flasks were subjected to approximately 3 Gausses of EMP for 20 minutes. The CO2 emitted from the yeast cells continually rose and traveled through tubing into an inverted 25mL graduated cylinder. The CO2 displaced the water in the filled cylinder and measurements were taken from top to bottom. In my experiment, there was no significant difference between the yeast grown with EMF and the yeast grown without EMF. These results suggest that EMF does not affect the ability of the cell to reproduce or to carry on essential function!

TESTING THE FLOWING OF LIQUIDS.
A. M. Ziegler and J.T. Davis (teacher) Park View Intermediate, 808 W. Avenue J, Lancaster, California 93534.

This project tests the flowing of liquids to see which liquid has the most viscosity: syrup, clear liquid soap, cooking oil, or water. I filled the jars with the liquids listed above. After this I dropped a jelly bean in each of the jars. I repeated this three times. It seemed to be that the jelly bean in the water always went to the bottom first. the syrup ended up having the most viscosity. The water ended up with the least viscosity followed by: cooking oil, liquid soap, and syrup.

HOW DO CHILDREN LEARN TO THINK.
Solomon Lee, Mrs. Simonds (teacher). Portola Magnet, 18720 Linnet St., Tarzana, CA 91325.

This study examined a child's thinking behavior and how it compares with an adults. Children under the age of 7 were asked which of the nine glasses, each different in size, contained more milk. This experiment was repeated three times. The results show that the children chose the one where the milk has reached the highest level. This suggests that children make such judgments based on the height of the liquid, not its volume.
FINDING THE BLIND SPOT.
Paul Choi and Ben Vallejo (teacher). Reseda High School, 18230 Kittridge St., Reseda, CA 91335

The experiment was done to see if age and sex affect the size of the blind spot. There were four subjects. Two being old and two being young. There also was male and female between the age groups. First a picture of a cross and circle about two inches apart were shown to each subject. The pictures were moved back and forth in front of each subjects face. We kept the left eye closed in order to find the blind spot in the right eye. We measured the distance where the blind spot was achieved. We did this by measuring the distance between the paper and the subjects eye. The further it was the smaller the blind spot. The result were the older subjects had bigger blind spots than the younger subjects. The sex of the subjects did not matter.

EFFECT OF DIFFERENT CHEMICALS ON THE BOILING POINT OF WATER.
N. D. Branman, (Ms. M. Simonds) Portola Highly Gifted Magnet. 18720 Linnet St., Tarzana, CA. 91356

The purpose of this project was to see if different chemicals had any effect on the boiling point of water or if they sped up the boiling process. I performed this experiment by placing water (two kinds, tap water and distilled water) in by themselves 3 times each as the constant and then placed a chemical in the water (distilled) and tried it 3 times until I had tried all 3 chemicals. The results were tap water on the average boiled at 100.333°C. Distilled water boiled at 100.666°C. Water with baking soda boiled at 100.333°C. Water with salt boiled at 101°C. Water with vinegar boiled at 100°C. In my experiment I learned that chemicals do not effect the boiling point that much though the experiment may be inaccurate because of many factors. The chemicals may speed up the boiling point slightly though.

EFFECTS OF MUSIC ON THE GROWTH OF PLANTS.
Julia Cho and Mrs. Darshana Shah (teacher). Gaspar de Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study was conducted to examine the effects of different types of music on the growth of plants. There were three plants, all philodendron cordatums, of around the same age and size. The plants were labeled A, B, and C. Plant A listened to classical music and plant B listened to rock music ten minutes every day. Plant C was the control and did not listen to any music. Every few days, the height, width, and number of leaves of each plant were recorded. By the end of this experiment, surprisingly plant A had actually shrunken in height but grew a little in width. Plant B had grown in height, too and grew a leaf. Plant C had grown in height and three more leaves, but it shrank in width. In conclusion, I feel that music had very little effect on the growth of plants. But overall, plant C, the control, did the best, plant B, which listened to rock music did second best, and plant A, which listened to classical music did third best. The results of this study however goes against my hypothesis and predictions completely.
WHICH CLEANS BETTER, A GENERIC BRAND DETERGENT OR A NAME BRAND DETERGENT?
Jordan Davis and D. Shah (teacher). Gaspar De Portola Highly Gifted Middle School, 18720 Linnet Street, Tarzana, CA 91356.

My experiment examines the effectiveness of a name brand detergent vs. a generic brand. My experiment tests cleaning power of the detergent on 10 different stains and on stains overall. I washed identically stained white T-shirts with identical stains in identical loads of wash. My variable was the two different detergents. The results from the experiment show that the Leading Brand (Tide) washed the stains a little more effectively than the Ralph's brand detergent. Neither of the detergents could satisfactorily wash out the mustard or lipstick stains, but washed out the chocolate syrup effectively. The results should be imparted to the consumers that the name brand and the generic brand detergents clean clothes similarly. It should be revealed however that the Tide was more concentrated and less was needed to wash a partial load than the Ralph's brand detergent.

EFFECTS OF DIFFERENT VARIABLES IN GUITAR TUNING.
M. D. Arbuckle, and M. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

I set out to find out if the tone of a note is changed when certain variables are added. I did this by hooking up my electric guitar to an electric tuner and then strike a string while a certain variable is in effect. The first variable that was put into effect was striking the string in many different places. First, I struck the string near the front pick-up. Then I struck the string near the back pick-up. After that, I struck it in between the two pick-ups. Last, I struck the string at the first fret. If the tone of the note was changed at all (which I will have been able to see using the tuner), I would know that the tone of a note can change if you strike the string in different places. The second variable that was put into effect was switching from different pick-ups. I set the pick-up selector so that the front pick-up is in use and I did the steps mentioned above. Then I set the pick-up selector so that the back pick-up is in use and I repeated the steps mentioned above. Finally, I set the pick-up selector in the middle so that both pick-ups are in use and then I did the steps mentioned above. If the tone of the note changed at all, I would know that the tone of a note can change if you use different pick-ups. The last variable that I put into effect was to use many different sized picks. First I used a “heavy” sized pick and did all the steps mentioned above. Then I used a .50 mm size pick to do all the steps mentioned above. After that, I used a .60mm size pick to do all the steps mentioned above. Then I used a .88 mm size pick to do all the steps mentioned above. After that, to do all the steps mentioned above, I used a 1.0mm size pick. Finally, I used a 1.14 mm size pick to do all the steps mentioned above. My results were kind of inconclusive. You have to make the decision for yourself because each of the different readings were so close to each other that you couldn’t tell if the tone was actually different or if just by chance that string went slightly out of tune. The change of tone is so subtle that you would need a machine (unless you have a really good ear) to tell the difference. But since the results from both guitars were like this, I am determining that adding the different variable does, in fact, change the tone of the note.
DOES ANTIFREEZE EFFECT THE FREEZING POINT OF WATER?

To find out which substance can be used as the best antifreeze. Eleven household substances were tested. 1 tablespoon of each substance was dissolved in 50 ml of water, then all were placed in the freezer. The time it took for each solution to freeze was recorded. Nine of the substances took 15 minutes to freeze completely, salt solution took 1 hour, and the alcohol solution took 2 hours. From these results it can be concluded that salt is a good antifreeze but alcohol is better!

EFFECTS OF GIBBERELLIC ACID ON HYDROPONICALLY GROWN RADISH PLANTS.

The purpose of this experiment was to determine whether soaking radish seeds in nutrient solution prior to planting them in a Rockwool base significantly affects the growth of the stems of the plants. Using two sets of 21 seeds I soaked the first set in a control nutrient solution (solution consisted of tap water and Schultze’s Plant Food). The experimental set of seeds was soaked in a 5% gibberellic acid nutrient solution. After soaking the seeds for 20 minutes, the seeds were planted in separate Rockwool bases and the same type of nutrient solution that was used in the soaking was added to the tray. Both sets of plants were grown over a period of 16 days, and after the first 3 days, the seeds began to germinate. 13 plants grew in the control tray and 20 plants grew in the hormone tray. Based on the average height of each set of plants (control= 5.67mm & hormone=7.13mm), I concluded that the 1.37mm difference was not significant and that soaking the seeds in gibberellic acid does not significantly affect the growth of the plants.

INDUCING NATURAL RESISTANCE TO TMV IN PINTO PLANTS.
Barnie Y. Lim and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

This experiment was aimed at illustrating the theory of systemic acquired resistance in pinto plants with tobacco mosaic virus. Diatomaceous earth, a very fine abrasive, was dusted on the surfaces of the leaves to disrupt the cell walls prior to inoculation. The top half (from the tip to the middle) of the leaves of twenty pinto plants were then inoculated with a pure solution of TMV that has been diluted fifty times. Five days later, the entire surface of the leaves (from the tip to the stem) of ten plants were given a second inoculation. Necrotic local lesions were abundant on the top half of the leaves as a result of the initial inoculation, but very few, if any, lesions appeared on the bottom half (from the middle to the stem) of the leaves as a result of the challenge inoculation. These results suggest that the pinto plants have developed disease fighting proteins, or antibodies, against TMV as a result of the initial inoculation that helped them fight off the virus after the second inoculation.
AIDS: DO THEY KNOW ENOUGH?

This survey was conducted to find out how much young adults and teenagers in Ferrahian High School know about AIDS. By using information on AIDS from books and pamphlets, a survey was put together and given to the students in the 7th, 8th, and 9th grades. After correcting the surveys, the total average score of each class and both male and female students were determined, and graphed. The results showed that even though these students know a fair amount about AIDS, they do not know enough and that older students and the females know more. It was concluded that students should learn more about AIDS to protect themselves in the future.

CAN OPTICAL ILLUSIONS FOOL YOU?
Alma-Maria Dumitru, M. Simonds (teacher). Portola Highly Gifted Magnet, 18720 Linnet Street, Tarzana, CA, 91356.

My study examined the question of whether a large percentage of people will be fooled by an optical illusion. My hypothesis was that more than fifty percent of the people I surveyed would be fooled. I photocopied nine optical illusions and took a survey of fifty people to see how many would get fooled. The results I obtained proved my hypothesis correct. Sixty-three percent of the people were fooled.

FLOW OF LIQUID FROM A CLOSED CONTAINER.
Michael R. Meisel and Mary Simonds (teacher). Portola Middle School HG Magnet, 18720 Linnet Street, Tarzana, CA 91356.

The purpose of this experiment was to measure how fast water will flow from a bottle with no air holes except the one the water is flowing through. Tubes of different length and thickness were affixed to the sole opening of an air-tight bottle. Water flowed in spurts, allowing air to enter and fill the gap left by the exiting water, before more water can flow out. The variables which were measured against the flow rate were the height of the water, the length of the tube and the width of the tube. The height of the water had no effect upon the flow rate for the levels measured. The rate decreased with the length of the tube approximately in a linear manner. The flow rate increased as the tube became larger in proportion to the area of the tube.

DOES VIVARIN AFFECT THE RATE OF MOVEMENT OF REGENERATED PLANARIA?
Chris Chiuu and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

In a series of experiments done on regenerated planaria heads and tails, the purpose was to determine if their rate of movement decreases after being exposed to Vivarin during regeneration. Vivarin contains caffeine which is a stimulant that restores alertness. Vivarin decreases the rate of movement of both regenerated planaria heads and regenerated planaria tails. The majority of planaria heads and tails exposed to Vivarin had slower rates of movement than those exposed to...
pond water. The t Test shows that there is a significant difference in the rates of movement of regenerated heads and regenerated tails exposed to Vivarin versus those heads and tails exposed to pond water. The probability is less than 0.05 which means that the difference in the rates of movement is not due to chance.

WHICH SOAP WORKS BETTER?

This experiment examined which liquid soap worked better among Jergens, Crystal Ivory, Lever 2000, and Dove. Each soap was gradually tested measuring drop by drop into 10 mL of distilled water in a test tube. The test tube was then plugged and shaken for five seconds to observe any sudsing effect. The results shows that Crystal Ivory proved to have the most sudsing in the least amount of drops of liquid soap. Dove was proven to have the most moisture. In conclusion, Crystal Ivory cleans the best and Dove has the least cleaning effect, but with the most moisture.

DO BOYS AND GIRLS REMEMBER THE SAME ITEMS IN TESTS OF SHORT-TERM MEMORY?
A. Haut and M. Simonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This study examined the relationship of gender and short-term memory. A total of thirty children were tested. Five girls and five boys from first, third, and fifth grades participated. Each child was shown a poster with twelve gender-based pictures. Each child was given fifteen seconds to view the pictures before being asked to list as many of the items as he or she could remember. In general, boys tended to remember items associated with boys and girls tended to remember items associated with girls. However, the results were not consistent along gender-based lines. There were two items that both genders recalled equally well.

THE EFFECTS OF WATER WITH SODIUM CHLORIDE VERSUS DISTILLED WATER ON THE GROWTH OF WATERMELON SEEDS.

This experiment was conducted to see under which circumstances does a watermelon seed germinate and grow quicker. Seven groups of five cups, each with one seed, was the layout of the experiment. Each group was given water that had a different concentration of sodium chloride. The first group was given water that had a .25% concentration of sodium-chloride. The second had a .5% concentration. The third had a 1% concentration. The fourth had a 1.5% concentration. The fifth had a 26 concentration. The sixth had a 2.5% concentration. The seventh had a 0% concentration, or distilled water. In each cup, cotton was used to keep from drowning the seeds. The results seem to show that the seeds watered with distilled water grow the fastest.
WHAT ARE YOUR DREAMS?
J.A. Gunman and M. Simonds (teacher). Portola Highly Gifted Magnet, 18720 Linnet St., Tarzana, CA 91356

This study examined the dreams of the average 8th grader. First I made a questionnaire consisting of four questions. I handed them out to ten 8th graders and examined each type of dream. I compared their dreams to a book of configuration. The results of this was that 100% of these students are very stressed and dream about school. 80% dream about their family. 50% have sleep disorders, who sleepwalk, talk, or snore, and 90% are females who have the disorders. Overall, these dreams reflect that students these days have to much pressure on them and release it on their dreams.

HOW BLOOD PRESSURE IS AFFECTED?
L. Manning and B. Vallejo (teacher). Reseda High School. 18230 Kittridge, Reseda, CA 91335

The purpose of this project was to show how blood pressure is affected by different environmental conditions. The experiment showed that blood pressure is affected by variables including exercise. The results showed that the systolic and diastolic pressure is affected by exercise, standing, and laying down. Diastolic pressure increases when exercising and standing up. At a higher rate than the systolic pressure. I believe that this means the diastolic pressure, if increased enough, could cause low blood pressure. In my experiment how ever, I show that the diastolic is increased, but not enough to cause low or high blood pressure.

IN WHICH FOOD PRODUCT WILL YEAST GROW THE BEST?
C. Kupelian and M. Altabarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This test was performed to find out how well yeast cells can use and grow on different food products. Four tablespoons of yeast were added to the same amounts of syrup, flour, gelatin, and grape juice, and poured in 4 different bottles of the same size. A balloon was fastened on the mouth of each bottle; all the bottles were put on their sides in a warm and dark place. Yeast cells use sugar and produce Carbon Dioxide gas that is trapped in each balloon. The result showed that the balloon on the grape juice bottle inflated the most, then the gelatin, the syrup, and the least with flour. At the beginning the balloon on top of the bottle containing the flour grew a little and then dropped. These results indicated that yeast can grow best on natural sugar found in the grape juice. Yeast can also survive in gelatin and syrup that also contain sugar; but cannot continue to grow on flour that contains starch.

WHAT DYES, WHERE.
J. Ahn and M. Simonds (teacher) Portola Magnet Center 18720 Linnet St. Tarzana CA 91356

The point of this project is to see the combination of dyes in certain candy coats. By manipulating the candy coat in a solution and finding the composition we can understand if what we see is really that color. The process of this separation is at first add a number of candies into a solution of
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distilled water and acetic acid. When the coat is removed, remove the candies. Then by boiling it, convert the mixture into a solution. Then after use chromatography paper to develop the different dyes. The conclusion of this experiment was that no matter what color it is, there is some dye a different color or shade.

TASTE WITHOUT SMELL: APPLE VERSUS POTATO VERSUS ONION.
E. Duong and D. Shah (teacher). Gaspar de Portola Highly Gifted Magnet Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study is to show how essential the sense of smell is to the sensation called “taste,” and how difficult it would be to taste things if we did not have the ability to smell. Raw portions of an apple, potato, and onion were chopped very fine to reduce some of the texture of the food, to make it uneasy for the test subject to recognize what the food being placed in his/her mouth was. The test subject was blindfolded and had to use nose clips, in order not to see or smell. The apple, potato, and onion were divided into 1/4 teaspoons and were labeled for me to identify it. Selected randomly, one of each sample was placed in the test subjects' mouths and he/she had to roll it around on their tongues without chewing and swallowing. The test subjects then told me what he/she thought it was. After testing each of the samples, the subject had to rinse their mouths out with water. I tested 10 people from the ages of 12-30, and all were able to distinguish the onion right away. Six were able to identify the apple, some had mistaken it with unripe pears and Asian pears. Four test subjects were able to identify the potato. Amazingly, three people were able to identify everything. The results suggest that we are unable to specifically taste anything without the ability to smell. So in short, the abilities to smell and taste go hand in hand.

TOPICAL ANESTHETICS.

The purpose of this experiment was to find out which type of topical anesthetic would depolarize pain neurons in the forearm, and thus stop the electrochemical process, the fastest. The anesthetics that were tested were: the spray anesthetics Solarcaine and Dermoplast, the cream anesthetics Nupercainal and Ben Gay, the liquid anesthetic, Campho-phenique, and the gel anesthetics Americaine, Orajel, and SensoGard. The results were as follows, the spray anesthetics, as well as the cream anesthetic, Nupercainal, took only five minutes to depolarize the pain neurons. The Campho-phenique took fifteen minutes to depolarize the pain neurons. Finally, the cream anesthetic, Ben Gay, as well as all the gel anesthetics, took twenty-five minutes to depolarize the pain neurons, and stop the electrochemical process.

HOW DO ANTS REACT TO CHEMICALS?
Hoa Le and Ben Vallejo Jr (teacher). Reseda High School, 18230 Kittridge, Reseda, CA 91335.

The experimentation was performed to see how ants react to chemicals. First one garden ant was placed on one piece of paper and was sprayed with hairspray once. It was observed and the reactions were recorded. Then it was sprayed again and observed again. After recording it's reactions, it was sprayed a third time. It was observed again for the third time. Then these steps were repeated with two other garden ants. After the experimentation was finished, three other ants were experimented with, with perfume. Then three other ants were experimented with, with liquid
sweetener. After the garden ants were experimented with, the carpenter ants were then exposed to the chemicals and the procedure was repeated. All the garden ants perished, but 4 carpenter survived. This proves that the size of an ant and the species of an ant are some of the factors which affect how an ant reacts to chemicals.

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HOW HUMAN VITAMINS AFFECT THE GROWTH OF PLANTS.

The purpose of this investigation was to determine the effects of human vitamins on plants. We cultivated four different groups of pea plants, Pisum Sativum of the Leguminosae family, that contain various amounts of vitamin and iron supplements. One group contained 500 mg of iron. Another group contained 500 mg of vitamin-C. The third group contained 250mg of vitamin-C and 250 mg of iron. The fourth group was the control group, which contained no vitamins. We observed the growth of the plants over a twenty-two day period. During this time period the amount of sunlight and water were equally distributed among the plants. For the final results, the average height of the iron group measured 6.67 em, the average height of the vitamin C group measured 5.2 cm, the average height of the vitamin-C and iron combination measured 10 cm, and the average height of the normal group measured 6.25 cm tall. These results suggest that a combination of vitamin C and iron supplements can greatly improve the height of Pisum Sativum..

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SHOULD PLANTS TAKE DRUGS?

This experiment demonstrated the questionable effects of three commonly used household drugs on the plant Phaseolus aureus, also known as the mung plant or the bean sprout. Six mung seeds were planted in each of four pots. The control pot was given only water every other day. The other three pots were given the powder from the crushed tablets of Acetaminophen, Ibuprofen, or multiple vitamins with iron, dissolved in water every other day. None of the seeds sprouted in the pot that was given Acetaminophen. Only some of the seeds sprouted in the other three pots. The experiment was to last until the twenty first day. The experiment was supposed to have been continued until day forty nine during which time all the pots were to be given only water every other day. However, the experiment had to be halted on day thirty seven, because all the plants had died. Results show that, of the three drugs, multiple vitamins with iron have the best effect on the mung plant but not as good as plain water from the kitchen faucet.

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THE ABSORBENCY RATE OF DIAPERS.
A.E. Schaffer and M. Simonds (teacher). Portola Middle School, 18270 Linnet St., Tarzana, CA 91356.

This experiment was designed to test whether an off brand or a popular brand of diapers had a higher absorbency rate. First, I opened up one diaper and poured water in it until the water came leaking out the sides, just to get an idea of how much water a diaper can hold. Next, I poured 8 cups of water into a large steel bowl and decided on a time amount of the diapers exposure to the water. I tried several different time exposures, ranging from 1 second to 10 seconds. To find out how much the diaper could hold, I would submerge the diaper in the water for a decided upon
time. Then, after the time was up, I would quickly lift up the diaper out of the water, and then measure how much water was left. The results were quite strange, though. I tested an off brand and Huggies. Huggies stopped absorbing water after 5 seconds, and the off brand stopped after 7 seconds. And the most amount of the water the Huggies absorbed was 1.75 cups of water. The most the off brand could absorb was 2.75, exactly one cup more!

**WHAT ITEMS CUSHION A WATER BALLOON BEST?**
J. R. Epner and Mrs. Shah (teacher). Portola Jr. High School, 18720 Linnet Street, Tarzana, CA, 91356

This project shows what items will cushion a water balloon the best. I accomplished this by dropping each balloon in a box with the cushion at a second story height. I used items such as cereal, damp newspaper, damp cereal, newspaper, and styrofoam. The results were the damp cereal which worked the best. My conclusion was that because the cereal was sticky, I think it worked the best.

**EFFECT OF GENDER IDENTITY ON SHORT TERM MEMORY.**
Lisa Concoff, M. Simonds (teacher), Portola Middle School, 18720 Linnet Street, Tarzana, CA, 91356.

This was an experiment on the effect of gender identity on short term memory. A board was constructed containing 18 pictures of items such as a kitten, two people boxing, flowers, a baseball players and several highly publicized people. Four people at a time were tested: two boys and two girls. Each group was allowed 20 seconds to study the board and memorize everything they could. Then, they were asked to write down everything they remembered. Ten boys and ten girls were tested in each of three grade levels, 6th, 7th, and 8th. The results were that the girls tended to remember a higher percentage of the items, and tended to list the items first with the highly publicized people, then the animals and food items, and then the sports pictures, cars, and planes. The boys did the same, only reversing the animals, etc. with the sports, etc. The three highest number of items remembered were 17, 14, and 13, all by 8th grade girls.

**IS THERE A RELATIONSHIP BETWEEN ELECTROMAGNETIC RADIATION IN A GRAVITATIONAL FIELD AND COSMIC RADIATION IN A MAGNETIC FIELD?**
S.P. Donner, M.L. Weitkamp (teacher), Chaminade College Preparatory High School, 7500 Chaminade Avenue, West Hills, CA 91304.

This study examined the question of a possible relationship between the deflection of cosmic radiation in a magnetic field, and the deflection of electro-magnetic radiation in a gravitational field by using a magnet and a cloud chamber to track the altered condensation trails of the alpha, and beta particles emanating from a small fragment of radium. I found that cosmic radiation in the presence of a powerful magnetic field acted in an analogous and similar manner to electro-magnetic radiation in the presence of a strong gravitational field (such as occurs in a black hole).
COMPARING SOAP AND DETERGENT.
Sara Tajyar Mrs. Simonds (teacher). Portola Middle School, 18720 Linnet Street, Tarzana CA 91356.

This study is to determine which substance (soap or detergent) is best. It was done by testing a variety of soaps and detergents using different types of water (salt, distilled and tap). The amount of suds and the ability of it to dissolve is observed. Then oil is added to see if the oil dissolves. The results were that the soaps made more suds and dissolved faster but the detergent picked up the oil. The conclusion is, when washing oily objects the detergent is best.


The purpose of this experiment is to conceive which type of milk spreads faster and which one will take a longer time to spread and why this happens. First we poured both whole and non-fat milk into separate cups. Next, we added two drops of coloring simultaneously to each cup. We then repeated the process twice. The results of the project were: In the whole milk food coloring spread slower and took more time for the colors to blend. Meanwhile in non-fat milk the colors expand at a faster rate, and the colors combine in less time compared to the whole milk. We have proved our hypothesis correct. The coloring in whole milk spread slower and in the non-fat milk it spread faster.

WHAT AIRPLANE WING DESIGN FLIES THE BEST.

The purpose of this project was for my own personal interest. First of all, I made some wing designs out of a piece of construction paper. After that I took the wings and put them on a pencil and put them in front of a fan one at a time. The results showed that the standard wing design flew the best, followed by an "O" shaped wing, and in last place was the wing with two points on the ends.

LEVELS OF WATER POLLUTANTS AT TOPANGA CREEK AND 200 METERS NORTH OF THE TOPANGA CREEK.
M.A. Garcia and M. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

This study set out to find different levels of four water polluting factors: turbidity, PH, oil, and debris. Samples were taken from two sites, site A in front of the Topanga Creek and site B 200 meters north of site A. The results express that in all but three cases the turbidity of the water was greater at the site A as compared to that of site B. Furthermore the results stated that in all cases the PH level of the water was higher at site B than compared to that of site A. In addition the results specify that on only two occasions oil was visible and on both occasions it was at site A. The results also express that the weight of the debris from site A was greater than that of site B on all
CAN ROCKS ABSORB AND HOLD OIL.

The purpose of this experiment is to see if we can retrieve petroleum from rocks. First, I laid a sheet of wax paper out. After laying the different rocks out I took an eyedropper and dropped one drop of vegetable oil on each. I waited five minutes. Then, repeated this process three more times (in different areas). The results are as follows; lava rock didn't absorb, 4/4, lava foam absorbed, 4/4, granite didn't absorb, 3/4, sandstone absorbed, 4/4, and shale didn't absorb, 4/4. I have concluded that rocks can absorb and hold oil. After the period of twelve hours, I found that all the rocks absorbed and held oil.

ALCOHOL'S EFFECT ON DROSOPHILA MELANOGASTER FERTILITY.
Sharla N. Hoig and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

There have been many studies on alcohol's teratogenic effects, but the possibility of alcohol's adverse effects on fertility are just now coming into the forefront of study. This area of investigation into alcohol's effect on fertility is still in its infancy stage. Research that is done on the myriad defects related to alcohol exposure, including its effect on fertility, will bring much needed answers to long standing medical questions. I designed a lab to see if ethyl alcohol has an effect on Drosophila melanogaster fertility. In search of the answer to my question, I compared the number of vestigial mutant offspring Drosophila had after living a full life cycle in the presence or absence of alcohol. The Drosophila that were exposed to alcohol got a daily dose of 0.05 ml of alcohol in their culture media. The Drosophila in the control group were not exposed to any alcohol. I counted the number of offspring produced in the two groups everyday for ten days. The total number of offspring in the control group was 715 Drosophila and the total number of offspring in the experimental group was 400 Drosophila. This data showed that there were 44% less offspring in the vials containing alcohol as compared to the control vials. I conclude that the difference between the number of offspring in the control and the number of offspring in the experimental group was not due to chance. The alcohol did have an adverse effect on Drosophila fertility.

EFFECTS OF AN ELECTROMAGNETIC FIELD ON THE GROWTH OF RADISHES.
R. Acevedo and Fr. C. Kearney (teacher). St. Francis High School, 200 Foothill Boulevard, La Canada Flintridge, CA 91011.

This study examined whether or not radishes would grow in an electromagnetic field. 10 purple radishes were planted into a metal pot containing potting soil. Another 10 purple radishes were planted into an identical metal pot containing the same potting soil. The variable in the second pot was that there was an 8 meter insulated copper wire wrapped around the pot 17 times. The electrical output of the wire was 12V IDC and 800 mA. This wire created an electromagnetic field of .000017097 T. The pot was exposed to this electromagnetic field for 24 hours a day. The experiment lasted for 10 days. Both pots were in a controlled temperature environment of 21.1 degrees Celsius, and both pots received 100 mL of water daily. The results of the experiment
showed that the radishes in the experimental setup grew slightly faster than the radishes in the control setup.

**WATER ABSORBENCY OF VARIOUS BRANDS OF PAPER TOWELS.**
Karen Chiang, Mrs. Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This study measures the water absorbed by 12 brands of paper towels. Towels were cut into 8 inch by 10 inch sheets. They were weighed on a small scale while they were dry, then dipped into water for one minute. After that they dripped on a hanger for another minute. Then they were weighed to see how much water each had absorbed. Bounty paper towels did the best out of all 12 brands. Hi-Dri paper towels did the worst. This was not surprising, because Hi-Dri was among the cheapest of all the brands. However, this does not necessarily connect price with performance. For example, Bounty prints seemed to do better than Bounty all-white.

**WHICH FREEZES FASTER, HOT OR COLD WATER?**
G.M. Guevara and Simonds (teacher). Portola Highly Gifted, 18270 Linnet Street, Tarzana, CA 91356.

This experiment tested whether if hot water freezes faster or if cold water freezes faster. 100ml of hot water was poured into a plastic bottle without a lid, and 100ml of cold water was poured into a plastic bottle without a lid. The two bottles were carefully placed in the freezer at the same time. The two bottles were observed every 30 minutes observing the differences of each other. The results had told that cold water freezes faster than hot water. In conclusion, this experiment had told the difference of hot water and cold water frozen, testing whether which freezes faster.

**WHICH MATERIAL IS MOST EFFECTIVE IN RETAINING HEAT.**
Kristhine Malamug and M. Simonds (teacher). Portola Middle School, 18720 Linnet St., Tarzana, CA 91356.

This experiment examined which material is most effective in retaining heat and therefore serve as the best material for warming the human body. Five materials were tested, wool, flannel, thermal insulation, cotton, and goose feathers. A jar containing a pint of water at 70 C was wrapped in one of the materials and placed in the refrigerator. Temperature was recorded every 15 min. during a period of two hours. The temperature in the wool jar went down 12 degrees, flannel-14 degrees, thermal insulation-9 degrees, cotton-15 degrees, and goose feathers-17 degrees. The results suggest that thermal insulation is best in retaining heat. Wool is also best in retaining heat and would be more practical.

**HOW LONG CEREAL WILL STAY IN MILK WITHOUT GETTING SOGGY.**
J.J. Choi, Mrs. Shaw (teacher), Portola Highly Gifted Magnet Center 18720 Linnet Street Tarzana, CA 21356

I started this project because my cereal didn’t stay crispy that long. I bought 10 major brands and all of them lasted longer than 4 minutes. One even stayed crunchy for at least 8 minutes. Out of the
brands, Cocoa Krispies, Frosted Flakes, Foot Loops, Golden Grahams, Trix, Honey Nut Cheerios, Apple Jacks, Smacks, Kix, and Pops, Trix lasted the longest with the time of 8 minutes and 10 seconds. I learned that even though my favorite cereal brand doesn't stay crunchy that long I'm still going to buy it. The brand that got soggiest the fastest was Kix.

THE MOST RESISTANT COMPUTER DISC TO MAGNETIC FIELDS.
D.E. Erickson and Shah, Portola Junior High School, 1870 Linnet St., Tarzana. CA 91356.

This study examined the effects of electromagnetic fields on 3.5 double sided high density discs. Four brands of computer discs were put next to a strong electromagnetic field for 7 seconds. Then they were inserted into a computer disc drive to see if they had not been erased and still retained its formatting, or if it had been erased of its formatting. Then the experiment was repeated exposing the disc for 8, 9, 10, and 11 seconds. The experiment was repeated 4 times with the same results. Verbatim fell out at 8 seconds, Sony 9.5, Adacomp 11, and Kao 10. Adacomp clearly can take a strong magnetic field for a longer time than any others tested. If I were to buy a computer disc, I would keep in mind that Adacomp will be the hardest to become erased.

WHICH STOCK MARKET INDICATORS ARE THE MOST RELIABLE PREDICTIVE INDICATORS?
V.M. Bender and M. Weitcamp (teacher). Chaminade College Preparatory, 7500 Chaminade Ave., West Hills, CA 91304.

Which stock market indicators are the most reliable predictive indicators? I found, by backdating five indicators (Earnings' Growth, In-Favor Stocks, Undervalued Companies, Overvalued Companies, and 52-Week Breakout), that the 52-Week Breakout indicator gave the highest profit in 1994, adding $27,000 to a $100,000 recommended investment. The In-Favor indicator picked stocks that also had positive results, earning $15,000 on a $100,000 recommended investment. The other strategies were negative, with the Earnings' Growth being the most negative, changing a $100,000 recommended investment into $84,000. Overvalued Companies went from $100,00 to $93,000, and Undervalued Companies picked stocks that together changed the $100,000 recommended investment into $97,000, indicating a negative investment trend. The Dow Jones Industrial Average control gained $2,000 on $100,000 fictional investment, and NASDAQ control changed $100,000 into $94,000. When investing, it is best to chose the 52-Week Breakout indicator.

TYPE OF FOOD A DOMESTIC GUINEA PIG FAVORS.

This project examines my interest in small rodent animals and what they favor. First I bought three different kinds of food and got lettuce from home. Next I will delay my guinea pig's food intake for 24 hours. Then I will give him four bowls of food; one, in which, will have his regular guinea pig pellets, the second will contain Supreme's Higher Quality Guinea Pig Mix, the third will contain rabbit pellets, and the fourth will contain lettuce. I concluded that my guinea pig favors lettuce the most because it has a natural taste to it. Since my guinea pig favors lettuce the most I will feed him some of that very often. My main concern on this project is to find out what kind of things make my guinea pig happy because I am very interested in animals and their ways of life.
ARE ARTIFICIAL AIR FRESHENERS BETTER THAN NATURAL FRESHENERS?
Jessica Fisher and Mrs. Shah (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA, 91356.

The object of this study was to find out if commercial fresheners are better at masking odors than natural objects, such as cinnamon, cedar, and orange blossoms. In a test in which eleven people rated which of the fresheners best masked onion odors, the cherry-smelling commercial air freshener came out on top. Four of the people tested said that cedar was second best, four said it was the orange blossoms, and three said it was the cinnamon. According to the results, I conclude that only in larger amounts could natural substances mask odors better than artificial fresheners.

IN WHICH ENVIRONMENTS DO SEEDS GERMINATE THE FASTEST.
Nathan L. Shamban and Mrs. Shah (teacher). Gaspar De Portola Middle School, 18720 Linnet St., Tarzana, CA 91356.

This study answered the question in which environments do seeds germinate the fastest. I grew 64 plants in the herb category and 64 plants in the flower category. I had 4 different places: inside in the dark, in the sunlight, outside in the recreation room in the dark and in the sunlight. The experiment showed that the herbs grew better inside because they do not need the sun like the flowers do. More herbs sprouted than flowers. I gave them a month to have a chance to sprout. The controls died from the heat since they have a lack of nutrients at that early stage.

WHICH BRAND OF PAPER TOWELS WORK THE BEST?
P. Wu and D. Shah (teacher). Gaspar De Portola H.G.M. Middle School, 18720 Linnet Street, Tarzana, CA 91356.

The purpose of my study was to show which brand of paper towels had the best performance. Four of the most common brands were tested for quickness, strength (durability), thickness, and texture. I spilled a small amount of liquid on a surface and wiped it up with a different brand of paper towel each time (for quickness). Next, I sprayed the center of each paper towel until it broke (for strength and thickness). Finally, I rubbed a paper towel across a blindfolded person's arm asked what they thought was the softest. The result was the "Bounty" paper towel brand was the best for quickness, strength, and thickness. "Viva" and "Bounty" were in a tie for softest.

PROCESSING POGGENDORFF FIGURES BY EIGHTH GRADE BOYS AND GIRLS.
M.A. Serrano, M. Simonds (teacher). Portola Magnet Middle School, 18720 Linnet St., Tarzana, CA 91356

This study examined the possible differences between eighth grade boys and girls in their ability to perceive the Poggendorff figures. 14 boys and 14 girls were asked to observe the same two figures and draw a line indicating the oblique. The subjects were graded on how far away the line indicating the oblique was from the oblique. This exercise was done to determine if there was any difference in the responses between boys and girls. Results indicate .43 millimeter difference (in
favor of the boys) in processing of figures between girls and boys. My conclusion is that neither sex is has more ability to perceive the oblique and that the results taken from a different group could contradict the results from my test.

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BLEACH VS BLEACH VS. BLEACH.
Shane H.W. Shepherd, Randy Lee Vidal, Mr. Swensen (teacher), Parkview Jr. High School, 10th. St. W. Lancaster CA 93534

This study examines the question of which bleach, using equal amounts, will best remove a tomato juice and worchester sauce stain on 100% cotton material...equal amounts of a name brand bleach, Clorox Bleach, a no-name brand of bleach, Vons store brand bleach, and dry bleach. After soaking each piece of cloth in the stain solution, and drying in the sun for a half hour, each piece of material-was submerged into a bowl of each of the bleaches for 30 seconds and then rinsed with water for ten seconds each and then air dried. The conclusion was that the no-name brand and the name liquid bleaches both removed the stain, the dry bleach did not, however to our surprise, the no-name bleach made the stain sock brighter and more clean than the name-brand bleach.

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CABBAGE AND TURMERIC PAPER.
G. Diarian and M. Altibarnakian (teacher), Holy Martyrs and Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

This project was designed to find out if home-made cabbage and turmeric papers can be used as good as litmus paper as indicators for acids and bases. To make cabbage paper a few leaves of red cabbage were left in hot water for an hour. To make turmeric paper 1/4th teaspoon of turmeric powder is dissolved in 1/3rd cup of alcohol, and stripes of coffee filter paper were dipped in it. The stripes were left to dry and used as indicators along with litmus paper to test a number of household products (milk, water, Windex, soap, detergent, juice, citric juice, nitric acid, and sodium hydroxide). The results indicate that the home made cabbage and turmeric papers are as good indicators for acids and bases as litmus paper.

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THE EFFECTS OF DIFFERENT SUBSTANCES ON YEAST.
B. Davidson, D. Gordon, K. Lerner, and A. Morton. Calabasas High School, 22855 West Mulholland Highway Calabasas, CA 91302

The purpose of this study was to determine the effects of different substances on yeast. The various doughs made with the leavening yeast also included identical amounts of flour and water. The control included only yeast, flour, and water. The other mixtures were composed of flour, water and either a tablespoon of baking powder, sugar, salt, or molasses. Each jar containing its own mixture was placed in an oven at 100 degrees Fahrenheit for 25 minutes. Each mixture was then punctured in order to observe which ones emitted carbon dioxide or which mixture had reproducing yeast. The substances could only grow if they had food and, since yeast's food is sugar, only those ingredients containing sugar were food for the yeast. The components that allowed yeast to grow (reproduce) were molasses, sugar, and baking powder which all contained the common sugar glucose (C6H12O6). The results suggest that the sugar glucose is most likely to be the food that enables yeast to reproduce (i.e. grow, expand).
EFFECTS OF COMPOSTING GRASS CLIPPINGS ON THE GROWTH OF PINTO BEAN PLANTS.
Pahoua Vue, Steven DeGusta (teacher). John F. Kennedy H.S., 6715 Gloria Drive, Sacramento, CA 95822

The purpose of this experiment was to determine the effect that composted grass clippings had on the growth of Pinto Bean plants, whether it stimulated growth or inhibited growth. Fifteen plants were grown with a layer of grass clippings covering the surface. The grass clippings were allowed one and a half weeks to compost onto the soil, expecting that this grass compost would provide extra nutrients such as nitrogen into the soil. It was on this basis that I hypothesized that the grass clippings compost will promote the growth of these plants. A control group of fifteen plants were also grown but not exposed to grass composting.

However, after two weeks of measuring and comparing the heights of the experimental plants, which had been exposed to grass composting, and the heights of the control plants, which had no exposure to grass composting, I concluded that the composting grass clippings had no real significant effect on the growth of Pinto Bean plants.

EFFECTS OF DEODORANT UNDER INTENSE HEAT.

This study examines which deodorant handles the most heat before melting. I started this study using four different types of deodorant. The four types are Ban Clear, Suave Active Sport, Suave Regular, and Crystal Clean. To test this study I took a piece of plexi-glass and placed it on top of the heat lamp. I ran my test 3 times. The results of the tests were the Ban Clear melted instantly. The Suave Active Sport melted extremely fast and the same with Crystal Clean. The Suave Regular lasted the longest and smelled the best after melting completely.

HOW AIR PRESSURE AFFECTS AN EGG
M. Carlos, D. Shah. Gaspar De Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

When an egg is placed on the top of a bottle and will not slide through unless by force is a way of demonstrating air pressure. I will explain the process of demonstrating how the egg can slide through without force. First you boil an egg, then peel. Next, you find a bottle (preferably an old milk bottle) and place the egg on top of it making sure that it will not slide through. You then pick the egg up and drop a fired up piece of paper into the jar and quickly place the egg back on top. As you can see, the egg has slid through without force. The reason for this is that the fire inside the jar has burned up all the oxygen so the air pressure on top causes the egg to be pushed down. This experiment has been proven many times. This concludes my abstract.
EFFECTS OF ANTACID ON HYDROCHLORIC ACID.

The purpose of this investigation was to compare the differences between two name brand antacids, Mylanta and Maalox. This antacids were mixed with 0.01 M of Hydrochloric acid. The molarity concentration of HCL was matched to that of a human stomach. Maalox and Mylanta were used in increments of five drops. After every five drops, a drop of Bromcresolblue was used to determine the acidity of the solution. As the indicator changed from yellow to blue, a point of neutralization was found. As a result, Mylanta had a greater and more significant effect than Maalox on HCl acid. The statistics showed a p. value of less than 0.001. Therefore the null hypothesis is rejected. It was concluded that not all antacids are the same and can be tested for effectiveness.

THE EFFECT OF DIFFERENT VITAMINS ON IVORY PLANTS.
Reza Mirzaie, Mrs. Simonds (teacher). Gaspar De Portola, 18720 Linnet St., Tarzana, CA 91356

My project is on the effects of different vitamins on the growth, appearance, and durability of ivory plants. I chose this project because I have a basketball court in my backyard and whenever I play, the ivory plants close by get ruined when the ball hits them. At the same time I wanted to test Miracle Grow plant food to see if that could help my problem. I proceeded by choosing three different vitamins and Miracle Grow, while having an independent variable. I studied the results over a period of three weeks. The results I found were that vitamins A and B did not stimulate growth, appearance, or durability a considerable amount. Biotin and Miracle Grow, however, helped all three categories a little bit. So, I conclude that Biotin and Miracle Grow have a definite effect on ivory plants and do solve my problem to some extent.

EXTRASENSORY PERCEPTION.
Jordan Miller, Ben Boudreau, F.A. Swensen (teacher) Park View Intermediate School, 808 West Avenue J, Lancaster, CA 93536.

Purpose: Our purpose of doing this experiment was to discover if there really is a such thing as extrasensory perception.

Procedure: First, we create a deck of 25 3x5 cards and illustrate each card with a different colored symbol: It will either be a red, blue, green, yellow, or purple heart, star, circle, square, or hand. Then I, assuming the role of the sender, will shuffle the cards, and then cut the deck. I will then take the first card off the top of the deck and keep it turned facing me so Ben, assuming the role of the receiver, cannot see it. Ben will then try to guess what symbol is on the card. This will be repeated 56 times with the whole deck. Then, the positions will be reversed, with Ben as the sender and me as the receiver.

Hypothesis: We do not believe that there will be any proof of ESP through this experiment.

Results: Out of 25 cards, Ben made a single correct guess. During my turn, I guessed none correct.
Conclusions: Through this experiment, we discovered no signs of extrasensory perception. If it does in fact exist, we don’t have it.

THE BEST LIQUID FERTILIZER FOR YOUR MONEY.
Lauren McCarthy and M. Simonds (teacher). Portola Highly Gifted Magnet Middle School, 18720 Linnet Street Tarzana, CA 91356.

This study examines the question of liquid fertilizers accelerating the growth of yellow pear tomato plants. Three plants per fertilizer were tested and given equal amounts of liquid daily, set in the sun, and measured at weekly intervals. There are two fertilizers (Miracle Grow, Schultz Instant Liquid Plant Food) and one control (tap water).

The results were tap water works the best and is cheapest, Schultz Instant food worked the second best and was the second cheapest, and Miracle Grow killed my plants and was the most expensive.

WHAT IS THE EFFECT OF INCREASED AIR PRESSURE ON PLANTS?
R.N. Ramirez, Ms. M. Simonds. Portola Highly Gifted, 18720 Linnet St., Tarzana, CA 91356.

This study examined the effect of increased air pressure on plant growth. Beans were grown in specially designed plastic containers that were pressurized to 30 PSI, 15 PSI, and normal air pressure (which served as the control). The plants grown at 30 PSI achieved a final height of 8 1/2 in. to 3 5/8 in.. The plants grown at 15 PSI achieved a final height of 6 in. to 3 1/2 in. The control plants achieved a height of 2 1/2 in. to 0 in. The results indicate that increased air pressure augments plant growth.

WHAT ARE THE EFFECTS OF DIFFERENT HOUSEHOLD SUSTANCES ON FIRE?
Morgan Wyenn, M. Simonds (teacher). Portola Middle School, 18720 Linnet Ave., Tarzana, CA

My science experiment was how different household substances affect fire. Instead of buying expensive items to make my family fireplace fire smell and look better, I wanted to find something I already have to do this. I collected various household items, such as salt, mint, and soap. I watched carefully as I added each substance to the fire, recording what I saw, heard, and smelled. I discovered that light, flaky items burned and sometimes sizzled. I also found that fire exaggerates the smell of the item, such as garlic smelling strong and sugar sweet.

HOW DOES THE HEIGHT OF A PLANT RELATE TO ITS USE OF CO₂?

I was setting out to find how different heights of Phaseolus sp. plants determine how much carbon dioxide they take in. These plants were kept inside a clear air tight bag, along with a cup of Alka Seltzer and water, in order to create carbon dioxide for the plants to take in. They were to be kept under light, since that is the only time they would be able to take in carbon dioxide, because of
photosynthesis. The plants were kept under light for 24 hours and after the 24 hours were over, I measured for carbon dioxide directly from the bag. I found out that five 2 cm. plants were able to take in 24.33\% of the carbon dioxide given off by the cup of Alka Seltzer with water, five 7 cm. plants were able to take in 33.34\% of the carbon dioxide in the bag, and five 16 cm. plants were able to take in 39.56\% of the carbon dioxide in the bag. The control which just consisted of the cup of water and Alka Seltzer inside the air tight bag contained 74.06\% of carbon dioxide.

**EFFECT OF TEMPERATURE ON PHOTOSYNTHESIS.**
M. Madenlian and M. Altibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This project was done to find out if temperature has any effect on photosynthesis. Anarchasis, a water plant, was put in a test tube filled with water and covered with a one hole rubber stopper. A pipet filled fully with water was inserted in the hole. To compare the rate of photosynthesis, the amount of gas collected in the pipet was measured at each half hour intervals for one hour and thirty minutes. Two similar test tubes were set. One was placed in a warm water bath and the other in a container of ice cold water. The results showed that the plant left in the warm water bath produced 3 ml of oxygen in half an hour. The one left in the ice cold water produced 1 ml of oxygen in half an hour. The results indicate that temperature has a great effect on the rate of photosynthesis. Plants carry on photosynthesis faster in a warm place than in a cool place.

**EFFECTS OF ANTIBACTERIAL SOAPS ON BACILLUS CEREUS.**
Laura Yabu and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

The purpose of this experiment was to find out if ordinary name-brand "antibacterial" soaps have any significant effect on Bacillus cereus. Tubes of nutrient agar were inoculated with Bacillus cereus and then pour plates were made. Filter paper disks that had been soaked in an 18\% soap solution (four different brands of soap were tested) were placed on the pour plates The plates were then incubated for 24 hours at 38° C. After incubation, zones of inhibition were present around all of the soap disks. After 96 hours, all of the inhibition zones around the disks remained clear. These results indicate that the soaps do have a significant effect on Bacillus cereus, and that the soaps most likely contain some antibacterial or bactericidal ingredient.

**COULD THIS BE YOUR LUNG? THE EFFECTS OF SIDE-STREAM SMOKE ON THE HUMAN BODY.**
D. Schneider and B Vallejo (teacher). Reseda High School, 18230 Kittridge St., Reseda, CA 91335

I have discovered that nonsmokers inhale many of the same hazardous chemicals as do smokers, by means of two different types of smoke. The first, exhaled main-stream smoke, comes from the lungs of the smokers, while the second, side-stream smoke, permeates through the air after it leaves the lit end of a cigarette. Side-stream smoke poses a greater threat to nonsmokers than exhaled main-stream smoke, which is filtered through someone else's lungs before reaching the nonsmoker's. It is the difference between the entire five or ten minutes the cigarette is lit versus the approximate ten puffs of mainstream smoke.
This experiment was conducted in order to view the build-up of tar from airborne side stream smoke on the lungs of a nonsmoker. In researching this topic, I learned that slowly, but surely, contacted lungs will become contaminated and will eventually deteriorate. Two coffee filters (representing lung membranes) were used, one free from side-stream smoke, and the other elevated in a jar and put in direct contact with secondhand smoke. After only three cigarettes, specks of tar were visible on the filter and there was a difference of 0.0052 grams in the weight of the two lung membranes. Realistically, the harm is much greater, with consideration that the average smoker inhales twice as many cigarettes in one day alone.

1603

WHICH TOOTHPASTE IS BEST?

The purpose of this project is to determine by experimenting which type of toothpaste works best in protecting the calcium and enamel around our teeth. The two variables in my project will be baking soda and peroxide; for a control I will use fluoride.

The first step in accomplishing my project was to gather the following materials: four beakers, four medium sized eggs, lemon juice, three kinds of toothpaste; fluoride, baking soda and peroxide. I then put lemon juice in all of the beakers, I put one egg without any toothpaste on it and put it in one of the beakers, then I separately applied to the three remaining eggs, each one with a different toothpaste.

My results were as follows: the egg without any toothpaste was very weak and slushy. The egg with the fluoride was a bit stronger and so was the one with the peroxide but they were not as strong as the one with the baking soda. And after doing this experiment three times I concluded that the best toothpaste was the baking soda, then the peroxide, and last the fluoride. The egg without any toothpaste showed how weak our teeth get when we don’t brush them and how the harmful acids in our mouth will eventually destroy the enamel.

INHIBITING THE GROWTH OF BACILLUS CEREUS USING CITRIC JUICES, SALT, AND ROOT BEER.
Katrina M. Hunter, Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

In this experiment lemon juice, lime juice, salt water, and diet and regular root beer were tested to determine if they were effective in inhibiting the growth of bacteria commonly found in fresh meats and bacteria that may cause serious bodily harm if ingested. Filter paper disks soaked in the above substances were placed into petri dishes containing Bacillus cereus in congealed nutrient agar. When tested, the lemon juice and the regular root beer showed no growth of bacteria in or on their disks. The salt water, diet root beer, and lime juice showed growth on their disks. Therefore, lemon juice and regular (non-diet) root beer simply and effectively inhibit the growth of bacteria.
THE EFFECTS OF THE HERBAL REMEDY KOMBUCHA TEA ON THE BACTERIA BACILLUS CEREUS.
Leslie Joe and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831.

In this study, Bacillus cereus was exposed to kombucha tea, an herbal remedy, and the kombucha mushroom to see if the bacteria was affected by their presence. Using aseptic techniques, bacterial pour plates were made with either tea-soaked filter paper disks or a small piece of the mushroom placed on top of the agar. The tea disks had prevented the growth of the bacteria around them, while the mushrooms hindered the growth for only one day. Wild mushrooms, grocery store variety mushrooms, Nestea Pekoe tea, and Lichee tea were also tested to see if the inhibition of bacterial growth is a characteristic unique to the kombucha mushroom and tea or if it is one of other teas and fungi as well. The non-kombucha mushrooms and teas tested had no effect on the growth of the bacteria, suggesting that the kombucha tea may have a special antibacterial ingredient.

BREATHING RATE OF FISH AT DIFFERENT TEMPERATURES.
V. Sherbetchian and M. Altibarmakian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This investigation was conducted to figure out the breathing rate of fish at different temperatures. Five fish were placed in a jar filled with cold water. A few minutes were given for the fish to calm down. The number of times the fish opened and closed its mouth in one minute was counted (breathing rate). The average of three countings with each fish was taken, then all were averaged together to get dependable results. The same procedure was repeated with the same fish in water at room temperature and the results were recorded and calculated. These results show that the breathing rate of fish changes with temperature. Fish breath less in cold water than in warm water.

EFFECTS OF ACID RAIN ON COMMON BUILDING MATERIALS.
Adrian Mak and D. Shah (teacher). Gaspar De Portola Middle School Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This study observed the effects of acid rain, a common problem in the eastern United States, on typical building materials. Each of the different materials, painted wood, stainless steel, steel, wood, aluminum, plastic, and glass, were placed in covered glass containers. Each was placed in pH 4.0 acid solution and a neutral water solution. The materials were examined daily. After a 9 day period, 4 materials in the acid solution experienced no visible decay. Those materials were painted wood, aluminum, stainless steel, and glass. The steel had 1/2 disintegrated, and the wood in the acid solution disintegrated slightly. The plastic in the acid developed rough edges. In the water, the painted wood, plastic, and glass were unscathed. The aluminum and stainless steel had high levels of oxidation. The steel completely rusted over, and the wood chipped. This shows that painting wood greatly increases its durability. Also, aluminum and stainless steel performed better than steel. Plastic stood up well to the acid. This shows that acid rain can have adverse effects against many common building materials.
HOW ARE ANTS AFFECTED BY HOUSEHOLD PRODUCTS?
Eyal Marom and B. Vallejo (teacher). Reseda Environmental and Physical Magnet School, 18230 Kittridge St., Reseda, CA 91335.

The experimentation examined how common household ants are affected by household products. Products such as perfume, rubbing alcohol, acne medication pads, and sore throat spray were used in this experiment. The products just listed were placed between a colony of ants and sugar. It turned out that the perfume was the most effective repellent out of the rest. It drove the ants away quickly and kept them away for over an hour. The second most effective repellent was the rubbing alcohol which kept the ants away for half an hour. The rest of the products used had almost no effect on the ants. The results show that alcohol found in the products was repelling the ants away.

HOW DOES IRON AFFECT THE RATE OF GROWTH?
J.D. Carlson, M.L. Weitkamp (teacher). Chaminade College Preparatory, 7500 Chaminade Ave, West Hills, CA 91307.

This experiment set out to determine if iron affected the rate of the pupal stage of *Tenebrio molitor* (mealworms) and what the effects were. This was done by creating three test groups of thirty mealworms each. One group was fed a cereal high in iron. The second group was fed cereal that had a low iron content and the third was fed a combination of the two cereals. The mealworms were studied for twenty-five days and checked every five days for growth rate. The *Tenebrio molitor* fed the most and least amount of iron had the same number of pupas formed at the end of the experiment and also had a slow pupal growth rate. This shows too much or too little iron can have equally undesirable effects. The meal worms fed the mixture of both cereals (balancing out the extremes) had the most pupas within a twenty-five day test period.

COPPER TOP TESTER.
Albert Kwan and D. Shah (teacher). Portola Highly Gifted Magnet, 18720 Linnet Street, Tarzana, CA 91356.

In this experiment, the question of how the size of the battery affects on how much energy it uses. I had done an experiment on batteries before and for this experiment I'm using Duracell batteries. I had built a device to test out these batteries. The device uses a light bulb to exhaust the energy in the batteries. I time the use of the batteries for 30 minutes. After that time period is up, I checked on how much energy there was with a copper top tester. I measure the exact percentage of the energy with a ruler. I had especially used this ruler (inches) that measures to 1/64 of an inch. It took time to do this, however the results were uncanny in some ways and predictable in others. In both of my tests, size D had the most energy left. The AA batteries had the second most energy left. In both tests, the average of the batteries were the same. The size C batteries turned out third in this race. The AAA batteries had the least averaged amount in this test.
NATURAL WONDERS; THE EFFECTS OF GARLIC, CINNAMON, ONION AND GINSENG ON THE INHIBITION OF BACILLUS CEREUS.

The purpose of this investigation was to test the effectiveness of herbs used in natural remedies in killing bacteria. Pour plates were made using nutrient agar and the bacteria Bacillus cereus. 140 1/4” filter paper discs were made. 20 discs were soaked in each of the following: garlic juice, garlic oil, onion juice, concentrated cinnamon and water, diluted cinnamon and water, and ginseng and water. Discs soaked in distilled water were used as a control. Also tested were pieces of onion and garlic, with pieces of agar as controls. A minimum of 10 trials were conducted. Only the concentrated cinnamon solution, the garlic juice, and the garlic pieces showed clear areas on the plates and, therefore, bacterial inhibition in the lab tests. The results of this investigation seemed to show that onion and ginseng do not inhibit bacterial growth, while large doses of cinnamon and garlic do show inhibitive qualities.

SOLUTION TO POLLUTION
C. Y. Strong, M. Simonds (teacher) Portola Highly Gifted Center, 18720 Linnet Street, Tarzana, CA 91356.

This experiment examined whether or not the presence of oil prevents a plant from getting water and other nutrients. Three house plants were used. One plant was fed motor oil then a nutrient solution. Another plant was fed cooking oil then a nutrient solution. The final plant was a control plant. The plant with the cooking oil continued to grow healthy. The plant with the motor oil became weaker and died. The control plant continued to grow healthy. The results suggest that the cooking oil allows the nutrient solution to get through and the plant to get it.

YEASTS ARE HUNGRY.

This experiment examined the effect of yeast on food decomposition. Two slices of banana, apple, and pear were cut. Same amount of yeast was sprinkled on two slices of each kind of fruit. Each is placed in a separate Ziplock sandwich bag and stored in a warm dark place. For seven days each was observed and a piece of each was tested with iodine solution. The iodine solution changed the color of the fruit according to the amount of decomposition. The different shades of blackish to purple color produced as iodine was added indicated the amount of decomposition. The results show that the fruit pieces covered with yeast showed the most and fastest decomposition.
EFFECTIVENESS OF AN ASSISTANCE SIGNALING DEVICE FOR ELDERLY PERSONS AND THEIR CAREGIVERS.
B.J. Coates and M. Simonds (teacher). Portola HG Middle School, 18720 Linnnet Street, Tarzana, CA 91366.

This study originated as an attempt to develop a product that will signal caregivers of elderly persons who are reluctant to request assistance during the night. Administrators of small residential facilities (six residents or less) were interviewed and data analyzed regarding currently used signaling systems and desirable features of a new system. A common "touch" lamp was utilized as the sending component (elderly resident) of the system and a door chime as the receiving component (caregiver). An appropriate electrical schematic was designed and the "Smart Lamp" was developed for an attractive, practical, and relatively inexpensive signaling device that was tested in a residential facility for one month. The Smart Lamp was found to be used by residents 91% of the time upon leaving beds during the night, as compared with an estimated 33% usage of emergency call buttons and 67% effective usage of auditory intercom monitors. In conclusion, the Smart Lamp appears to be more effective in regulating the movement and possible need for assistance to the elderly than previously used devices, by discretely alerting the caregiver while retaining the independence of elderly persons.

IS URINE AN EFFECTIVE FERTILIZER?
H. Ho and B. Vallejo (teacher). Reseda High School, 18230 Kittridge Street, Reseda, CA 91335.

The purpose of this experiment was to identify whether or not human urine may be used as a substitute for commercial fertilizer. If the experiment had been successful, people would have no longer had to spend money for commercial fertilizers. The experiment was carried out with a control group and a variable group. The control group was watered with water, while the variable group was watered with urine. All of the plants in the control group grew to be strong and healthy. On the contrary, the entire variable group died and disappeared into the soil. However, this did not necessarily mean that urine may not be used as a fertilizer. My results were inconclusive because there were many other factors that may have contributed to the results. The high concentration of the morning urine that was used, its failure to be diluted, and the high level of acidity may have contributed to the death of the variable group. Finally, the urine itself may have needed to be combined with other ingredients to produce an effective fertilizer.

GROWING CRYSTALS.

The purpose of this project was to see what conditions were best for growing crystals with salt and sugar. To do this project, you need to obtain six cups, table salt, cane sugar, food coloring, six sticks or pencils, and kite string. Take the six cups and fill them with water then microwave them each for 2 minutes. Put 1/4 cup of sugar in three, and 1/4 cup of salt in each. Tie string around the six pencils so there is some hanging into the cup. Put two drops of one color food coloring in one salt cup and one sugar cup. Put two drops of a different color coloring in one salt cup and one sugar cup. Put another two drops of another food coloring in one salt cup and one sugar cup. Put one salt and one sugar cup in a window seal, one salt and one sugar cup under a light, and one salt
and one sugar cup in a dark place. Let the cups sit for one to two weeks undisturbed. We thought that the salt crystals would grow faster than the sugar crystals. We also thought that the cups in the window seal would grow faster than the other two cups. We thought the cups in the artificial light would grow slower than the cups in the window, but faster than the cups in the dark all the time. The results suggested that the cups in the artificial light all the time grew faster than the other cups. The ones in the dark grew the next biggest and fastest, then the ones in the sunny window. The salt crystals grew much faster and bigger than the sugar crystals. We think that the salt crystals grew faster and bigger because they were already small crystals and were not as fine as the sugar. The ones in the light all the time grew faster because they had more light than the other two. We think that the ones in the dark place grew faster than the ones in the sunny window because they had more warmth. We do not know why the cups in the sunny window didn't grow as fast as the other ones because they had almost as much light and almost the same amount of warmth as the other cups.

THE EFFECTS OF COLOR ON PEOPLES MINDS.
Gina Russo, Mrs. Shah (teacher) Portola Middle School 18720 Linnet Street, Tarzana, CA 91356

This experiment will show how certain colors (black, red, green, blue, purple, orange, and yellow) affect the human mind. This experiment was repeated 44 times. I asked the person what came to mind when I mentioned a certain color. For black and red especially most people mentioned feelings. For blue and green most people mentioned a thing. This showed, depending on the time and surroundings, people had more psychological thoughts towards black than any other color.

ECOLOGICAL BALANCE OR SURVIVAL OF THE FITTEST.
D.H Lee, Mrs. Simonds (Teacher) Gaspar De Portola Middle School, 18720 Linnet St Tarzana, CA 91356

This study tested how long the Carassius auratus and Elodia canadensis will survive if left in an enclosed environment at different ratios between the plants to animals. The plants and animals were divided into seven groups of different ratios. The ratio was 1:5p; 2: 4p 2f; 3: 3p 3f; 4: 2p 4f; 5: lp 5f; 6: 4p; 7: 5f. The experiment was repeated twice. The fish in group 1 lived to day 5, the last fish in group 2 died on day 7, the last fish in group 3 died on day 7, the last fish in group 4 died on day 3, the last fish in group 5 died on day 3, the last fish in group 7 lived the longest. The results show that rather than the fish dying of a lack of oxygen or food it was more of a test to see who was the strongest and that it doesn't matter if there is an ecological balance when all the animals are weak.

CONDUCTORS AND NONCONDUCTORS OF ELECTRICITY.

The purpose of this project is to see which of the six solids and five liquids that I have picked are conductors of electricity, and which ones are nonconductors of electricity. After assembling my project, I tested the six solids and five liquids. Then, after testing my experiment three times, I recorded my observations. I have concluded that liquids cannot conduct electricity very well because they do not have enough ions. I have also concluded that solid objects that contain metal
are more likely to conduct electricity than those that do not.

1620

DOES EXPENSIVE CAT FOOD TASTE BETTER?
Hector Flores and M. Simonds (teacher). Gaspar de Portola Middle School, 18720 Linnet St. Tarzana CA 91356

This study will attempt to answer the question whether or not a more expensive brand of cat food is preferred by my cat over a less expensive less known brand. The first brand is "Fancy Feast", which I purchased for forty cents a can, containing 3 oz. (85g). The second is "NewPet", which I bought for twenty-five cents a can containing 5.5 oz. (156g). The better buy is surely the 25¢ can containing almost twice as much. But, even though there was more food in the bargain can, my cat, Hellcat, could and did taste the difference. I put both brands one on each side of a two sided plate, then let Hellcat choose which ever one he wanted to eat. The first time he rapidly chose the "Fancy Feast" food and yes it was all gone. This happened all three trials. So, to my beloved pet more expensive food is more fitting to his ravenous apetite!

1621

HOW MUCH GARBAGE A FAMILY PRODUCES IN A WEEK.
Jonathan Marcus and D. Shah (teacher). Portola Junior High School, 18720 Linnet Street, Tarzana, CA 91356.

This study observed the amount of garbage that a family produces in one week, and the effects of that garbage on landfills. There were four different categories of garbage biodegradable (paper goods), recyclables, non-recyclables, and organic material, (food bits, plants, etc.). The garbage that a family produced was weighed and categorized for one week. The weights of the different garbage items were carefully recorded. In a period of five days 3 pounds 4 1/2 ounces of biodegradable trash was produced, only 2 1/2 ounces of non-recyclables, 1 pound 2/3 ounces of organic material was thrown away, and no recyclables were thrown away due to the fact that the family observed recycled their recyclable material. The results of the study showed that there was a lot of garbage in the paper goods category. This has a negative effect on our landfills. Because of all the biodegradable and recyclable material in our landfills they are filled up faster and new landfills must be found.

1622

EFFECTS OF ACID RAIN ON SOIL.
Eric Chow and Steve DeGusta (teacher). John F. Kennedy High School, 6715 Gloria Drive, Sacramento, CA 95831

In this experiment, 24 California Blackeye Cowpeas were planted in soil that had been continuously rinsed with acid rain. The growth of these plants was then compared with California Blackeye Cowpeas that had been planted in soil that was rinsed with tap water. A 6 liter solution of acid rain was mixed, using 0.025M H₂SO₄, 0.025M HNO₃, and tap water. The acid rain solution, having a pH of 2.0, was then poured over a sample of potting soil. Using a colander, the acid rain solution was drained from the soil. Two liters of the acid rain solution were slowly poured over the soil sample every day, for a total of 3 days. The soil sample was then rinsed with 2 liters of tap water to wash out the remaining acid in the soil. During this same period of time, 6 liters of tap water were poured on another sample of potting soil for a control group. Both soil samples were then allowed 2 days to dry, before the Blackeye Cowpea seeds were planted. A total of 48 Blackeye Cowpea seeds were planted (24 in each soil sample). For 15 days the plant growth was
are more likely to conduct electricity than those that do not.

**DOES EXPENSIVE CAT FOOD TASTE BETTER?**
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In this experiment, 24 California Blackeye Cowpeas were planted in soil that had been continuously rinsed with acid rain. The growth of these plants was then compared with California Blackeye Cowpeas that had been planted in soil that was rinsed with tap water. A 6 liter solution of acid rain was mixed, using 0.025M H2SO4, 0.025M HNO3, and tap water. The acid rain solution, having a pH of 20, was then poured over a sample of potting soil. Using a colander, the acid rain solution was drained from the soil Two liters of the acid rain solution were slowly poured over the soil sample every day, for a total of 3 days. The soil sample was then rinsed with 2 liters of tap water to wash out the remaining acid in the soil During this same period of time, 6 liters of tap water were poured on another sample of potting soil for a control group. Both soil samples were then allowed 2 days to dry, before the Blackeye Cowpea seeds were planted. A total of 48 Blackeye Cowpea seeds were planted (24 in each soil sample). For 15 days the plant growth was
observed. At the end of the 15 day time span, a total of only 14 plants had grown. Seven plants had grown in the soil rinsed with acid rain and 7 had grown in the control group. Using the T-test, I found that there was no significant difference between the heights of the plants grown in soil exposed to acid and the soil exposed to tap water. According to these results, acid rain of pH 20 has no effect on potting soil.

WHICH DETERGENT REMOVES THE MOST DIRT?
Javier Grajeda and D. Shah (teacher). Gaspar de Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356

The purpose of this experiment was to determine which of several detergents removed dirt better. The detergents that I used for this experiment were Tide, Surf, All, Von’s Brand, and Cheer detergents.

First I washed each sock (six in all) each in one of the detergents. After I washed the socks I marked the sock by putting the name of the detergent that it was washed in. After they were washed I dried all of the socks in the sun. When the socks were dry I put them against a piece of paper to compare how clean they got. The sock that was washed in the Tide detergent came out the cleanest. Cheer was the second cleanest and all the other detergents cleaned just about the same. I have concluded that not all detergents clean the same. The detergents that are thicker wash clothes better.

WHICH DETERGENT WORKS BEST.
Erick Gonzalez, M. Simonds (teacher). Gaspar De Portola, 18720 Linnet St., Tarzana, CA 91356.

This study examined the question of which detergent works best for a specific stain. I tested three detergents: Cheer with color guard, Tide with bleach, Clout. I also got three different kinds of stains such as a mud stain, oil stain, and a sweat stain. The result of my experiment was that Cheer with color guard worked best on the mud stain, it was the best overall. Tide with bleach was best for the oil stain and Clout worked best on the sweat stain. In conclusion I’d like to say to many people that this experiment is not really important, but to me it is important that people know which detergent works best overall. In the long run it may end up saving people money. People will not have to waste money buying different kinds of detergent or have their clothes ruined.

SURFACE TENSION.
Stephanie Chang, Marisa Oh and F. A. Swensen (teacher) Park View Intermediate School, 808 West Ave. J-2, Lancaster, CA 93534

The purpose of this experiment is to determine how various dishwashing detergents reduce surface tension and how this ability is related to their cost. My hypothesis is that the Dawn Liquid Detergent in 8 oz of water will have the best cleansing ability along with the price. Start by filling a container with eight ounces of water. Next loop thread through the holes of a button and gently lower it onto the water surface. Using the eyedropper, place one drop of the first detergent to be tested in the container of water. Stir the solution thoroughly with a stirring rod. Carefully lower the button again on the water’s surface. Keep adding drops until button sinks. Keep track of the drops added. Repeat these steps until all of the detergents have been tested. In conclusion, the Palmolive used the least number of drops to break surface tension and the Vons brand used the most.
WHICH FERTILIZER WORKS THE BEST?

K. Ravadran and J.T. Davis (teacher), Park View Intermediate, 808 W. Ave. J, Lancaster, CA 93534

The purpose of this project is to see which fertilizer grows the best plant. I first took four 2” pots and poured potting soil into them. Then I added different kinds of fertilizer but I left one pot alone. Each plant got the same amount of water and sunlight. I then measured each plant everyday to see which fertilizer made the plant the tallest. Miracle-Gro worked the best. The plant had a thick stem and nice looking leaves. This plant was also the tallest. I concluded at the end of my experiment, if you use Miracle-Gro fertilizer in the soil it will grow well.

THE EFFECTS OF COLORS AND LETTER FORM ON HUMAN READING ABILITY.

M.Y. Kim and D. Shah (teacher), Portola Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

In this experiment I tried to find out if different colors and letter form influences the human reading ability. The first thing to do is to cut out two pieces of each colored paper. Then you write easy different sentences on each of the cards. This should be done in lower case letters. After this you should write sentences on the second cards (the same ones you wrote before) this time in capital letters. Then let someone read each card, timing them on each. Record the results. The results were that the people read things on the white card faster than the ones on the colored cards. That is probably because the colors distract the mind and they have more trouble reading them. The people read the things written in lower case faster than the ones in capital letters. That is probably because people are more used to reading things that way. This experiment helped me learn many things that I have always wondered about and I’m glad I did it.

FACTORS SEPARATING SALIX BEBBIANA AND POTENTILLA FRUTICOSA AT HART PRAIRIE PRESERVE, ARIZONA.


In an observation of the Hart Prairie Preserve near the San Francisco Peaks in Arizona, it was noted that both Salix bebbiana and Potentilla fruticosa were found along the major drainages. Salix bebbiana is a species of special concern in this area because of its limited (and shrinking) range. The two species, though found near each other, were found only in distinctly isolated patches, never growing together. We undertook a study to see what may be affecting this discontinuous distribution. Soil moisture and nitrate nitrogen levels may be helping to determine this pattern, whereas plant diversity, soil pH, and soil temperature did not vary between the patches. Although differences were noted, cause and effect could not be identified. Further tests should include germinating seeds and growing seedlings under different nutrient and moisture conditions. Interspecies effects such as possible allelopathic interactions between Salix bebbiana and Potentilla fruticosa should also be investigated.
EFFECT OF SMOKING ON LUNG CAPACITY.
Narine Sossikian, Mrs. Der Megerdichian (teacher) Holy Martyrs Ferrahian Armenian High School. 5300 White Oak Ave. Encino, CA 91316.

In this study the effect of smoking on lung capacity was studied. In controlled experiments two trials were used with twenty volunteers. Ten non smokers (5 male, 5 female) with an average age of thirty-four and ten smokers (5 male, 5 female) with an average age of twenty-five. Both groups were asked to blow a balloon with one breath. The average diameter the non-smokers blew up was 21 and the average diameter the smokers blew up was 18. The results show that smoking does affect lung capacity.

THE EFFECTS ON CO$_2$ PRODUCTION IN YEAST.

To determine how various levels of sugar affect CO$_2$ production in yeast, a test was conducted using three different amounts of sucrose. The three samples had uniform amounts of yeast and distilled water, 1.5 g and 25 mL, respectively. The variance of the sucrose used for the experiment was 1g, making the three 0.5 g., 1.5 g., and 2.5 g. The tests showed that the amounts of CO$_2$ increased as the amount of sucrose was increased.

SEED ADAPTATION.
Ara Estes, Mrs. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School. 5300 White Oak Ave, Encino CA 91316.

In this study the effect of different soil samples (cotton, well conditioned soil, and soil from the side of a street) on the growth of lentil seeds was examined. The objective was to observe the growth of seeds land to see how the different environments affect the speed at which the plants grow and the quality and quantity of growth.

Three different containers were each filled with the well conditioned soil, the soil from the side of the street and cotton. Respectively, the seeds were planted and watered shortly there after, then watered the next day and the next and so on, making sure that the experiment was controlled and each container received the same amount of water.

The results show that the seeds in the cotton based container germinated the fastest followed by the container filled with soil from the side of the street. The soil from the side of the street stopped growing after germination and the soil that was well conditioned kept growing despite germinating last.
ACID RAIN.
Eddie Bosnoyan and Mrs. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak avenue, Encino, CA 91316.

The purpose of the study was to test different kinds of liquids to see if they are acid, base, or neutral. Seven different liquids were tested individually on a pH scale. Each liquid was tested 3 times. One liquid was neutral and that was distilled water. Battery acid, lemon juice, and vinegar were the liquids found to be acidic because on the scale they were all less than seven. Sea water, ammonia, and lye were all found basic because on the scale they were all greater than seven. The liquid that was the most acidic was the battery acid because it had a pH of 1 which was the lowest of all the liquids. The liquid that was the most basic was the lye because it had a pH of 13 which was the highest of all the liquids.

WATER BOILS AT LOW PRESSURE BELOW 100 DEGREES CESSIUS.

This study showed the effect of air pressure on the boiling temperature of water. 200 ml water was filled in the Erlenmeyr flask, set on a stove burner until it was boiling, then it was carried over with a stopper in the flask to the sink that was filled with four gallons of chilled water. Holding the flask by the stopper, it was placed so that it sat on the bottom of the sink. With hands on the stopper the water continued to boil for about two minutes. After the boiling stopped, the water inside the flask was only warm and did not burn our hands. We concluded that by putting the stopper in the flask, the air pressure will have no effect on the boiling water inside the flask, and the air pressure inside will drop lower and lower, making it easier for the bubbles in the water to push out (or boil). So the lower the air pressure, the lower the boiling temperature of the water, even if the water is ice cold.

A COMPARATIVE ANALYSIS OF LATE WOODLAND CERAMICS AT THE EVIE SITE.
M. Hildebrand, mentor: L. E. Varnado. Center for American Archeology, NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

From 1993 to 1995, the Center for American Archeology excavators have recovered Late Woodland pottery sherds from the Evie site, which lies in the Lower Illinois River Valley. It is hypothesized that these sherds are of the Jersey Bluff phase, a time period between A.D. 800-1200. Yet no extensive studies have been conducted to prove this assumption. The purpose of this project is to classify the Evie site ceramics by examining and categorizing the rim sherds according to temper, thickness, and surface treatment, among other discerning criteria. The sherds are then comparatively analyzed with ceramics from other Late Woodland sites in the Lower Illinois River Valley, such as Starr Village and the Alpha 3 site. Secure temporal data from Evie will shed light on the cultural components present at the site, which will permit archeologists to conduct more accurate studies on the prehistoric occupations in the Lower Illinois River Valley.
THE AERODYNAMIC PERFORMANCE OF DIFFERENTLY SHAPED OBJECTS IN A WIND TUNNEL.
Adrian Mak, M. Simonds (teacher). Portola Middle School Highly Gifted Center, 18720 Linnet Street, Tarzana, CA 91356.

I tested the aerodynamicity of several differently shaped objects. The purpose of the experiment was to find the design on wheels that would offer the least amount of wind resistance. I hypothesized that the teardrop shape, with the point facing forward, would offer the least amount of drag, because the point would splice the onrushing airflow, and equally disperse it on all sides. I created a wind tunnel, with a cardboard box, and a fan, several figures made from construction paper, a pulley system using yarn and a piece of cardboard, and a base resting on 3 wheels. The figures that I tested were a forward teardrop, a reversed teardrop, a rectangle, a cylinder, and a triangular figure; all with the same frontal area of 16 square inches. The forward teardrop, and the triangle offered the least wind resistance, while the rectangle had the highest coefficient of drag. The cylinder and the backwards teardrop performed both equally and moderately well. It seems that the most aerodynamic figure has a pointed edge to separate the oncoming air flow.

FACTORS INFLUENCING THE RATE OF YEAST RESPIRATION
Rebecca Bismejian, Mrs. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian H.S., 5300 White Oak Ave. Encino, CA 91316.

This experiment showed how different types of liquids affect the rate of yeast respiration. Five test tubes were used in which four were separately filled with lemon juice, apple juice milk, and orange juice. The next test tube was used as control and filled with 12ml of glucose solution and yeast. The four test tubes were added to yeast culture. This experiment was repeated with cold and warm water to measure the difference of the amount of carbon dioxide bubbles released. The results were as follows: The orange juice had the least amount of carbon dioxide bubbles released with 5 bubbles the first minute and none after. The lemon juice had 23 bubbles released the first minute and every other minute either 1 or 2 bubbles would be released. The milk had 10 bubbles released the first minute and none later. Finally, the apple juice had the most amount of carbon dioxide bubbles released. The test tubes in warm water had the most amount of carbon dioxide bubbles released.

THE EFFECTS OF VARIOUS SUGARS WITH YEAST PRODUCTION OF CO2.
Zeina Zeitouni, Diana Abu-Kazam, Natasha Bakhru, Shaud Kheradmand. Teachers; Mrs. Sveiven and Mrs. Rayfield Quartz Hill High School, 6040 W. Ave. L, Quartz Hill, Ca. 93536.

In our experiment we tested the effect of various sugars; maltose, dextrose, and sucrose, combined with yeast and H2O to produce CO2. After combining 1.5 g. of each type of sugar, 1.5 g. of yeast, and 25 ml. of water with a temperature of 32 degrees Celsius in three separate test tubes, we placed a balloon on top of each test tube. After fifteen minutes of waiting we observed the expansion of each balloon from the different sugars. We concluded that the maltose mixture produced the most CO2 with an expansion of 1.8 cm. of the balloon. Sucrose mixture had the second largest expansion of 1.7 cm., and the dextrose mixture contained the least amount of CO2 with an expansion of 1.5 cm.
EFFECTS OF VARIOUS MATERIALS FOR SOLAR COOKING.
L. B. Sahyouni, Ms. Flores (teacher), Ms. Flagan (teacher). Ramona Convent Secondary School, 1701 W. Ramona Road, Alhambra, CA 91803.

This experiment was conducted over two consecutive days to see which of three solar cookers collected the most heat. Solar cooker #1 was built out of handiwrap, cardboard, foil, and cotton and increased an average of 17°F. Solar cooker #2 was made of foil, cotton, glass and wood and increased an average of 23°F. Solar cooker #3 was made of foil, cardboard and cotton and increased an average of 18°F. My results indicate that solar cooker #2 was the most efficient in collecting heat energy.

RATES OF DIFFUSION OF GASES.
Rosine Barsamian, V. Der Megerdichian (teacher). Holy Martyrs Armenian High School 5300 White Oak Avenue Encino, CA 91316.

The purpose of this experiment was to determine the relative rates of diffusion of hydrochloric acid and ammonia. Four drops of 37% hydrochloric acid and aqueous ammonia were applied to each of two cotton swabs respectively. At precisely the same time, the swabs were inserted into opposite ends of a 26 cm glass tube. Three minutes later a white vapor ring appeared indicating a reaction that had occurred at a distance of 5 cm from HCl and 21 cm from NH3. After the experiment was repeated three times the results were based on the distance traveled by four drops of each gas. Under the same conditions hydrochloric acid traveled about 1:4 the distance that of ammonia.

INFLUENCING THE RATE OF PHOTOSYNTHESIS.

This study examined how to influence the rate of photosynthesis by using an Elodea plant and counting the bubbles of oxygen gas produced based on the distance of the light source. In the first experiment the plant was placed 5cm away from the light, the second 20cm, and the third 5cm away with the use of sodium bicarbonate added to the water. Each experiment was tried five times and the result was that the Elodea plant that was 5cm away including sodium bicarbonate, underwent photosynthesis faster, the second one was the Elodea that was 5cm away and the third, the Elodea that was 20cm away.

DO YOU LET YOURSELF BURN IN THE SUN?
Y. Sheehy and G. Sorensen (teacher) Henry Middle School, 17340 San Jose Street, Granada Hills, CA 91344.

Recent research has found that excessive tanning and burning may be linked to skin cancer and that the use of sunscreens may reduce the risk developing this type of cancer. The purpose of my survey was to see which group, males or females, allowed themselves to burn more often in the sun. There was a total of 400 people surveyed 48% of the males and 52% of the females responded that they
sometimes allowed themselves to tan in the sun. However, 25% of the males responded that they allowed themselves to burn compared to only 18% of the females. There were also more females (16%) who said they used sunscreens compared to the males (11%). I conclude from this survey, that the females were more concerned about their skin than the males.

SEED ADAPTATIONS.
Fadi Mikhael, Der Megerdichian (Teacher), Holy Martyrs Ferrahian Armenian High School 5300 White Oak Avenue Encino California 91316.

This study helped determine that water temperature can alter the amount of seed germination, scraping seed coats can alter seed germination, and that seed adaptations may aid plant survival and reproduction. 40 seeds, beakers, plastic lunch bags, coarse sandpaper, hot plate, water, masking tape, and pen, and some paper towels were used to prove the hypothesis. 10 seeds were taken, boiled, and wrapped in a paper towel. After that, 10 seeds were left in normal water, for 15 minutes, and then wrapped. Unscraped seeds were wrapped. After that, 10 seeds were taken, scraped, and wrapped. 30% of the seeds were germinated when boiled. 70% of the seeds were germinated when left in cold water. 60% of the seeds were germinated after they were scraped. 40% of the seeds were germinated when left unscraped. The results suggested that seeds grew better when they were in cold water and they grew better when they were scraped.

SALT AND THE CORN SEED.

The purpose of this study was to examine the effects of salt water on corn seeds. Each of the experiment pots were given .05% salt water and the control pots were given regular distilled water. After 2 weeks of growth we found that 45% of the experiment and 35% of the control seeds germinated. The average height of the plants given salt water was 8.9 cm and the average height of the control plants was 7.3 cm. This may mean that a small concentration of salt in soil does not harm certain plants.

BALANCING ACT.

This experiment answered the question about the center of gravity. You need 10 nails, 8 ribs and 2 back bones lay them across alternating on one nail then place the second nail over it, and pinch together then lift and place on the nail that's been nailed on a board. All the nails will stay on the one nail balanced. Locking all the nails together they become one mass whose balance which we call center of gravity is below the head of the nail, so they stay balanced.
THE EFFECT TEMPERATURE HAS ON THE GROWTH OF YEAST.
S. Sosko, R. Agarwal. Teacher: M. Sveiven and S. Rayfield. Quartz Hill High School, 6040 West Avenue L, Quartz Hill, CA 93536

The purpose of this experiment was to determine: in which temperature does yeast grow faster. The four temperatures we used in conducting this experiment, were twenty-one, thirty-two, sixty-one, and ninety degrees Celsius. The yeast in twenty-one degrees Celsius and thirty-two degrees Celsius grew fairly slow and produced little to no gas. The growth of yeast in sixty-one degrees Celsius was fairly moderate and produced a small amount of gas. The growth of the yeast in ninety degrees Celsius was fairly rapid and produced a great amount gas. As a result of this, we conclude that yeast grows more in a higher temperature.

DETERMINING THE AFFECT OF DIFFERENT CHEMICALS ON PLANTS. Gary Berghoudian, Mrs. Der Megerdichian, (Teacher) Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

The purpose for this project was to see what happens to Princess Mix when Clorox Beach and Ammonia are added. There were three small plants, one was left untouched except for adding water, to the other two, to one was added Clorox and Ammonia to the other. After adding the solutions, the plants were left alone for two days. The one with water only continued to grow, the one with Clorox had changed to a lighter color and had weakened, and the one with Ammonia had weakened greatly and had fallen. By conducting this experiment, it was determined that Clorox Bleach and Ammonia retard plant growth.

THE EFFECT OF SUGAR TYPE ON GAS PRODUCTION IN YEAST.
Group: Gary Copeland, Ratrin Riefer, Asim Sultan, and Stephen Wagstaff. Teacher: Mrs. Susan Rayfield and Mrs. Mandi Sveiven. School: Quartz Hill High School, 6040 West Avenue L, Quartz Hill, CA 93536

Abstract: We experimented with the reaction of yeast to three (3) different types of sugar. Maltose, Dextrose, and Sucrose were used in the experiment. In three test tubes, 1.5 grams of commercial yeast was placed. 1.5 grams of each of one of the tested kinds of sugar was then placed into a yeast-filled test tube and shaken. After the mixtures had reached a suitable level of homogeneity, 25 ml of water was added to each and an empty balloon attached to the top of each to measure gas production by the yeast. The tubes were then observed for an hour, after which, the following numbers were recorded. The maltose/yeast mixture resulted in 12.5 cubic centimeters of Carbon Dioxide gas. The sucrose/yeast mixture produced some 57.9 cubic centimeters of Carbon Dioxide gas. The dextrose/yeast made approximately 112.1 cubic centimeters of Carbon Dioxide gas.
**SCIENTIFIC ILLUSTRATION OF EVIE SITE ARTIFACTS.**

S. Yaqubi. Mentor: J. Brogan NSF Young Scholars Program, PO Box 366, Kamps ville, IL 62053

Scientific illustration is the production of drawings of measured accuracy and other graphic images that effectively illustrate a broad spectrum of subject matter. Scientific illustrations can be universally understood and appreciated, unlike written or verbal descriptions which are subject to misinterpretation due to the ambiguities of language or the imprecision of authors. Accurate visual representations of specimens are essential to both the students of material culture who usually cannot physically examine all original objects needed for any given comparative research task and to the average person who may not be able to grasp a mental image of an artifact based on an enigmatic scientific description. The subject matter of my illustration project is artifacts from the Late Woodland site at Evie in the Lower Illinois River Valley. These artifacts (ceramic rim sherds) were correctly depicted by utilizing an array of set conventions, techniques, and tools integral to scientific illustration. Illustration is especially important in relation to Evie site research. Since information on the Late Woodland period is not abundant, illustrations can aid the analysis of artifacts (e.g.—determining the chronological period of a pottery vessel sherd on basis of illustrations of telltale characteristics).

**THE PERMEATION OF EGGS.**

E. Duong, M. Simonds (teacher). Portola Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This experiment evaluates the question if egg shells are able to withstand being exposed to various solutions; and if not, which solution(s), and what effect did it impose on the internal portions of the eggs. Sixty chicken eggs were soaked in milk, salt water, rubbing alcohol, beverage alcohol, and oil. The last ten were kept as the control group. All the eggs were soaked for four weeks, and were kept out in the open. After the four weeks, the eggs were boiled, and physical changes in addition to the colors of the yolk, egg whites, as well as shells, were recorded. In the control group, the yolks were light yellow, and were given a 4, which was graded on a scale from 1 being the lightest to 10 being the brightest. Its shells had a normal brown color. All of the test subjects' egg whites were a normal white. The eggs soaked in milk that had a bright orange yolk were given a 6, and its shells had white spots on various portions of the eggs. The eggs soaked in salt water that had a bright orange, light reddish yolk were given a 9, whose shells were a normal brown color. The eggs soaked in rubbing alcohol that had a bright orange yolk were given a 7, which also had normal brown shells. The eggs soaked in beverage alcohol that had a brighter color yolk than that of the control group, were given a 5, and had brown and white spots on various portions of the shells. The eggs soaked in oil had the exact results as the control group. The results suggests that there must be pores in the shells of eggs, which allow certain solutions to permeate it. My results also suggest that salt water was the solution that had the most impact on the eggs because it had caused the yolk of its eggs to turn bright orange and almost red.

**EFFECTS OF VINEGAR ON SEA URCHIN FERTILIZATION.**


This study tested the question of possible vinegar involvement in sperm-egg interaction in the sea urchin _Lytechinus pictus_. Eggs and sperm were placed in a solution of 100% vinegar for 5 minutes.
and the percent of fertilization was recorded. Three drops of vinegar was added each time as the experiment was repeated three times. The first test showed a fertilization percent of 44%. The second time the experiment was tested a fertilization percent of 34% was shown. The final test resulted in a fertilization percent of 42%. In comparison to the normal control value of 88% + 6%, the results suggest that vinegar does play a role in sperm-egg interaction in *Lytechinus pictus*.

1651


Palak Patel. Mentor: Mike Strezewski. National Science Foundation Young Scholars Program, P O Box 366, Kampsville, IL 62053

The Audrey site is a Late Woodland/ Mississippian habitation village in the Lower Illinois Valley. Faunal remains that were previously excavated from the Audrey site were examined from blocks four, five, six, eight, and nine. Block five and eight are possibly Late Woodland areas and blocks four, six and nine are possibly Mississippian areas. Deer bones from these blocks were examined to test the hypothesis that deer meat was being exported from the Audrey site to the American Bottom. The patterning would indicate that the Audrey Site was a venison procurement site for the American Bottom. This hypothesis was tested by examining element representation, minimum number of individuals (MNI) and the food utility index (FUI). Based on the FUI, the results of this project proved to be inconclusive. The FIJI did not conform to the pattern of a high concentration of elements in the low food utility index, as was expected. Instead, the only major development from this research was that the Jersey Bluff areas had a higher concentration of identifiable deer bones than the Mississippian areas.

1652

HOW ACIDS EFFECT THE GROWTH OF PLANTS.

C. Bartle and M. Simonds (teacher). Portola Magnet Center, 18720 Linnet Street, Tarzana, California 91356.

This experiment investigated the possible effects acidic substances can have on the plant *Pilea nummularifolia*. Three groups containing ten plants each had a different level of acidity. The groups were placed in four different cups, each with the same amount of liquid. The first was in 300 mL of plain water, the second in 10 mL of vinegar and the remaining space left water, the third had 20 mL of vinegar, and the fourth 30 mL of vinegar. The plants remained the same until the third day, when all the plants in the acidic groups started to wilt. Some leaves turned dark brown where they had come in contact with the solution. By the fifth day, some of the plants in the plain water developed roots, while the others did not. By then, every plant, except the control, had wilted. This experiment concludes that acid is unhealthy for plants. If they are exposed to acid for a long period of time, the plant will suffer from lack of pressure within stalks and from leaves turning darker colors.

1653

THE EFFECTS OF VARIOUS SUGARS WITH YEAST

Gayle Copeland, Jessica Pick, Dawn Dvorak, Susan Rayfield (teacher), and Mandi Sveiven (teacher), Quartz Hill High School, 6040 W. Ave., Quartz Hill, CA 93536

The purpose of this experiment was to determine what type of sugar among Dextrose, Sucrose, and Maltose would produce the most carbon dioxide with yeast in a time period of 45 minutes. In
order to do this experiment we had to combine 1.5 grams of one type of sugar, 1.5 grams of yeast, and 25 ml of water at the temperature of 32.5 degrees Celsius. We repeated this process five times using each of the different sugars once. We used test tubes to hold the mixture and party balloons were used to enclose the carbon dioxide and to measure the amount of carbon dioxide produced. The results of this experiment proved that Dextrose sugar worked best followed by Sucrose and lastly Maltose.

WHO CAN ESTIMATE TIME BETTER?

This study answered the question of who can estimate time better between men and women and between kids and adults. Little kids are known to be impatient, they will surely overestimate time. Fifty people were tested in five different age groups. They were each told to estimate time while they were reading, listening to music, and doing other activities that are time consuming. All of my studies showed that my hypotheses was right. Little kids were very impatient and they always overestimated time. Teenagers underestimated time, adult were always close, but the older people were the best at estimating time. In all age groups women were better than men at estimating time. Age wise, my results suggest that older people are better at estimating time. Gender wise, my results suggest that women are better at estimating time. In conclusion, my studies suggest that older women are the best at estimating time.

THE EFFECTS OF DIFFERENT SUBSTANCES IN SEA URCHIN FERTILIZATION.
J.D. Friedman, K. Twomey, and N. McIntyre (teacher). Chaminade College Preparatory High School, 7500 Chaminade Avenue, West Hills, CA 91304.

In this experimentation, we studied sperm and egg interaction in sea urchins (Lytechinus pictus), with salt and sugar variations. My partner and I successfully achieved three trials and one control. First, we did our control which consisted of approximately fifty eggs and, a half pipette full of sperm, with no variations. Our first trial started out with eggs and sugar which we let sit for six minutes before inserting the sperm. In our second trial, we did the exact same thing as before. However, in our third trial, we used sodium chloride or, salt. The results showed that the sugar trials were the same in relation to each other but, showed considerable differences from the control. In the control, the process went slower than the first and second sugar variations. However, the salt made the process of fertilization go even slower than the control. When we looked into the microscope, the trial with the salt went slower than both the control and the two sugar variations.

EFFECTS OF ACIDS ON PLANTS.
Hsien Chen Lai, S.B. Minassian (teacher). Schurr High School, 820 N. Wilcox Avenue, Montebello, CA 90640.

The purpose of this experiment was to see how acid rain influences the growth of plants. Vinegar was used to simulate acid rain. During this experiment twenty plants were grown in individual cups. Ten experimental group plants were grown by using a water/vinegar solution at PH 3.5. Ten plants were grown as a control group by using spring water at PH 7. After three weeks, the results showed that acids kills or stunts plant growth. Six individual cups in the experimental group died and the average size of the remaining plants was 4.1cm. But in the control group, all nine plants
that survived were healthy and the average growth was 8.48cm. Thus, this experiment demonstrated that plants exposed to acid rain in the environment, either fail to grow or their growth is stunted.

1660
THE EFFECT OF ULTRA VIOLET LIGHT ON EARLY DEVELOPED RADISH SEEDS.
Nelson Chavarria, Suzanna Gordon, Teacher: D. McDonnell, Sherman Oaks Center For Enriched Studies, 18605 Erwin Street, Reseda, CA 91335

This study examined the effect of Ultra Violet light (220 nm) on early developing radish seeds (Raphanus sativus). Two hundred seeds were imbibed in 45 ml's. of spring water. Upon radical emergence (24 hours), the experimental group (consisting of 30 seeds) was exposed to UV light for two hours at a distance of seven cm. The results show that U.V. light retards growth rate when compared to control groups. Multiple trials were run, each for a duration of three days following treatment. These experiments are being run with various exposure times in an attempt to determine the critical exposure time.

1661
TASTE TEST.

This experiment examines the question of whether or not odor and taste are related. Raw apples, potatoes, carrots, and onions were cut up into small cubes of the same size. Each person was blindfolded and asked to hold his/her nose. The subject tasted each vegetable cube one by one and tried to guess what it was. The results suggest that your tongue has separate areas to taste sweet, sour, salty, and bitter, which can only be identified by taste buds. The rest of the information about the taste of food comes from its characteristic odor. Thus, that is the reason why it was hard to tell one food from another of similar texture.

1662
PALEOETHNOBOTANY: LATE WOODLAND PERIOD TEMPORAL SERIATION BASED ON NUT:WOOD RATIOS AT THE EVIE SITE.
Camilla R. Sulak, mentor: Karen Atwell, NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

It has been suggested that the ratio of nuts:wood fluctuates through prehistory due to technological modifications, climatic changes, availability of resources, etc. This study attempts to create a preliminary temporal seriation of Late Woodland sites such as Evie based on the analysis of carbonized plant remains. The Evie site, located on Crawford Creek on the western bluff of the Lower Illinois River, will be used to provide archeobotanical data for this study. One hypothesis posits that the introduction of agriculture in the Late Woodland period resulted in an increased exploitation of wood and a decrease in nuts due to less effort being spent on gathering relative to the pre-agricultural Archaic period. The results of the study of the Evie site will be compared with those of the Deer Track site-a Late Woodland neighbor to the north. The ratios for Evie were found to be complimentary to those of Deer Track and in contrast with ratios of the Archaic period. This study has general relevance to the economic transition from gathering to cultivation and from mobility to sedentism.
THE ASSOCIATION A MOUSE MAKES BETWEEN SOUND AND FOOD.
P. Motamedinia and A. Morton (teacher), Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

My experiment shadows the Pavlov experiment. In my experiment I wanted to prove that mice could use sound to help them find food. I deprived the mice from food for 4 days prior the experiment. I starved them so that they would immediately go to the food without being too frightened by the buzzer's sound. After the 4 days were up I took a food dish with a buzzer in it and filled it with food. I put the food dish in their cage and started the buzzer. They were startled at first, but their hunger drove them to the food and forced them to eat it. After 1 minute I took the food dish away and turned off the buzzer. After that they where used to the buzzer. Every other day I put the buzzing food dish in their cage. This was done over 1 week. I tested the effects by putting the buzzer at the end of a maze and the mouse in the other. So that they won't use their sense of smell I didn't put the food dish in with it. I did this three time, each time in a different part of the maze, and each time the mouse ran to the buzzer in under 50 seconds. With the food dish alone, the mouse was only able to find the food dish in under 1 minute and 10 seconds. In conclusion this proves that mice can use their sense of hearing not only as protection but as an efficient way of finding food.

WHAT PERCENTAGE OF THE GENERAL PUBLIC PRACTICES GENERAL HEALTH MEASURES THAT ARE KNOWN TO LEAD TO CANCER?

This study examined the health practices of 172 adults in the metropolitan area. These subjects were asked to respond to ten question regarding their health practices and each question was rated on a scale of 1 to 5 as to the potential cause of this health practice to be one that could lead to cancer. Rankings, numbers 1-5, were given to each answer and the percentages of their answers are as follows with 1 being the highest risk and 5 being the lowest risk factor: 8% ranked 1, 19% ranked 2, 23% ranked 3, 20% ranked 4, and 30% ranked 5. This study suggests that of the subjects questioned, more are practicing better health practices and are more conscious of the possible causes of cancer in their daily lives.

EFFECTS OF PROZAC ON THE EATING HABITS OF WHITE MICE.
R. Solomon and A. Morton (teacher). Calabasas High School, 22855 Mulholland Drive, Calabasas, CA 91302.

The purpose of this study was to test whether or not monitored dosages of Prozac, fluoxetine hydrochloride, would affect the eating habits of a test group of four white mice. The Prozac was diluted to a dosage appropriate to the weights of the mice in question. Once daily, .012cc of this solution was administered orally to each of the four mice in this group. Each day, the amount of food consumed was weighed and recorded. At the end of ten days, these results were then compared against the consumption records of a control group of four mice not given Prozac. The Prozac group consumed 3% less than the control group, which is a non-significant difference. The results suggest that the administration of Prozac does not significantly change the eating habits of mice.
1666


The quality of water was tested by finding out the amount of oxygen gas and Carbon Dioxide gas dissolved in water. I used 2 types of water, tap and pool water. For each water I added (48% Manganous Sulfate) and I mixed Solution A. Then I did the same with Solution B (70% Potassium Hydroxide) (15% Potassium Iodide), Solution C (Concentrated Sulfuric Acid) and Solution D (2% starch). When I added Solution D, a blue color appeared. After solution E (.31% Sodium Thiosulfate) was added until each became clear. Then I calculated the amount of Solution E drops to see when the water became colorless. Results: 14 drops of Solution E for tap and 19 drops of Solution E for pool water. I did the same procedure to test for the presence of Carbon Dioxide I added Phenolphthalein to each sample. Pool water formed a light pink color and stayed pink, so no carbon dioxide was present. But one drop of Sodium Hydroxide was added to tap water so the color became pink. The results were that tap water contained more oxygen and carbon dioxide than pool water.

1667

EVIE SITE SPATIAL ANALYSIS.
D. Knight. Mentor: Harry Murphy. Center for American Archeology, NSF Young Scholars Program, P.O. Box 366, Kamps dive, IL 62053

Examination of the feature types, as well as the distribution of features, ceramics, and lithics at the Late Woodland Evie Site permit the development of initial statements concerning spatial utilization and site function. These preliminary interpretations are discussed as hypotheses to be tested by further excavations and analysis.

1668

THE SMOKING AND DRINKING PATTERNS OF HIGH SCHOOL ADOLESCENTS.
Ali Kaufman and A.A. Young (teacher). Birmingham High School, 17000 Haynes Street, Van Nuys, CA 91406

This study examined the smoking and drinking patterns of teenagers (9th-12th graders) at Birmingham High School. Surveys questioning cigarette and alcohol habits were distributed in selected classrooms. Sample population consisted of 100 students. Eighty-one percent (81%) of those questioned had never smoked. Ten percent (10%) smoked occasionally. One percent (1%) smoked 1 pack or more daily. Of those surveyed, fifty-eight percent (58%) had never taken a drink. Twenty-nine percent (29%) drank occasionally, about once a week. Less than .02% drank 2 to 3 drinks a week. Only .07% drank 4 or more drinks a week. Recent studies have shown that both alcohol and tobacco usage has risen among teenagers. The statistics of the sample population at Birmingham High School indicate that there has been no significant increase of the smoking and drinking patterns among the teenagers who attend there.
DOES BETA CAROTENE AFFECT PLANT CANCER?

Beta carotene has been shown to be effective in reducing the incidence of cancer in animals. The purpose of this experiment was to determine if beta carotene also has an effect on cancer in plants. Sunflower seeds were grown using three different watering solutions: 75,000 I.U.'s beta carotene per pint water, 150,000 I.U.'s beta carotene per pint water, and water. Two-thirds of the resulting plants were inoculated with agrobacterium tumefaciens, a plant carcinogen. Plant growth was observed and judged in terms of size, color, amount of foliage, and tumor development. Plants grown in the beta carotene solutions were greener, grew to larger sizes, and had more foliage. Tumor development, however, was the same regardless of the presence or absence of beta carotene. Therefore, it appears as if beta carotene acts as a fertilizer, but not an inhibitor of cancer growth in plants.

WHAT WAVELENGTHS OF COLORED LIGHT ARE ABSORBED IN DIFFERENT TYPES OF PLANT PIGMENTS?

The purpose of this study was to compare and contrast the wavelengths of colored light to others absorbed in different types of plant pigments. To determine the wavelengths of colored light absorbed in the plants, the plants' pigments must first be separated into its component colors by paper chromatography. Acetone was used to extract the pigments from 5 different plants such as chlorophyll (spinach), carotene (carrots), anthocyanin (red roses), naphthoquinone (henna shrub), and leucoanthocyanidin (indigo). Once the pigments from each plant was extracted, it was placed separately on the bottom of a sheet of filter paper. After it dried, the sheet of filter paper with the pigment was inserted into a closed jar with a thin pool of isopropyl alcohol for 30 minutes. The produced paper chromatograms showed the results of the 5 different pigments into their absorbed wavelengths of colored light. The spinach mostly contained the wavelengths in the red-blue range in comparison to the carrots of the blue-green range. However, the results of those two plant pigments differed to the results of the red roses, the henna shrub, and the indigo which contained the wavelengths in the yellow-green-orange range. Thus, the experiment suggested that the pigment of a plant was reflected light and that even though a pigment of one plant was different to a pigment of another plant, the absorbed wavelengths of the colored light had some similarities.

EFFECT OF EXPOSING LIMA BEAN SEED TO MICROWAVE RADIATION,
A. Tchakerian and Mrs V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian H.S, 5300 White Oak Ave., Encino, CA, 91316.

In this study the effects of microwave radiation on lima beans were examined. There were 15 plants microwaved. Two seeds were microwaved for 5, 10, 15, and 25 seconds, while 5 seeds were microwaved for 30 seconds. All the seeds were microwaved at 200°F. There were 4 plants to be used as controls along with the other 6 plants grown in the first experiment. The control groups, showed no damage to their seeds after several days of maturing into a full grown plant. They simply died slowly as a whole. Six of the microwaved plants with their seeds still attached to their
stems had black scars and orange dots. The leaves of five plants were trapped in their seeds for a while because these seeds failed to shed their outer coatings at the appropriate time. Also one seed with a black scar started growing then developed fungus around it. These results suggest that microwaving lima bean seeds caused 40% of these plants to deteriorate at an earlier stage in plant growth while 33.3% of the seeds failed to shed their outer layer at the appropriate time which trapped the plants' leaves trying to escape their seeds.

1672

HOW TO MAKE CLOUDS.

This study developed a simple understanding of condensation through the formation of clouds. A jar was half-filled with very hot water and the lid was put upside down on top of the jar. Light powder was blown inside the jar and the lid was quickly put back on top of the jar. A plastic bag holding ice cubes was placed on the lid. The lights were turned off and the flashlight directed through the jar. Swirling clouds were seen by the condensed vapor with the droplets of water sticking to the sprinkled powder. We concluded that a cloud will be formed when warm air heated by the hot water comes in contact with the cold air cooled by the ice cubes on the lid. The water vapor will grab onto the powder before it can become water droplets.

1673

NATURAL REACTION BOOSTERS.
Alex Song, M. Simonds. Portola Magnet Center, 18720 Linnet Street, Tarzana, CA 91256.

This study investigated how the speed of a chemical reaction can be changed by adding a catalyst. For catalysts, enzymes from vegetables and fruits were used. A jar was filled with water and a baby bottle was nearly filled with hydrogen peroxide. The amount of peroxide was then recorded. A piece of red potato was cut into a cubic centimeter. It was placed into the bottle. The nipple and the cap of the baby bottle were then immediately tightened on and the bottle was turned invert into the jar. An hour later, the volume of the oxygen collected in the baby bottle were measured. It was measured by subtracting the amount of hydrogen peroxide remaining from the amount that was measured previously. The data was recorded. This experiment was done again with white potato, turnip, carrot, banana, pear, and avocado. The experiment was repeated 7 times on each of the enzyme catalysts. Red potato was the best enzyme catalyst. The results are not final, however. No decisive conclusion has yet been established.

1674

EFFECTS OF CLOROX BLEACH ON GROWTH OF RADISH PLANTS.
Ani Markarian and V. Der Megedichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This study examined the question whether Clorox Bleach would have a reaction on the growth of radish plants. Ten cups were used, Five being control cups and the other five being injected with five drops of Clorox Bleach every two days after the germination of the seeds. The same amount of water and light was given to every cup. The five radish plants that were injected with the Clorox Bleach slowly died. The results therefore suggest that the addition of Clorox Bleach to radish plants causes their termination.
1675

**BETTER INSULATION.** Armen G. Derian, Stephen N. Keoseian, Andre L. Petrosian and Anush Abrahamian (teacher). Ferrahian Elementary School, 5300 White Oak Avenue, Encino, CA 91316.

This study is to show that a thermos is better insulator than a towel. The items needed are 6 ice cubes, 2 paper towels and a well sealed thermos. Wrap 3 ice cubes in the paper towels, then put the other 3 ice cubes in the thermos and close the lid. Wait for about 15 to 30 minutes. Then check to see if the ice cubes in the thermos are melted and then check to see if the ice cubes in the paper towels are melted. Notice that the ice cubes in the paper towels are melted more than the ones in the thermos. This is because the thermos has better insulation than the paper towels.

1676

**EFFECTS OF A CANCEROUS SUBSTANCE ON SWEAT PEAS AND LETTUCE SEEDLINGS.**
Becky McCormick, Louise Komp (teacher). Ventura High School, 2155 East Main Street, Ventura, CA 93001.

This study examined the effects of a cancerous substance, the juice of decayed celery, on growing sweet peas and lettuce plants. After the seeds had germinated they were placed in an agar and fertilizer solution with or without the cancerous substance. Each experiment was repeated nine times for each plant. The plants grew for 2.5 weeks and smaller leaves were the only difference observed between the control and the plants in the cancerous solution. The results suggest that, within the constraints of this experiment, the test plants did not develop visible tumors after 2.5 weeks of growth.

1677

**TOO MUCH PRESSURE.**

This experiment lets us see that air pressure exists. A piece of stiff, flat cardboard was placed over the top of a glass, filled with water right to the top. The cardboard was held tight against the glass and turned upside down. The pressure of the air pushing up from the outside is greater than the weight of the water pushing down on the cardboard from inside. The cardboard was firm and flat and did not let air in and water out. Although we can't see the pressure, it presses down on us and everything around us.

1678

**THE EFFECT OF CIGARETTES ON THE GROWTH OF MUNG BEANS.**

This study examined the effect of cigarettes on the growth of mung beans. Each of three groups composed of six pots, with each pot containing six seeds, was watered differently. Group one was the control group with only water, group two's solution was 1.2 grams of the cigarette extract per cup of water, and group three's solution was 2.4 grams of cigarette extract per cup of water. The first week's total growth averaged 31.9 mm. for group three, 26.9 mm. for group two, and 24.0 mm. for group one. Group two started to grow at a faster rate than the other groups, and after one
month had longer, thicker roots and weighed an average of 2.98 grams. The average weight of group three was 1.95 grams and group one was 2.1 grams. In conclusion, a large amount of cigarette solution initially stimulates mung bean growth, however, a small amount will achieve a constant growth rate.

EFFECT OF ADDING POTASSIUM ON SEA URCHIN FERTILIZATION.

In this study the effect of potassium nitrate solution on the process of fertilization in sea urchins, *Lytechinus pictus* was examined. Three drops of potassium nitrate solution were added to sea urchin eggs before introducing the sperms. There were 3 control groups and 3 experimental groups. The control groups showed an average of 48.75% fertilization while the experimental group with the potassium ion solution showed an average of 56.00% fertilization. The results suggest that potassium ions favor fertilization in *Lytechinus pictus*.

MIDDLE ARCHAIC SUBSISTENCE: A COMPARISON OF FAUNAL REMAINS FROM QUASAR, KOSTER, AND PABST.
J. Lopinto, mentor: K. White, NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

The faunal subsistence of prehistoric peoples can be reconstructed by recovering, identifying, and comparing faunal data from relevant sites. Faunal data from Middle Archaic components at three sites in central Illinois are compared in order to evaluate the hypothesis that Middle Archaic faunal subsistence patterns do not reflect environmental settings, but rather a similar standard of resource selection. Faunal remains from the Quasar site, a stratified Middle Archaic site located on a natural levee of the Illinois River in Greene County, Illinois, are analyzed and compared to the Koster site, located at the base of the bluff on the Illinois River flood plain in Greene County, and Pabst, located in the prairie setting of the Salt Creek Drainage, in DeWitt County, Illinois.

EFFECTS OF WATER TYPE ON PLANT GROWTH.

The purpose of this study was to determine the effect of tap, instapure filtered, Arrowhead mountain spring lime flavored, ocean, chlorinated pool, and gray (soapy) water on green bean growth. With nine per water type, the green bean seeds were planted in a tablespoon of soil and grown for a 25 day period. Daily measurements of their growth were recorded. Tap water plants grew to an average of 4.2 inches, but the 8 that germinated in filtered water grew to 3.6 inches. In mineral water, they only grew to 5 inches on average, and the seed that did not germinate eroded. None of the plants in ocean water germinated. The chlorinated plants grew rapidly, but peaked on the 17th day at 4.7 inches, wilted to 3.7 inches, and grew again to 4.1 inches. Although those in the gray water grew to 4.9 inches, the root system and stem were not firm and only 8 of the 9 plants germinated. Based on the results, we concluded that the tap water is best for long-term growth of green bean seeds, and ocean water should not be considered.
THE ANALYSIS OF LATE WOODLAND AND MISSISSIPPIAN CHRONOLOGIES IN THE LOWER ILLINOIS RIVER VALLEY AND THE AMERICAN BOTTOMS USING CALIBRATED RADIOCARBON DATES.
S. R. Jemison, Mentor: Sarah Studenmund, Center for American Archeology, NSF Young Scholars Program, P.O. Box 366, Kamps Ville, IL 62053

The ability to date artifacts is the basis of archeology. Archeologists use these dates to create interpretations on how prehistoric humans lived and interacted with each other. It is not possible for archeologists to consistently form correct interpretations without a refined chronology. The objective of this paper is to calibrate radiocarbon dates from the Late Woodland and Mississippian cultures in the American Bottoms and Lower Illinois River Valley. It is hypothesized that the calibration of the radiocarbon dates will produce a significant change in the time phases that are presently used. These dates are more accurate than the dates generally used in the Midwest region because of the new emphasis on greater accuracy in dating. The dates are graphed to produce time phases closer to the actual dates than the time phases that are currently being used. This will help to provide archeologists with a more accurate time frame from which more accurate interpretations will develop.

DOMINANT AND RECESSIVE TRAITS IN THREE GENERATIONS.
A. Bennett and M. Simonds (teacher). Portola Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This study examined the genetic patterns of three generations in ten different families. I was trying to determine whether each of the traits I tested were dominant or recessive. The control trait, hair color, proved to follow already established genetic patterns, meaning that dark hair came out dominant and light hair recessive. Next, I had to test the five variable traits in order to determine my results in relation to my hypothesis. For variable "A", widow's peak, I hypothesized that having a widow's peak would be dominant, I was mistaken. Not having a widows peak was the most common, dominant trait. I was correct on both variables "B", (free or attached ear lobes) and "C" (straight or bent pinky fingers). Free ear lobes are dominant as well as having bent pinky fingers. According to the testing of variables "D" (tongue rolling) and "E" (tongue folding), I hypothesized correctly that the dominant trait lied in being able to roll your tongue and not being able to fold it. In conclusion, I am aware that some of my results may conflict with other proven patterns, but genetics is a very difficult topic to work with considering I did not have access to records of past generations and family members. Heredity seems to be too intricate of a study to determine facts using only three generations of ten families in five variables.

DO VARIOUS FRUIT JUICES AFFECT THE GROWTH OF VIOLAS?
A. Tuchman and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway Calabasas, CA 91302.

The purpose of this experiment was to evaluate the effects of various fruit juices on plants. Apple juice, grape juice, pineapple juice, and cranberry juice were used to determine their influence on the growth patterns of violas. Every other day for six weeks, mixtures of 1/2 cup of the individual juice and 1/2 cup water were fed to a total of twenty plants (five plants for each mixture). This procedure was repeated for the apple juice, grape juice, pineapple juice, and cranberry juice. One
cup of water was also used as the control and was fed to five other plants every other day for six weeks as well. Apple juice along with the grape juice quickly killed the plants within three weeks. The pineapple juice produced a sticky film which remained on top of the soil. This film had a high concentration of sugar. It appeared that this sugary film killed those plants within two weeks. The plants watered with cranberry juice survived longer than the ones watered with other juices, but ended up dying after a month. The control plants grew beautifully and outlived all the others. Therefore, these particular juices not only did not enhance the growth of the violas, but actually stunted and killed these plants. It would be fair to say that the un-enhanced water provided the healthiest nourishment for the violas in this experiment.

TESTING WATER QUALITY.
Suzy Melkoun, Mrs. Der Megechichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316.

The quality of water was tested by finding the amount of oxygen gas and carbon dioxide gas dissolved in water. Two types of water were used, bottled and tap water. To each water, Solution A (48% Manganese sulfate) was added and swirled. Then the same was done with Solutions B (70% Potassium hydroxide/15% Potassium iodide), C (Concentrated Sulfuric acid) and D (2% starch). After Solution D was added, a blue color appeared. Afterwards, Solution E (.31% Sodium thiosulfate) was added until each became colorless. Then the amount of Solution E drops were calculated to see when it became colorless. The results were, 10 drops of Solution E needed for the bottled water and 16 drops of the same solution needed for the tap water. The procedure was repeated to test for the presence of carbon dioxide. Phenolphthalein solution was added to each sample. Tap water formed a light pink color and stayed pink, therefore no carbon dioxide was present. However, two drops of Sodium hydroxide added to bottled water changed the color to pink. The results suggested that bottled water contained more oxygen and carbon dioxide.

REGENERATION OF PLANT ROOTS.
Brent Stem, A. Morton (teacher) Calabasas High School 22855 W. Mullholland Hwy., Calabasas CA 91302

This study examined the possibility of regeneration of a plant's roots after separation from them. Three segments of the house plant Pothos were cut off and planted three inches deep in soil. Each segment was placed in a separate pot. Two more segments were placed in water. Segments planted in soil include: part of the stem structure, one leaf and one leaf attached to the stem. The segments placed in water were one leaf and one leaf still attached to the stem. Each pot was watered thoroughly and placed next to a window. Each week the bottoms of the segments were examined to see if any root growth appeared, while the segments with the leaf still attached sustained themselves, in soil and in water, they did not grow or regenerate their roots. All of the other segments died. This experiment was conducted three times, and in all experiments the results were the same. My conclusion is that regeneration of a plants roots might be possible but only if the stem and leaves are intact.
AN EXAMINATION OF JERSEY BLUFF WARE ATTRIBUTE: AN EXPERIMENTAL ARCHAEOLOGY APPROACH.
L. J. Williams, mentor: M. Miller, NSF Young Scholars Programs P.O. Box 366, Kamps ville, IL 62053

There are many attributes used to classify ceramics. When an attribute is not accurate it makes it very difficult to fit the pottery into a chronological and/or cultural period, making it impossible to answer questions related to the pottery. One of the many attributes used to categorize Late Woodland, Jersey Bluff Ceramics is vessel color (Farnsworth 1991). This experimental research project tests the use of color as a typeable attribute for classifying this ware. The results of this project revealed that the color of the fired vessels was dependent not on the various clays and tempers utilized, but on the fixings themselves.

GAS EXCHANGE IN MICROORGANISMS.

The purpose of this study was to observe if microorganisms take up oxygen from the environment or release carbon dioxide. In bean water, bacteria was grown and three drops were added to Bromothymol blue solution. A yeast mixture was also made from yeast and boiling water, and three drops were also added to the Bromothymol blue solution. Bromothymol blue can detect if carbon dioxide gas is present. If so, Bromothymol blue will change color from its normal blue to a greenish blue, yellow or orange. The same number of drops of the same bacteria and yeast were added to Methylene blue solution. Methylene blue can detect if oxygen has been used. If so, Methylene blue will change color from its normal blue to a very light blue or a colorless condition. In the second set, drops of oil were added so that the Methylene blue solution can be sealed from the oxygen above. After 24 hours the experiment showed that both bacteria and yeast exchanged gases by either using up oxygen or releasing carbon dioxide.

WATER ROCKET.
Steve Ouzouhian, Alex Gasparian, and A. Abrahamian (teacher). Holy Martyrs Ferrahian Armenian School, 5300 White Oak Avenue, Encino CA 91316.

This experiment proves that all machines need energy to make them go. You will need: a plastic bottle, a rubber stopper, a bicycle pump, and an air valve. First, make a small hole through the rubber stopper with a pin or a skewer. Then push the air valve through the stopper. Then, pour water into the bottle until it is about one-third full. Push the stopper tightly into the neck of the bottle. Attach the bicycle pump to the air valve, ask an adult to hold the bottle and start pumping. Caution: This rocket is very powerful and could hurt people seriously if it hit them. Always fly the rocket outdoors in a wide empty space well away from roads. Never fly rocket near other people. Don't stand over the rocket as you pump it up. Keep off to the side.
DETERMINING THE OPTIMUM RANGE OF pH FOR THE COMMON GOLDFISH.

This experiment was designed to determine an acceptable range of pH for the common goldfish, Carassius auratus, to live in. The experiment consisted of three different test groups. In each group, there were three fish in order to repeat the experiment three times. A sulfuric acid solution was used to lower the pH in the first group, and a sodium hydroxide solution was used to raise the pH in the second. The third group was the control. pH measurements were taken at 4:00 PM on a daily basis. The fish were fed following the pH tests. The natural pH of the water was approximately 7.3, which remained the stable measurement for the control. When changing the pH, four drops of the proper solution were dropped each day into two of the bowls, excluding the control. In the first group, where the water became acidic, one fish died at a pH of 6.4 and two others died at 5.8. In the second group, where water became basic, two died at a pH of 8.2 and the last one died at 8.4. All of the fish survived in the control group. The results suggest that the pH range for the optimum survival of goldfish is between 5.8 to 8.1, although the safest environment would be a pH of 7.0. It is known that certain environmental factors, such as acid rain, can change the pH of water. Understanding the effects of these factors can help to study their impact on the immediate ecosystem.

EFFECTS OF GIBBERELLIC ACID ON THE GROWTH AND DEVELOPMENT OF ONION SEEDLINGS.
A. Proudian, Mrs. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316.

This study examined the question of how the plant hormone gibberellic acid (GA3) affects the growth of onion seedlings. The controlled experiment consisted of three separate onion seedlings. Gibberellic acid wasn't added in the first (control). For the second, gibberellic acid and water were diluted (50% GA3, 50% water). For the third, 100% GA3 was used. The plants were watered every other day with equal amount of water (1/2 cup) and were placed under equal amount of sunlight. They were of same height at experiment's start (5cm). The experimental group’s leaves were covered with little pieces of cotton. Each received a drop of either 50% GA3 or 100% GA3 depending on the group it belonged to, respectively twice a day. The control seedling grew 2cm, the one with the diluted hormone grew 5 cm., and finally the one with the 100% hormone grew 8cm. Therefore, gibberellic acid causes the onion seedling to grow.

THE ATLATL VERSUS THE BOW AND ARROW: THE BATTLE OF KAMPSVILLE.
J. Lin, L. Wilburn, mentor: J. Pomfret .Center for American Archeology, NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

Possible reasons why the bow and arrow replaced the atlatl in North America between 1200 and 1500 b.p. is the subject of this comparative paper. A series of controlled experiments were conducted to examine differences between the two weapon systems in range, accuracy, and penetration. The interpretation of the experimental data will provide important information about the two weapon systems and their transitional development. The bow and arrow proved better in range and accuracy tests but the atlatl proved better than the bow and arrow in penetration tests. Although no actual tests were done, ease of use in cover is also discussed.
THE RELATIONSHIP BETWEEN HUMUS AND EARTHWORMS IN THE SOIL.
Jessica Gottlieb, and M. Simonds (teacher). Portola Middle School, 18720 Linnet Street, Tarzana, CA 91356.

This science project examines the relationship between humus and earthworms in the soil. The purpose of this study was to discover the effect of earthworms on humus levels in soil. More specifically, it measured how much humus is produced by earthworms in a three week period and what type of organic matter is most effective in creating a nourishing environment for humus production. The first step in my experiment was to fill six tubs with peat moss, two each with three types of organic matter, manure, grass and leaf cuttings, and food scraps. I then placed twelve red worms (*Helodrilus foetidus*) in three of the tubs, leaving three tubs as controls. Every three days, I recorded my observations of each tub and noted in-depth comparisons in a journal. On these days, I also tested the six tubs for humus content with a scientific humus test kit. The experiment showed that manure produces the highest levels of humus and grass the lowest, while food creates slightly higher levels of humus than grass. I also discovered that the soil with worms became darker, richer, and more homogenous than the soil in the control tubs. However, significantly high levels of humus were not exhibited at the end of the three week period. These results suggest a significant and positive relationship between earthworms in soil and the production of humus.


The purpose of this study was to determine the glucose storage, if any, of a radish without its leaves. There was a total of four groups of radishes including one control group. The first group's leaves were continuously cut after first sprouting. Every two weeks later the next group of radishes would be dealt with in the same manner while the control group never had its leaves cut off. We repeated the experiment three times with a total of 150 radish plants. The results proved that for every additional week with leaves, glucose storage in the radishes increased, resulting in a bigger radish bulb. These results suggest that the leaves are the source of production and distribution of glucose in the radish.

TOLERANCE OF SUNFLOWER SEEDS TO SALT.

This study was to see the possible effects that different salt water solutions had on the growth of sunflowers. 20 seeds were first soaked in either the salt solution or distilled water for a day. In total: 120 seeds were soaked in *water which acted* as the control. 180 seeds were soaked in *different salt water solutions of .1%, .3%, and .4% salt*. After soaking, the seeds were planted in groups of 20 in separate containers. The seeds were watered for 16 days with the solution with which they were soaked. The experiment was run three times with two controls for each percent of solution. For the control the height of the plants ranged from 1-14cm, and the percent of germination was about 50%. For the .1% solution the range of height was 5-1 6cm, and the percent of germination was also at 50%. At .3%, the height was .5-13cm, and the percent of germination was 25%. At .4%, the range of the height was .5-9cm, and 20% was the percent of
OSMOSIS AND IMBIBITION OF WATER.
Chris Vanderpuil, Kapil Mahendra, and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

The purpose of this study was to determine how osmosis and imbibition occur. To test osmosis, two potatoes were used. A cavity was made in each potato. One was filled with corn syrup and the cavity was sealed with a rubber stopper which had a glass tube through it. A potato with water was prepared also. The potatoes were placed in beakers filled with water. Observations were made every five minutes for two hours. The potato with the water stayed the same, but the potato with the corn syrup rose a few centimeters. To test imbibition two containers were used. Characteristics of the beans were recorded. One container was placed in water and stood for 24 hours and doubled in size. The second container had dry seeds and stayed the same. Characteristics were recorded. The results of the osmosis experiment showed that water moves from an area of great to low concentration. The imbibition experiment showed that water is absorbed by a seed in order to germinate. These experiments were performed three times and the results remained constant.

EFFECTS OF ETHANOL ON MUSCLE FIBER.

This study examined the question of possible chemical inhibition of rabbit muscle tissue by a 1% solution of ethanol and water. In a comparison to the effects of an ATP and salt solution, the ethanol solution was found to be minimally inhibitive in the three trials. Measurement of the muscle fiber before (4 mm) and after addition of ATP and salt (2.5 mm) and ethanol (3 mm) and both collectively (2.25-2.5 mm) implies the inhibition as the solutions cause the muscle to fray. The inconsistent results suggest that the size of drops of ATP and salt and ethanol were also inconsistent. Further testing should be carried out on other tissue to determine whether the muscle reacted to the ethanol in the same way as the ATP and salt solution or the muscle's shrinkage was due to dehydration resulting from addition of ethanol.

EFFECTS OF VARIOUS LIGHTS ON PLANT GROWTH.

The purpose of this experiment was to determine the effects of various types of artificial lights on plant growth. Bean plants were placed in equal soil types, pot size, planting depth and with equal water rations. Our control sample was placed in the sun, with the plants under the experimental variables in a specialized plant light, incandescent light, red colortone light, and fluorescent light. We put one plant in each of these types of lights. We found after 42 days that the bean plant under fluorescent light reached nine inches in height with three sets of leaves; the bean plant under red colortone light reached a height of ten inches with three sets of leaves; the plant in incandescent light reached 15 inches with four sets of leaves; the plant in plant light reached 15 inches with five sets of leaves; while the control sample (sunlight) reached a height of 16 inches with four sets of
leaves and two flowers. Therefore, while sunlight works best for plant growth, artificial plant lights are the next best source of light.

A COMPARISON ON THE BURIAL OF DISARTICULATED BONES IN MIDDLE WOODLAND BURIAL MOUNDS TO THE BUREAL OF SIX SKULLS FOUND IN FEATURE 1 OF MOUND 3 AT THE ELIZABETH SITE.
Robert J. Scott, mentor: Jane E. Buikstra, NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

A general problem encountered during the excavation of burial mounds is the scattering of disarticulated bones. The significance of these bones is usually not determined. Feature 1 in Mound 3 of the Elizabeth site contained only the skulls of six adult males all of which showed no sign of curation. The significance of why only the skulls of the deceased were placed in the trench is one such problem that was encountered. The hypothesis for this research is that Feature 1 is unique to this Middle Woodland mound. For this research a literary analysis of the Elizabeth, Kamp, and Gibson Mound groups was conducted comparing the burial of the skulls to the burial of other disarticulated bones. The burial of the six skulls is indeed unique to this Middle Woodland burial mound. The significance of this research was to study the mortuary behavior of this culture. Studying mortuary behavior gives us the chance to develop a model of a culture's social structure and the events that were happening at the time.

MOLECULAR ADHESION MODELING USING DERIVITIZED BEADS.
L. Danakian, P. Narguizian (teacher). Rose and Alex Pilblos Armenian School, 1615 N. Alexandria Ave. L.A., CA 90027

This study was designed to examine the molecular adhesion effects of specific molecules. Carbohydrate/lipid and carbohydrate/glycoprotein combinations were studied. Twenty different carbohydrates derivitized to agarose beads were used in this study. To test for adhesion, first two microslides were taken. One drop of distilled water was placed on each end of one microslide. One drop of salt water was placed on each end of the second microslide. Toothpick tips were used to place carbohydrate beads on one side of each microslide, and the lipid/glycoprotein on the other. Using 10x magnification, the beads were observed for self-adhesion. Then the two drops of water on each microslide which contained agarose beads, were mixed and observations were recorded. Each test was repeated 3 times to reduce experimental flux. The results obtained indicate negative adhesion between each carbohydrate and lipid/glycoprotein tested. From previous experimentation and practical applications of adhesion properties, it is assumed that pH and ion concentration play a role in adhesion. In the near future, further experimentation will be conducted to determine the role of these factors in molecular adhesion.

THE EFFECTS OF THE GIBBERELLIC ACID HORMONE ON PLANT GROWTH
P. Yemenidjian, V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

This study examined the question of a gibberellic acid extract influencing the growth of ten day old Phasealus leguminosae bean plants with similar Phasealus leguminosae bean plant grown in water. Each ten day old bean plant was placed in two identical beakers, one filled with four ounces of water and the other in four ounces of 1:1000 concentration of gibberellic acid. The plants were
allowed to grow within a ten day period with daily checks for growth change. Both plants showed recognizable growth over the ten day period, although the bean plant grown within the gibberellic acid showed a greater amount of growth. Once the ten day period was completed the bean in the acid grew 4.2 mm over the leaf stem and the bean grown in water grew 3.7 mm. The results suggest that plants grown within the gibberellic acid hormone showed a quicker and greater amount of growth than in the control of water.

**1702**

**WHICH FOODS WILL CAUSE YEAST TO RELEASE THE MOST AMOUNT OF CARBON DIOXIDE?**
Bahram Namdari and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302.

The purpose of this study was to determine which foods would cause yeast to release the greatest amount of carbon dioxide. The experiments were repeated three times and the results were consistent. First, a yeast culture was produced by adding a tablespoonful of dry yeast to a cup of warm water. Then a tablespoon full of the solution was put into each of ten empty medicine cups. There was also a cup of just the solution to serve as a control. The solutions were flour, table sugar, sugar cubes, brown sugar, Equal, salt, milk, cooking oil, pancake syrup, and wheat starch. After that the cups were stirred with a clean straw. The cups were checked to see if any cups would react at normal room temperature. Then the cups were put in an oven heated to 150°F. After one minute the cups were checked for the presence of foamy bubbles of carbon dioxide. The cups were put back in the oven for an additional five minutes and were checked again. The results indicated that flour reacted the best at normal room temperature with the yeast culture. After the cups were put in the oven for one minute sugar reacted the best with the yeast culture. After the cups were put in the oven for five minutes sugar reacted the best with yeast culture. As a result of my experiment, I conclude that sugar produces the most carbon dioxide and alcohol with the yeast culture.

**1703**

**CAN LIMESTONE BE USED TO PROTECT COLLARD PLANTS FROM ACID RAIN?**

The purpose of this study was to determine if limestone could protect collard plants, *Doracea acephala*, from a simulated acid rain solution during a five week period. The acid rain solution consisted of 1% concentration of sulfuric acid and 99% concentration of water. Forty-eight collard plants were divided into 4 experimental groups consisting of 12 plants in each group. The plants were fed accordingly to their experimental groups. Once every 2 days, the plants were given 20 ml of either water, sulfuric acid solution, or both, depending on their group. Once every week, limestone was applied to the soil of the plants. Group 1 received limestone and sulfuric acid solution. Group 2 received limestone and water. Group 3 received sulfuric acid solution, while group 4, the control, received only water. The limestone in the soil of group 1 protected the plants from the simulated acid rain solution. The limestone in group 2 nourished the plant and helped it to become healthy and tall. The plants in group 3 became very malnourished and wilted gradually from being exposed to the sulfuric acid. The control group survived well under their normal conditions. After repeating this experiment 3 times, the results suggest that the limestone did, in fact, protect the plants from the simulated acid rain solution. These results can be applied to everyday life in the sense that limestone can help protect any plant in the world where acid rain is a problem.
EFFECT OF AN INHIBITING SALT AGENT ON THE FERMENTATION OF SUCROSE WITH ACTIVE YEAST.

This study examined the inquiry of possible salt, sodium chloride, obstruction in the normal fermentation process of sucrose, \( C_{12}H_{22}O_{11} \), with active brewer's yeast fungi. As the control, 7 g. of yeast was combined with 118.3 c.c. (4 ounces) of warm water and 9.9 c.c. (2 teaspoons) of sucrose. The experimental mixture combined the previous ingredients, but also added 4.45 c.c. of salt. After being stirred vigorously, the yeast was allowed to perform fermentation—after anaerobic respiration. The mixtures were each monitored at 15 minute intervals for 1 hour. (This experiment was then repeated four times to insure accurate readings.) Following the reaction, the height of the foam produced—indicating the amount of carbon dioxide produced in glycolysis—was measured in centimeters, averaged, and compared. The mixture containing glucose, water, and yeast rose an average of 12 cm, while the experimental agent caused the foam of the second mixture to only rise an average of 4 cm. Thus, the mixture with the inhibiting agent, salt, caused an average 66% reduction factor. These results suggest that sodium chloride does, in fact, hinder the yeast cells during fermentation, at least in some way. Further study must be done in order to determine whether or not salt inhibits glycolysis, fermentation itself, or simply the normal functions of the yeast cells.

SITE CATCHMENT ANALYSIS OF JERSEY BLUFF AND STIRLING PHASE SETTLEMENTS IN THE LOWER ILLINOIS VALLEY: THE NATURE OF MISSISSIPPIAN EXPANSION
R. P. Chan, mentor: Dr. M. W. Allen, NSF Young Scholars Programs P.O. Box 366, Kampsville, IL 62053.

Site catchment analysis of the Audrey site, "a bona fide isolated Stirling phase Mississippian village in the Lower Illinois Valley (Farnsworth et al. 1991:117)," suggests that the Mississippian societies in the American Bottoms, namely Cahokia, infiltrated the already existing Late Woodland cultural area for sociopolitical reasons as opposed to subsistence concerns. Analysis of the catchments of vegetal resource zones, which entails constructing circles of varying radii around a settlement to identify its potential economic resources, is used to test the hypothesis that Audrey was settled by Mississippian colonists, due to concerns other than maximizing agricultural potential. The site catchments of Audrey are atypical of Mississippian villages/towns as they contain high percentages of unarable land, and the site is a considerable distance from permanent lakes. The resemblance of Audrey catchments to a nearby Late Woodland site, instead of the catchments of Stirling phase third-line communities and other sites in the American Bottoms, can be viewed as evidence for mutual dependence of the Mississippian colonists with pre-existing local Late Woodland Apple Creek populations. Previous models of Mississippian entrance into the Valley to export food to Cahokia are not borne out by this study. This investigation into the nature of Mississippian expansion provides anthropologists with a unique opportunity to view culture contact and a case of a complex culture's attempted entrance into a densely inhabited region.
EFFECTS OF HIGH CO₂ ON SNAPDRAGONS  A.B. Siegel and M. Simonds (teacher). Gaspar De Portola Highly Gifted Magnet Center, 18720 Linnet St., Tarzana CA 91356

Because of fossil fuel burning, carbon dioxide levels are increasing in the atmosphere. In this experiment I attempted to find out the effect of high levels of carbon dioxide on plants. I sealed two groups (experimental and control) of snapdragon plants in Sparkletts water bottles. I added dry ice to the experimental to add carbon dioxide and I added regular ice to the control to counter the effect of the cold produced by the dry ice. After 6 days I measured the plants. The results of the first experiment supported my hypothesis that the CO₂ would reduce plant growth but I felt that the excessive cold caused by the dry ice could have been a factor in the outcome. I therefore did another experiment which was the same except that the dry ice was not placed near the plants. Instead the dry ice was placed in a container 2 meters away from the plants. There was a 2 cm diameter tube to carry the CO₂ from this container to the plants in the experimental group. I also placed thermometers to monitor the temperature in the bottles. Temperature did not differ in the experimental and control groups. However, plant growth was reduced in the high CO₂ group as in the first experiment. I conclude that high levels of carbon dioxide slow plant growth.

BIOCHEMICAL GENETICS.  
S. Hauss, J. Kim, N. Chung, A. Chaudron, and A. Morton (teacher). Calabasas High School, 2285 Mulholland Highway, Calabasas, CA 91302

The purpose of this study was to determine which fruit/vegetable had the highest acidity and which had the highest level of starch. Litmus paper was used to determine the pH and iodine was used to detect starch. Various fruits and vegetables were ground up and each one was tested 3 times. The pH of the fruits/vegetables varied, with lemon having the lowest pH of 3. When iodine was added, many of the fruits/vegetables did not show a change in color, but the one with the most dramatic change was the parsnip, which turned a very dark purple. The results show that the lemon has the highest acidity and that the parsnip has the highest level of starch.

EFFECTS OF SOAP ON SEA URCHIN FERTILIZATION.  
N. Todd, A S Hickman, and B. Van Duzee (teacher) Saugus High School, 21900 Centurion Way, Saugus, CA 91350

In order to better understand soap’s validity on sea urchin Lytechinus pictus insemination, a soap solution was interpolated with the gamete unification. A drop of 1:10 ratio of soap to water solution added to a sample of sperm in 8.0 pH artificial sea water, and then the eggs were added. After the experiment had been repeated a second time, the results were recorded and the percents calculated. The soap proved to be a spermicide to the Lytechinus pictus, with fertilization percentages of the test at 59% +/-29.5%, while the control group’s was 88%+/-6%.
AN ANALYSIS AND CLASSIFICATION OF THE FEATURES PRESENT AT EVIE, A LATE WOODLAND JERSEY BLUFF PHASE SITE
Elizabeth M Norris, mentor: Harry Murphy. NSF Young Scholars Programs P O Box 366, Kampsville, IL 62053

Traditionally, it has been assumed that the identification of feature functions will reflect a site's purpose. In order to test this assumption, this analysis identifies feature function and type at Evie, a Late Woodland Jersey Bluff phase site located in the Lower Illinois Valley. Definitions of four feature types are developed after close investigation of the Dohack (Stahl et al, 1985) and Leingnang (Bentz et al, 1988) site reports. The completely excavated Evie features are then classified according to these developed definitions. The Evie data was unlike the four other Late Woodland sites included in this comparison. Since only three percent of Evie was excavated, there is an insufficient amount of data to determine the site's purpose or adequately test the hypothesis.

MUSIC COMPOSITION RECOGNITION USING FOURIER TECHNIQUES
Kyle Jamieson, Mrs. Mary Yenmans (Teacher). Hopewell Valley Central High School, 259 Pennington-Titusville Road, Pennington, NJ 08534-1615

The purpose of this project was to recognize and extract musical notes, given a series of digital samples at a musical composition. The solution to this problem was implemented in object-oriented Borland C++ using the Microsoft Windows operating system. The program operates as follows: the data are read from disk into memory, and a Fast Fourier Transform (FFT) is performed on small sections of data. An analysis is performed on each resultant section of data to find the frequencies that contribute most to the perceived sound. After this process is complete, the data exist as a list of values representing the frequencies of the notes being played in each of many small sections of data. The list of values is then scanned for neighboring elements that are equal. These elements are then grouped together.

Next, the average length of the shortest group of list elements is found, and all of the groups are equated to a musical note of the closest frequency and duration. The data are then outputted to the user on a musical stave. The program is also capable of performing many types of graphical analyses of sound files, including graphing a musical composition in time, in frequency, and in frequency as a function of time.


This study examined the question of what effect baby oil has on sperm-egg interactions in the sea urchin Lytechinus pictus. One drop of baby oil was pipeted on the sea urchin eggs. Next the sperm was put on the eggs and baby oil. There was a 0% fertilization rate. The experiment was repeated 3 times. The results were the same all 3 times. The control values were at 83%-3%. The results suggest that baby oil is able to stop the fertilization of sea urchin Lytechinus pictus eggs.
CHLOROPLAST PIGMENT ANALYSIS. Adrine Reganian, Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA. 91316.

This study examined the different colors and position of the pigment on the Chromatogram and the amount of each pigment. Pigment was removed from spinach by boiling it in water and then by boiling it in ethyl alcohol. Then the spinach was reheated and squashed until the alcohol solution became a dark green color. The Chromatogram chamber was assembled with the filter paper placed in a test tube by a thumb tack. The filter paper was notched near the tip and the tip just touched the bottom of the test tube. The pigment was placed at the center of the end of the filter paper several times, and placed in the test tube with alcohol solvent only touching the tip of the filter paper. The results were: different pigments reached different heights on the filter paper. The first color was 1/3 inches high from the bottom which was Chlorophyll (a) bright green. The second color was 1/2 an inch which was Chlorophyll (b)-dull green color. The third was 1/3 inch which was xanthophyll-bright yellow. The last color was an inch which was Caroten-orange.

Whitney Moeller, mentor: Michael Strezewski, Center for American Archeology, NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

The Audrey site is a Late Woodland and Mississippian habitation site located in the Lower Illinois Valley. It proves to be a unique site because there is evidence for possible simultaneous Late Woodland and Mississippian occupation of the site and because it is the only known Stirling Phase village in the Lower Illinois Valley (Farnsworth et al 1991). This permits analysis of the interaction between the Late Woodland and the Mississippian people as well as the economic relationship between the Audrey site and the American Bottom. It has been suggested that Audrey served as a venison procurement site for urban centers such as Cahokia. White-tailed deer bone from three blocks were examined. These included two from the Mississippian and one from the Late Woodland areas of the site. This possibility was tested by examining element representation, the minimum number of individuals (MNI), and the food utility index (FUI). The Jersey Bluff region of the site had a higher density of deer bone than the Mississippian region, as well as a higher percentage of burned and calcined bone This indicates a possible smoking pit area located in block 5 but the analysis of the FUI did not confirm the expectation that the Audrey site served as a butchering site.

GLOBAL EFFECTS OF FOSSIL FUEL COMBUSTION
M. Kaufmann, A. Laghai, S. Wright, N. Loebs, teacher: D. McDonnell, Sherman Oaks Center For Enriched Studies, 18605 Erwin Street, Reseda, CA 91335

This study examined the effects of \( \text{SO}_2 \) on the environment. Three artificial greenhouses were constructed using one liter soda bottles and flexible tubing. Soil, chalk, clam shell, and a one inch potted marigold plant were placed in two of three greenhouses. The other excluded the plant to represent a deforested environment. The deforested greenhouse and one of the forested greenhouses were subjected daily to high levels \( \text{SO}_2 \) and \( \text{CO}_2 \). It was shown that after 2 weeks the experimental greenhouses exhibited the following: the soils were dry, the chalk became flexible
and unstable, the shells appeared the same, the water became acidic (pH 3.0), the plant became chlorotic. The control greenhouse showed none of the above characteristics. The effects of high levels of SO$_2$ and CO$_2$ were reversed with one week of normal conditions.

**1715**


This study was done to see if there is a way to kill bacteria without the use of antibiotics. We grew *Staphylococcus* and *E. Coli* by mixing each of them in a trypticas soy broth and a Mcfarland standard 0.5. Then we spread 1 microliter of solution on a petri dish prepared with blood agar that consisted of 5% sheep's blood and agar. Then we put the dish in a 5% carbon dioxide incubator that had a temperature of 35°C. After 24 hours the dishes were taken out and refrigerated so we could see the results. We tried each possible inhibitor 4 times. The substances that inhibited *E. coli* were bleach, vitamin C, mustard and vinegar. The substances that inhibited Staph were olive oil, bleach, toothpaste, mustard and vinegar. The substances that had no effect on either bacteria were apple juice, basil tea, cranberry juice and baking soda. We concluded that bacteria can be killed without antibiotics, but if you are ill you should see a doctor.

**1716**

DECOMPOSITION. J.N. Lee, M.S. Upadhyay, and B. Van Duzee (teacher), Saugus High School, 21900 Centurion Way, Saugus, CA 91350

This study examined the effects of yeast on food decomposition. Two slices of bananas were put into separate plastic bags. Next 1/2 a teaspoon of yeast was added to one of the slices. After one week the banana slice covered with yeast showed the most and fastest decomposition. It was found to be very mushy and expanded. The control banana looked almost the same except for the fact that is was a little dehydrated. The experiment was repeated 4 times. Since the yeasts did not have chlorophyll, they had to depend on the banana for food. The yeast feeds on the banana, causing it to decay.

**1717**

THE EFFECTS OF DIFFERENT ENVIRONMENTS ON PLANT GROWTH. Michael Yu and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy, Calabasas, CA 91302

The purpose of this experiment was to see if and how different environmental factors affect the way a plant grows. To do this, spinach and snow pea seeds were planted, every type in three different plastic cups. Each pair of spinach and snow pea cups were placed in a different environmental setting. One set of cups was placed inside, right next to a window, receiving a significant amount of sunlight. Another set was placed in a closet without any light. The last two cups were placed outside with a moderate amount of sunlight. The snow pea next to the window grew thick and healthy with several leaves branching out. The snow pea outside grew skinny and weak with only a few leaves. Also, the snow pea in the closet grew up very skinny but died in about three weeks. The spinach near the window grew nice and thick, while the spinach outside was weak and short. Finally, the spinach inside the closet grew about four inches but died during the third week. These results suggest that a warm, well-lighted environment is a much better place for a plant to live. Plants receiving moderate amounts of sunlight need to grow tall so they can find
more light to carry on photosynthesis. Plants without any light will grow very skinny and search for light the first few weeks. After the food supply runs out from the seeds, the plant cannot carry on photosynthesis and will die.

THE OF CORE REDUCTION STRATEGIES AT A LATE WOODLAND JERSEY BLUFF SITE
M. Serrano, mentor: M. P. Purtill, NSF Young Scholars Program, P.O. Box 366, Kampspeville, IL 62053

Recent archeological research has generated a number of hypotheses regarding the material culture of Jersey Bluff populations (AD 800-1200) in the Lower Illinois River valley. One such hypothesis predicts that these populations would have utilized a generalized core reduction strategy (Studenmund et al 1995). Specifically, it argues that Jersey Bluff settlements should be characterized by a large percentage of intensively reduced cores. This paper investigates the validity of this hypothesis by examining the core assemblage from the Late Woodland Jersey Bluff phase Evie site, situated in the Lower Illinois River valley. In order to accomplish this goal, I used a core typology based on technological variables. This typology was employed because it provided a systematic classification and can be replicated by other archeologists. The results in this study support the hypothesis that Jersey Bluff populations at the Evie site intensively used a relatively large number of cores. Moreover, the distribution of cores suggests that these tools were used in variety of on-site locations. Accordingly, it appears that these cores were utilized as curated items by Jersey Bluff populations as further suggested by the hypothesis.

EFFECTS OF SALT WATER ON THE GERMINATION AND EARLY GROWTH OF A PLANT.

This investigation searched for the effects, if any, of salt water on nasturtiums *Tropaeolum majus*. Seeds of the plants were soaked in and watered with water with a concentration of .05% or .1% salt. There were a total of six control groups, six experimental groups with .05% salt, and three experimental groups with .18 salt. Each group consisted of 20 seeds. Three control groups never germinated. Neither did three of the .05% experimental groups. Of the groups that did germinate, four of them only sprouted. The other five groups grew and flourished. This led us to the conclusion that the salt water did not have a great effect, if any, on the germination or early growth of the nasturtiums *Tropaeolum majus*.

CAN PEA PLANTS TOLERATE SALT WATER?

This investigation tests if bush pea plants can tolerate small amounts of saltwater. The four sets of 20 Bush Pea seeds we planted were first soaked then watered with distilled water; these were control. Three sets of 20 Bush Peas we planted were soaked and poisoned with a mixture of .2g of salt and 100mL of distilled water. Three sets of 20 Bush peas we planted were soaked and watered with a mixture of .5g of salt and 100mL of distilled water. We took down the avg. height and avg. mass for all plant experiments on the last day of the observation. The four control groups’ average height was 7.5cm, and the average mass was 1.52g. The average height for the 2% experiments
was 6.8cm, and the average mass was 1.19g. The average height for the 5% tests was 5.57cm. and 5.5cm, and the average mass was 1.2g. The conclusion that we have come to is that salt does effects the growth of Bush Pea plants in most cases because the controls were all taller than the salt experiments.
THE EFFECT OF DIFFERENT LIGHT INTENSITIES ON THE GERMINATION OF SEEDS.
N. Redjal and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway Calabasas CA 91302.

The purpose of this investigation was to determine how different light intensities affect seed germination, the development of a seed into a plant. Three different plants were used in the experiment three times throughout my investigation. These plants are *Raphanus sativus* (radish), *Pisum sativum* (pea), and *Phaseolus vulgaris humilis* (bean). The different light intensities that were used on the plants were a 100 watt light, fluorescent light, indirect light (which is sunlight that has been somewhat blocked by the window), and no light at all. The plants were all watered the same, kept in the same room temperature, and were kept basically in the same environment to obtain an accurate result. During my observation of these plants, I noticed that the one with no light grew very tall but did not have any leaves and was white. I discovered that the plant grew tall because the plant was searching for light. After researching I also found that it was white because no light refracted off it. In the 100 watt light I observed the plant becoming a little wrinkled. Under the microscope I noticed that the chloroplasts were shriveled due to the heat of the light. The fluorescent plant was not growing as fast as the other plants and was looking rather pale. I found that this happened due to the occurrence of the low intensity of the light. The plant with indirect light grew very well. I concluded that the indirect light was the best for these plants.

EFFECTS OF SODIUM CHLORIDE ON THE GROWTH OF *ZEA MAYS*.

The objective of this study was to determine what type of an effect salt water would have on the growth and development of *Zea mays* (corn seeds). We conducted our experiment using a control of distilled water and two different salt solutions, .05% and .3 %. Twenty seeds were planted into both the control and the experimental pots. The control seeds were watered with distilled water and the experimental seeds with the salt water solutions. Each salt concentration had different effects. In the case of the .05% salt concentration experiment, both the germination rate (100%) and the height (13cm) were the same as the control. That was not the case with the .3% salt concentration experiment. The control group had a 100% germination rate and an average height of 6.5cm while the experimental group's germination rate was approximately 77% and it's average height was 4.3cm. In conclusion, we observed that a very low salt solution such as .05 % did not have as great of an effect on the growth and development of the *Zea mays* as the .3 % solution did. It is fair to say that the salt water did alter the growth process of the corn seeds. Three separate experiments were run and all of them confirmed with this fact. These results are conclusive.

A COMPARISON OF EVIE SITE FEATURES WITH OTHER LATE WOODLAND SITES IN CENTRAL ILLINOIS.
J. Biringer, mentor: H. Murphy. NSF Young Scholars Program, P.O. Box 366, Kamps ville, IL 62053

Archeological research has suggested a similarity in feature types and feature type ratios among Late Woodland sites. This investigation's main objective is to first develop well-defined definitions for the feature types that are commonly found in Late Woodland sites. These definitions are
developed from the Late Woodland, Dohak and Leingang site reports. These definitions are then applied to the features at the following sites: Illinois Crossings, Joan Carrie, Alpha 3, and Deer Track. The results are used to test the following hypothesis: the shared cultural and subsistence strategy among the Late Woodland peoples will be reflected in similar distributions of feature types among Late Woodland sites. With the exception of basin hearth types of features, no other feature type is distributed in similar proportions among Late Woodland sites used in this comparison. The hypothesis was not supported.

**EFFECTS OF MUSIC ON YOUR MEMORY.**

J. Kim and M. Simonds (teacher). Portola Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This experiment was to solve the question if a certain kind music would effect our memories. There were three tests. The tests required twenty 7th grade students to memorize a list of twenty items in two minutes. On a separate piece of paper, the students were to write down all the items they could remember from the list. On the first test, the students did not listen to any music while taking the questionnaire. This was the control. The second and third tests were the variables. The students listened to rap (Gangster's Paradise) for the second test. For the third test, they listened to classical music. From the results, they suggest that we listen to classical music rather than rap or loud, boisterous music when remembering important dates, events, and names etc.

**A STUDY OF MISSISSIPPIAN SOCIAL AND STRUCTURAL ORGANIZATION AT THE AUDREY SITE THROUGH ANALYSIS OF WALL TRENCH STRUCTURES.**

L. Senchyshyn, mentor: Dr. M. Allen. N.S.F. Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

The Audrey site, located in Greene County, Illinois, illustrates a unique example of Mississippian culture introduced into the Late Woodland dominated Lower Illinois Valley. The social and structural organization of the Mississippian component of the site is studied through analysis of the Stirling phase wall trench structures at the site. The functions of each structure, their relationship to the entire site, the status of the site, and evidence of a social hierarchy are discussed based upon comparisons to similar Stirling phase sites and to Cahokia. It is hypothesized that the site represents a complex civic node (Emerson 1995) with residential, specialized, and communal structures, which possessed a social hierarchy. This social hierarchy is illustrated by numerous exotic items found within a high status residence. The Audrey site represents, both structurally and socially, a complex Stirling phase Mississippian community of short duration located within the Jersey Bluff occupation of the Lower Illinois Valley. The Audrey site proves to be a rare opportunity to study prehistoric culture contact, cultural resistance, and political hegemony.

**A YEAST POPULATION STUDY.**

Michael Zadorian and Mrs. V. Der Megerdichian (teacher). Holy Martyrs Feralhian Armenian High School, 5300 White Oak Avenue, Encino, CA 91316.

This study on yeast population was done to determine changes in yeast growth from 0 hours to 120 hours, changes such as its most rapid growth, its slowest growth, and its peak. A Bunsen burner was used to melt nutrient agar in a Pyrex beaker. The nutrient agar was poured into three sterile petri dishes. Yeast was put in the petri dishes and it was grown at room temperature for 120
hours. The progress of the yeast growth was checked once every 24 hours. The most rapid growth period was from 24 to 48 hours. Its slowest growth period was from 0 to 24 hours. Growth continued until 72 hours. Then the growth started slowing until reached 120 hour limit.

EXAMINING THE EFFECTS OF IRON AND CALCIUM ON SEA URCHIN FERTILIZATION.

This experiment examined the effect of iron and calcium 600mg on the fertilization process of the sea urchin Lytechinus pictus. After repeating the control experiment 8 times the fertilization rates were found to be at 95%±4%. In four tests it was found that a .08 M iron concentration reduce fertilization rate to 6% +2%. After adding the sperm the majority of the cells lost cohesion, and simply fell apart. In an effort to saturate the solution with iron the molarity was increased to .16, it was then found that the fertilization rate decreased to 0%+.0%. Calcium was then tested at .17M. All the sperm and eggs disappeared, a fertilization rate of 0%+-0%. The same results as the iron test, it was repeated 4 times. The iron and calcium both make effective inhibitors of the fertilization of Lytechinus pictus. The iron was found to be used up in the reaction. Further testing is needed to find if the calcium is used up in the inhibiting process.

COMPARISON AND CONTRAST OF QUASAR SITE TEST AREAS BASED ON FAUNAL ANALYSIS.
S. J. Krueger, mentor: K. White. NSF Young Scholars Programs P.O. Box 366, Kampsville, IL 62053

During 1991, 1992 and part of 1993 the Center for American Archeology field school excavated at the Quasar archeological site, a stratified Middle Archaic shell midden located on the east bank of the lower Illinois River Valley in Greene County. It is hypothesized that faunal remains at Quasar lead to identification of activities within an area. Animal taxa from test units in the center of the site which have few shell remains are compared to tests units located along the perimeter of the site which contain a large concentration of shell deposits found in pit and pile features. Differences in bone preservation and modifications are also considered. The hypothesis proved true showing two separate activity zones. The information gained from this project will benefit the further study economic patterns during the Archaic period.

ENZYME ACTION.

In this experiment the action of catalase enzyme on different tissue was examined by observing the test tubes to see if the tissues react to the solution (hydrogen peroxide). This is a controlled experiment. The materials used in this experimentation were 8 test tubes, hydrogen peroxide, unboiled and boiled, chunk and chopped, carrot, liver, potato, and muscle. In 8 of the test tubes, half of it was filled with hydrogen peroxide and unboiled and chunk and chopped carrots, potato, liver, and muscle were placed also. Observing the amount of bubbling (oxygen gas) in each test tube using a scale 010: Unboiled tissue carrot (chunk) 3, (chopped) 2, liver (chunk) 10, (chopped) 10, potato (chunk) 6, (chopped) 7, muscle (chunk) 9, (chopped) 9. In the unboiled experiment the
liver had the most bubbling with chopped and chunk. In the 2nd experiment boiled tissue: carrot (chunk) 0, (chopped) 0, liver (chunk) 8, (chopped) 7, potato (chunk) 2, (chopped) 1, and muscle (chunk) 10, (chopped) 9. There results suggest that chopped and chunk unboiled tissues react faster than chunk and chopped boiled tissues.

EFFECTS OF DIFFERENT COLORED LIGHTS ON SEED GERMINATION.
Justin Horn and S.B. Minassian (teacher). Schurr High School, 820 N. Wilcox Ave., Montebello, CA 90640

The purpose of this experiment was to test whether or not different colored lights (red, regular) would have an effect on the germination of radish seeds. My hypothesis was that the radish seeds under the red light would not germinate as successfully as the seeds under regular light. The experiment consisted of placing 20 film containers full of planting soil, radish seeds and fertilizer into 2 different buckets. One bucket had a regular fluorescent light and was the "control" bucket and the other had the same factors except that a plastic red translucent sheet of paper was placed on top of the film containers. The lights were turned on continuously for 24 hours and the plants were watered once every 2 days for a period of 2 weeks. After 2 weeks, the "control" seeds under regular light grew into big, green and healthy looking plants while the other seeds under red light barely even grew at all. This proves that different colored lights and the size of their wavelengths do indeed have an effect on seed germination.

EFFECTS OF CHEMICALS ON WHITE BUTTERFLIES.
Raffi M. Bulanikian and Mrs. V. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian High School. 5300 White Oak Ave., Encino, CA 91316.

In this study the effects of bleach, ammonia, and Armor All were investigated on white butterflies, Nephesitus plant. Eight plant groups were used of which two were control and the others each of two groups were added one half teaspoon of each of the chemicals mentioned above. After four days the plant with bleach lost its color and turned light yellow, the plant with ammonia collapsed and the plant with armor all stayed the same and didn't show any effect. This showed that the white butterfly plants responded to different chemicals differently.

THE IMPLICATIONS OF NONMETRIC TRAIT ANALYSIS OF SKELETAL REMAINS EXCAVATED FROM A UNIQUE MIDDLE WOODLAND BURIAL MOUND
G.R. Maslow, mentor: Dr. Jane E. Buikstra, NSF Young Scholars Programs P.O. Box 366, Kampsville, IL 62053

During the Middle Woodland period, six adult male skulls were interred in the central burial of Mound 3 at the Elizabeth Mounds Group. This type of burial is apparently unique for Middle Woodland mounds and for this reason promises to provide much information concerning social and mortuary activities during this time period. This research focuses on the genetic relationships between the skulls and the remainder of the mound population, in an effort to test five hypotheses which explain the circumstances surrounding the skulls interment. Nonmetric trait analysis is used to determine these genetic relationships and to provide a basis for the assessment of each hypothesis. Determining the circumstances surrounding the burial of the six skulls promises to provide a better understanding of life during the Middle Woodland period.
HOW MUCH SUN EXPOSURE DO YOU GET?
R. Levitt, J. Stott and A.P. Munsch (teacher). Henry Middle School, 17340 San Jose Street, Granada Hills, CA 91433.

A survey was made on how much sun exposure people allowed themselves. A total of 294 people were surveyed. In analyzing the results, I concentrated on those who were very pale skinned. In this survey group, two people surveyed reported that they had skin cancer. 4% allowed themselves to burn often, 12% sometimes let themselves burn, 81% responded that they sometimes let themselves tan (both reported skin cancers were in this response group). There was a typographical error in the survey questionnaire, listing two D's, one of which was supposed to be an E. The first D's response was "you sometimes let yourself tan in the sun". The second D's response was "you always use sunscreens so you almost never tan and never burn". This may have affected the results. 4% responded that they always used sunscreens so they almost never tanned or burned. The results suggest that most very pale skinned people are concerned about limiting sun exposure, even though both skin cancers were in this category.

AN OBJECTIVE EVALUATION OF THE UTILITY OF FLAKE ANALYSIS OF ARCHEOLOGICAL SITES.
S. Lee, mentor: M.P. Purtill, NSF Young Scholars Programs P.O. Box 366, Kampsville, IL 62053.

Archeologists are increasingly acknowledging the importance of debitage analysis because of the abundance, imperishability, and information contents of flakes recovered from archeological sites. However, a definite set of variables that can be used in flake analysis has not yet been agreed upon. An experiment was set up to isolate the most advantageous attributes. A set of quantitative variables (i.e. the length, width, thickness and weight of the flake) and a set of qualitative variables (i.e. the type of platform, flake type) were chosen to be used on a mass analysis of flakes. The flakes used in the study were retained from the experimental replications of three tool making episodes: a core reduction, biface production, and biface resharpening. The qualitative attributes which were found to be the most advantageous were then applied to a flake study of the Evie site, a Late Woodland Jersey Bluff site. It was found that it is difficult to rely solely on applying experimental archeology directly to a site study due to uncontrollable events that may occur post-depositionally. Such events may include trampling, flakes being taken out of the assemblage for use, or the different technique of production of each individual flintknapper (i.e., style).

EARTHWORM BEHAVIOR.
Raffi M. Bulanikian and Mrs. V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School. 5300 White Oak Ave., Encino, CA 91316.

This study examined earthworm behavior in two ways. Response to light and response to gravity. A piece of cardboard with a dark cover on it was placed on the earthworm to observe how many of the worms' anterior ends would be in the dark or the light part. Three out of four were in the dark part. The experiment was repeated and this time a line was drawn on the cardboard. The worms' anterior ends were on the line, one out of four worms moved in front of the line, the others stayed on the line. The experiment was repeated with the same cardboard and a 10° angle. The two worms moved up and two went down. The result suggests that earthworms respond positively to darkness and
DOES LIGHT AFFECT THE AMOUNT OF OXYGEN PRODUCED BY GREEN PLANTS?
Hrug DerManuelian, V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino CA 91316.

This experiment examined the question of light and its possible connection to the production of oxygen in green plants. Elodea was placed in two different test tubes filled with water. Two 250ml beakers labeled dark and light were filled with water. Then, the two test tubes were placed in the beakers and placed in similar conditions for four days. Four days later, the test tubes were removed from the beakers. A wooden splint that had been ignited and rapidly extinguished was used to test the presence of oxygen gas. The experiment was repeated three times. The results suggested that the Elodea placed in the lighted condition produced oxygen gas while the Elodea placed in the dark condition did not produce oxygen gas.

EFFECTS OF DIFFERENT LIGHT ON PLANT GROWTH.

This experiment examined the ways four different light environments - direct sunlight (S.L.), indirect sunlight (I.S.L.), fluorescent light (F.L.), and dark light (D.L) - effect plant growth. For this study I used spicy globe basil as the specimen. I placed the seeds about 1/4 inch below the soil level, and one inch apart from each other. Using ordinary tap water, I watered the plants almost every day (sometimes the plants did not need water). Scheduled germination was 8-10 days and, on the seventh day, I noticed small buds growing in the plants in S.L., I.S.L., and F.L. The plant in D.L. began growing on the ninth day. By the twentieth day, half of the stems of the plant in D.L. had fallen over. In summary, the results of this study showed that the plant in S.L. grew the best, while the plant in D.L. grew the worst.

CONDUCTING ELECTRICITY.
Andre L. Petrosian, Stephen N. Keoseian, Armen G. Derian and Anush Abrahamian (teacher). Ferrahian Elementary School, 5300 White Oak Avenue, Encino, CA 91316.

This study on conducting electricity proves that metal is a conductor of electricity. We got four batteries and made a circuit from which two wires were connected to a light bulb. Then we cut one of the wires so that we can connect the edges of the cut wires to a metal knife. If the bulb lights up, that proves that the metal knife is a conductor of electricity. After testing it, we noticed that the bulb lit up. When we tested on wood, the bulb did not light up. We proved that metal is a conductor of electricity and also proved that wood is not a conductor of electricity.

EFFECTS OF ACID ON BRASSICAS.
Mike Ma, David Kim, Marlene Natamihardja. Saugus High School, 21900 Centurion Way, Saugus, CA 91350

The objective of this experiment was to observe the possible effects that acid has on a plant called Brassica rapa. Twelve seeds were each placed in a small film capsule with a wick protruding to tap
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water. About half an inch of fertilizer was added to each capsule and were later placed in the sun to grow. After twelve days of undisturbed growth, each plant measured to be about ten to twelve cm in height. On that twelfth day, one drop of hydrochloric acid (0.1M) was added to three of the twelve plants (group A), and one drop of vinegar (1M) was added to another three of the twelve plants (group B). The remaining six plants, which were now our controlled group (group C), continued to grow with no acid added to them. Every other day, for eight days, a drop of hydrochloric acid was added to each of the plants in group A, and a drop of vinegar was added to each of the plants in group B. Three days after hydrochloric acid was first added to group A, the leaves of the plants began to turn yellow. After four more days, the plants turned completely yellow, and the tips of the plants were now brown. A week later, all of the plants in group A became completely brown and died. Three days after vinegar was first added to Group B, nothing happened. About a week later, the leaves began to turn yellow, and in about another week, all the plants in group B died. The plants in group C still continued to grow even after both, groups A and B were no longer existing; they reached a height of about fourteen cm. From this experiment, we can conclude that even at different pH levels, acid can have a potentially deadly effect of plants. For future experiments similar to this, we recommend testing all pH levels of acid to determine the length of time it takes for each to kill each plant.

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EFFECTS OF VARIOUS TYPES OF MANURE ON SNAP DRAGON GROWTH.

The purpose of this study was to determine which type of animal feces: horse, cow, dog, cat, or chicken is most effective in enhancing the growth of snapdragons, Antirrhinum majus. Weekly, 40 ml of specified manure was placed on the plants and 125 ml of water was added to each plant as needed. Three plants were used for each type of manure. The plants fertilized with cow manure had the most significant growth with an average of 89.4 mm over the seven weeks the experiment was conducted. The plants fertilized with horse manure grew an average of 83.6 mm. The plants fertilized with chicken manure grew 71.1 mm. The plants fertilized with cat manure had an average growth of 69.3 mm. The control group, plants given only water and no fertilizer, grew 58.1 mm, and plants fertilized with dog manure grew an average of 50.8 mm. The results suggest that cow manure contains the highest amount of nitrates. Nitrates are constituents of amino acids, various proteins and coenzymes, nucleic acids, and chlorophyll, all of which are important in the survival/development of a plant; thus, plants given the cow manure had the greatest increase in development.

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HOW MUCH FATTY MEATS AND DAIRY PRODUCTS ARE IN YOUR DIET?
Jason Oliver and Benjamin Kim, G.M. Sorensen (Teacher), Henry Middle School, 17340 San Jose St., Granada Hills, CA 91344

The purpose of this research was to see who ate the most fatty meats and dairy products in various age groups. There were 285 people in this survey. 7 stated that they had cancer (5 skin cancer; 1 colon cancer, 1 basal cell cancer). 74% of those under the age of 20, ate fatty meats and dairy products occasionally or once a day. 59% of those between the ages of 20 to 39, ate fatty meats and dairy products occasionally or once a day (2 reported skin cancers). 55% of those between the ages of 40 to 59, ate fatty meats and dairy products occasionally or once a day (1 reported basal cell cancer). 50% of those over the age of 60, ate fatty meats and dairy products occasionally or once a day (1 reported skin cancer). To the same question, 8% of those under the age of 20, 7% of those between the ages of 20 to 39, 15% of those between the ages of 40 to 59 (1 reported skin cancer).
cancer), and 41% of those over 60 (1 reported skin cancer), never eat meat and dairy products. From this study, most people have limited their intake of fatty meats and dairy products to once a day or less. Those over 60 had the highest response to not eating meats and dairy products. Of the reported cancer cases, skin cancer is not associated with intake of fatty meats and dairy products. The colon cancer was reported for a person over 60 whose intake of fatty meats and dairy products was once per day.

**EFFECTS OF SALT ON THE GROWTH OF SUNFLOWER SEEDS.**


This study examined how salt-water and distilled water affect the growth of sunflower seeds. Our salt concentrations were .2 % and .4 %. Forty sunflower seeds were gathered. Twenty were soaked in distilled water and the other twenty were soaked in salt-water overnight. We then planted the seeds in soil, twenty seeds per container. We watered the plants daily, watering one container with distilled water and the other with salt water. Each experiment was repeated six times. The average height of the plants watered with distilled water was 13 mm. The average height of the plants watered with salt-water was 9mm. The results suggested that salt-water has a negative effect on the growth of the sunflower seeds.

**USING DIFFERENT CHEMICALS TO DETERMINE PLANT GROWTH.**

Mike Najarian, V. Der Megerdichian (teacher). Holy Martyrs Ferahian Armenian High School, 5390 White Oak Ave., Encino, CA 91316

This study examined the comparison between a normal growth of plant with the growth of plant when chemicals in 409 cleaner is added. In 6 plastic cups rye seeds were planted and given the same amount of water and sunlight. Then, 3 of the plants were used as control and the other 3 were experimental. For the experimental plants, chemical 409 was added once a day. After 4 days the results showed that the chemicals in 409 cleaner had killed the rye plant.

**THE DENATURATION OF COMMON PROTEINS.**

S. Bailey and A. Morton (teacher). Calabasas High School, 2285 Mulholland Hwy., Calabasas, CA 91302

The purpose of this experiment was to determine if common proteins have different temperatures at which they denature. A saucepan of egg whites, primarily made of the protein albumin, was set on a stove at medium heat. Then a candy thermometer was placed in the saucepan to show the temperature at which the egg whites began to change their texture & consistency, meaning the protein was denatured. This procedure was repeated with reconstituted nonfat dry milk, consisting of casein protein. A small clump of hair, composed mostly of the protein keratin, was placed in the center of a cookie sheet, covered with a piece of aluminum foil. An oven thermometer and the cookie sheet were put into an oven. The temperature was slowly increased up to 200° F for 30 minutes. The oven temperature was then increased in 50° intervals until the hair texture began to change. In three tests with the egg whites, they began to denature at 93°F, 97°F, and 105°F. The reconstituted nonfat dry milk lost form at 150°F, 156°F, and 168° F. In the examination of the hair, it denatured at 333°F, 325°F, and 340°F. The results suggest that the proteins albumin, casein, and keratin denature at different temperatures.
EFFECTS OF FOOD ON YEAST GROWTH.
Justin Strauss and Marcia S. Dains (teacher). Arroyo Seco Junior High School, 27171 Vista Delgado, Valencia, CA 91354

This study examined how the growth of yeast is affected by different foods provided. A teaspoon of yeast was put in each of twelve jars. In four of the jars, one and one half teaspoons of sugar was added. In another four, one and one half teaspoons of salt was added and in the last four jars nothing was added. A cup of water measuring 75° Celsius was added to each of the twelve jars and the contents were mixed thoroughly. The jars sat for one hour after which observations were made. The jars with the sugar as food bubbled up and created a foam two centimeters tall. The yeast with the salt gathered toward the middle and did not change its physical appearance-no foam was created. The yeast with nothing to feed upon was very loose and did not change its physical appearance; no foam was created. The conclusion is that sugar provided the best food source for the yeast.

EFFECTS OF AGE, SEX, AND SMOKING ON THE VITAL CAPACITY OF THE HUMAN LUNGS.
D. Sevanesian and V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, Ca. 91316.

My controlled study of the vital capacity began with the interviewing of 4 people per category and having them blow into a balloon and converting the diameters into mL. The categories were non-smoker males forty and above, smoker males 40 and above, female non-smokers 40 and above, female smokers 40 and above. The same investigation was carried out with the age group of 18-25. The results suggest that non-smoker males have a greater vital capacity than smoker males in both groups, males tend to have a greater vital capacity than females in both groups, and the age group of 18-25 had a greater vital capacity than the age group of forty and above.

EFFECTS OF VARIOUS CHEMICAL FERTILIZERS ON SNAPDRAGONS.

The purpose of our experiment was to demonstrate the difference in growth and flowering of plants by controlling the nutrients given to them. We grew snapdragons and regulated the amount of nutrients they received by adding four different diluted fertilizers to several individual plants, while watering a control group with only water. The names of the fertilizers are: Bandini Sul-Po-Mag, Bandini Superphosphate, Bandini Urea, and Bandini Super Bloom. Every other day the plants were watered with a solution that contained one tablespoon of fertilizer for every gallon of water, and the results of height and budding were recorded. Keeping in mind that uncontrollable outdoor conditions such as temperature and amount of sunlight also determines the plants growth and health, we hypothesized that the plants watered with Super Bloom would flower the quickest, and that the plants watered with Sul-Po-Mag would grow at a quicker rate than the other plants. However, the results showed that Superphosphate, which contains phosphate, promoted quicker flowering, while Urea, which contains nitrogen, promoted the growth of the snapdragons. Because these results contradict our original beliefs, we proved our hypothesis to be incorrect.
ANALYSIS OF LITHIC DISTRIBUTION AND SITE STRUCTURE AT THE EVIE SITE.
K.E. Tew, mentor: M.P. Purtill. NSF Young Scholars Program P.O. Box 366, Kampsville, IL 62053

Recently, a number of archeological investigations have suggested that by the later phases of Late Woodland (ca. A.D. 1000), settlements in West-Central Illinois and the American Bottoms were becoming more complex and structured (e.g., Conner 1985: Stafford 1994). It is proposed in this study that Lower Illinois River Valley settlements occupied during the Late Woodland Jersey Bluff time period (A.D. 800-1200) also demonstrate such organization. Because previous studies have shown that lithic analysis can provide useful information regarding site organization (e.g., Purtill 1995), this study examines the spatial distribution of lithic artifacts at the Evie site, a Jersey Bluff occupation in the Lower Illinois River Valley. To accomplish this goal, this paper identifies the range of on-site activities through a systematic examination of lithic density maps. The results from the analysis showed that Jersey Bluff sites were organized in specific ways.

CALIFORNIA COASTS: TESTING FOR FECAL CONTAMINATION IN OUR WATERS.
Akiko Fujii, Katie Kane, Yashih Wu and A. Morton (teacher). Calabasas High School, 2285 W. Mulholland Highway, Calabasas, CA 91302.

The purpose of this experiment was to examine coastal waters for the presence of coliform and Escherichia coli (E. coli), an anaerobic bacteria commonly found in the large intestine of warm-blooded animals. Their presence in coastal waters indicates fecal contamination. Numerous tests were done on water collected from four different beaches. Ocean water samples were diluted with mineral water in a 1:100 ml ratio and placed in test tubes containing Colilert-MW (Colilert-Marine Water), a product which stimulates the growth of coliforms. Following 24 hours of incubation, at 95° F, the water will turn yellow in the presence of coliform. If the water fluoresces when exposed to a U.V. fluorescent lamp, it signifies the presence of E. Coli. However, no alterations of color were noted. We concluded that our coasts may not be as polluted as surmised.

SEED ADAPTATIONS. Ari Apelian, Mrs. Der Megerdichian (teacher), Holy Martyrs Ferrahian High School, 5300 White Oak Ave., Encino, CA 91316

This experiment raised the question if different conditions affect seed growth and development. Four different sets of radish seeds were used. The first set was boiled in hot water. The second was left in cold water. The third was used as a control. And the fourth was scraped separately on sandpaper. Each set was wrapped in moist paper towels, put in a plastic bag, and set aside for 48 hours. The results favored seeds in cold water, and seeds that were scraped. In conclusion, radish seeds grow better in cold water and if they are scraped.

EFFECTS OF SALT AND SUGAR ON FREEZING OF WATER.
Feng-Wei Hu, D. Shah (teacher). Portola Highly Magnet Middle School, 18720 Linnet Street, Tarzana, California 91356.

This study examined the possible effects of sugar and salt on the freezing time of water. Salt was put mixed in with 50 mL of water, sugar with 50 mL, and the control was just 50 mL of water.
The time it took to freeze was recorded. This was repeated 3 times. The control took about 3 hours, 10 minutes ± 5 minutes. The salt water took about the same time as the sugar which was about 2 hours, 45 min. ± 10 minutes. The results suggest salt and sugar speed up the freezing time of water.

EFFECTS OF CARBON DIOXIDE DEFICIENCY ON PLANTS.

The purpose of this experiment was to test the effects of the lack of carbon dioxide on plant growth. Two valerian plants were placed in separate systems composed of six, two-liter bottles containing water or water and calcium hydroxide solutions. Forced air was pumped through these systems by means of an aquarium pump. The air that passed through the containers with the 5% calcium hydroxide solution had all carbon dioxide removed. The plants were left to grow for seventeen days during which, observations were made of the plant's growth patterns. At the end of this time period, leaves from each plant were removed and tested for the presence of starch by means of an iodine tincture starch test, which would signify if photosynthesis had been occurring recently. The results suggested that leaves from the plant grown without carbon dioxide were unable to photosynthesize as suggested by their negative starch test. At the same time, the leaves from the control plant gave a positive starch test signifying the importance of carbon dioxide in a plant's atmosphere for photosynthesis. In conclusion it can be stated: if grown without carbon dioxide in the air, plants will not be able to photosynthesize and will eventually die.

SOMETHING'S FISHY IN THE L.A. RIVER.

In this six-month study, we observed the fish in the L.A. River. The objective is to locate the habitat and classify each of the fish present. The first step in reaching this goal was to visit the river and hunt for them. In September, we brought home a few specimens from the same species to further examine. They are thriving in an aquarium located at school. Because we want to see the fish in their natural abode, we only searched for the fish, rather than catching and killing them. With only a minnow seine, we were able to find two different types of fish. During December and January, no fish were observed or caught in the seine. When the winter rains came, much of the LA. River went downstream including the fish. The experiment is ongoing. Hopefully, more data in terms of fish count and variety will be collected as they re-populate this section of the river.

THE EFFECTS OF SULFUR DIOXIDE ON PLANTS.
M. Vernon and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302.

The purpose of this study was to determine the effects of sulfur dioxide on the growth of mustard seedlings. Sulfur dioxide is a major air pollutant in our society. Mustard seedlings were grown for two weeks in aluminum foil containers with potting soil. One of the containers of seedlings was then placed in a plastic bag with a cup of water and the other container of seedlings was placed in a bag with a cup of sodium bisulfite solution, which gives off sulfur dioxide gas. Then the appearance of both bags of seedlings was recorded. Thirty minutes after the seedlings were placed
in the bags the appearances were recorded again. After 24 hours from when the seedlings were placed in the bag their appearances were recorded once again. The experiment was repeated 2 more times. The results show that after 30 minutes there was no change in the appearance of the seedlings in both bags. However, after 24 hours the appearance of the mustard seedlings in the bag with sodium bisulfite solution was drastically different. The seedlings were of light green color and were all wilted and dying. These results prove that sulfur dioxide harmfully affects the growth of mustard seedlings.


This experiment was performed to see whether saltwater prevented or stunted the growth of Raphanus sativus. The experiment was run three times. Twenty plants were grown for each experiment and control. Trial one ran for 12 days and trials two and three ran for 16 days. The control groups of Raphanus sativus were watered with distilled water. The experimental groups were watered with various levels of saltwater from .05% to .5%. The exact concentrations were .05%, .2%, .3%, and .5%. Each day measurements of height and percentages of germination were taken. At the highest level of salt concentration, .5%, the experiment had an average of 15% germination. The control had an average of 4.7% germination. The heights for the control were 8.2 cm and the experiment height was 7 cm. Although the percent of germination for the experiment groups were better, the height of the experimental plants were substantially shorter than the control. This suggests that the percent of germination is not affected by the salt concentration although the height is affected.

LUNG CAPACITY OF ASTHMATIC PEOPLE PRIOR TO EXERCISE AND AFTER EXERCISE. S. Aratounians, V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316.

In this study lung capacity of an asthmatic person was studied. In a controlled experiment the vital capacity, expiratory reserve and tidal volume of a same aged male asthmatic person and a non-asthmatic person were recorded in four trials each and then averaged. This was done prior to exercise and after exercise. The average vital capacity, expiratory reserve and tidal volume of the asthmatic person prior to exercise were 21cm, 800cm and 200cm respectively. This resulted in average 1033.33cm³ lung capacity. The average vital capacity, expiratory reserve and tidal volume of the nonasthmatic person prior to exercise were 2550cm, 1500cm and 450cm respectively. This resulted in average 1500cm³ lung capacity. The average vital capacity, expiratory reserve and tidal volume of the asthmatic person after exercise were 1400cm, 350cm and 150cm respectively. This resulted in average 633.33cm³ lung capacity. The average vital capacity, expiratory reserve and tidal volume of the non-asthmatic after exercise were 2100cm, 650cm and 150cm respectively. This resulted in average 966.66cm³ lung capacity. The results suggest that people with asthma have less lung capacity than those who don't have asthma.
THE EFFECTS OF DEXTROSE, 1% ACETIC ACID, CALCIUM AND SALT ON STRONGYLOCENTROTUS PURPURATUS EGG FERTILIZATION.

We wanted to see the effects of dextrose, acetic acid, salt and calcium on the fertilization rate of Strongylocentrotus purpuratus. The test was done by adding a 1% dextrose solution, a 1% acetic acid solution, 1% sodium chloride solution and a 1% calcium solution separately to sea urchin eggs and then adding sperm. The percentage of fertilized eggs was then counted under 3 fields of the microscope at 100x and repeated 3 times for each added solution. Uncontaminated ocean water served as the control. Both acetic acid and dextrose caused a 13.6 decrease in the rate of fertilization. Sodium chloride caused a 12.3 decrease in the fertilization rate. Calcium caused a 12.8 increase in the fertilization rate. Since all substances except for calcium decreased the rate of fertilization, this suggests that only calcium helps in sea urchin fertilization.

TO TEST CARBON DIOXIDE IN YOUR BREATH.
Alicia Apelian, Houri Mahserejian and Talin Karagoeszian; Mrs. Anoush Abrahamian (Teacher), Holy Martyrs School; 5300 White Oak Avenue, Encino, CA 91316.

You can test your own breath for carbon dioxide. You will need a liquid called limewater that tests for carbon dioxide, safety glasses, a straw and a glass. Limewater turns into a milky white color when carbon dioxide is present in it. Pour some limewater into a glass. Blow through a straw into the liquid for several minutes. You will see that the water in the glass will turn into milkywhite, telling you, that the air you breathe out contains carbon dioxide.

PREFERRED QUANTITY AND TYPE OF SUGAR IN YEAST RESPIRATION.

The purpose of our study was to determine the ideal amount and form of sugar that yeast prefer to respire in. We chose to conduct two separate experiments. To begin each experiment, we massed 750mg of dry yeast. In the first experiment, 750mg of yeast were placed in each of 4 graduated cylinders. Then, 12ml of warm water and 18ml of granulated sugar were added to the first cylinder. Next, 15ml of water and 15ml of sugar were put in cylinder #2, 18ml of water and 12ml of sugar in the third, and in the fourth, 30ml of water and no sugar was placed. For the second experiment, 750mg of yeast were put in each of 4 cylinders. Fifteen ml of warm water was added to each cylinder. Then, altering the form of sugar used, 15ml of molasses, corn syrup, granulated sugar, and powdered sugar were added to different cylinders. Every cylinder from both experiments was placed in a warm, dark place. Over a period of 5 days, we observed and recorded the level of carbon dioxide bubbles that were produced by the yeast. We repeated these procedures three times. After closely examining the carbon dioxide buildup within the graduated cylinders, we observed that with little or no sugar added, the yeast failed to respire. The more sugar added, the more carbon dioxide was produced, until a certain level of sugar was added where the yeast stopped respiring. Our data also showed that yeast respire more efficiently in powdered sugar rather than molasses, granulated sugar, and corn syrup. Molasses proved to be the worst sugar environment for yeast colonies to respire in. The conclusion of our study is that yeast prefer to
respire in an environment with equal amounts of sugar and water, powdered sugar being the favored form of sugar.

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THE EFFECT ON PLANT GROWTH WITH DIFFERENT TYPES OF SOIL.
Youngjin Moon, M. Simonds (Teacher). Portola Magnet, 18720 Linnet St., Tarzana, CA 91356

My experiment tested which type of various different types of soil supported plant life the best from a seed to adult. Using beach sand, gravel, and mud, 3 radish seeds were grown in each type of soil. Each were given a same amount of sunlight and water daily, and growth progress was recorded over a two week period of time. The radishes in the mud were healthier and aprox. 4 cm taller in height then the radishes in the sand and aprox. 6 cm taller in height than the radishes in the gravel. This leads to the conclusion that mud, plain backyard soil is ideal for plant growing because of the high concentration of nutrients from decaying matter.

1764

DIFFUSION OF GASES.
Alice Geuydjian, Mrs. Dermegerdichian, Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91311.

This experiment was done in order to calculate the diffusion rates of gases based on the distance traveled by each gas. A few drops of HCL and Ammonia were placed onto cottonballs, each of which were applied on opposite ends of a 31 cm glass tube. Within two to three minutes a white vapor ring appeared where the two gases met and reacted. The distance between each side of the tube and vapor ring was measured. The experiment was conducted three times. On the average, the ammonia traveled 20.5 cm while the HCI traveled only 10.5 cm. The results suggest that ammonia travels about 2 times faster than HCI.

1765

EFFECTS OF HUMAN SPERMICIDE ON SEA URCHIN FERTILIZATION.

This experiment was designed to test the effectiveness of human spermicide, Nonoxynol 9 2.2%, on sea urchin eggs, Lytechinus pictus. Urchin egg were placed in a solution of 20°C sea water. Before the sperm was added, a drop of spermicide diluted in 20 ml of water was placed in the dish along with the eggs. After ten minutes the percent of fertilization was recorded. This experiment was repeated three times. The spermicide was shown to reduce the percent fertilization to 24%±4% while control values were found to be 98%±2%. The results suggest that fertilization is hampered by Nononoxyl 9 but the spermicide is unable to totally stop the process of fertilization.

1766

EFFECTS OF ARTIFICIAL LIGHT ON PHOTOSYNTHESIS.

This study examined the effect of artificial light on ready-grown plants and plant seeds. The purpose of the study was to find out if artificial light performs a negative or positive effect on the photosynthesis of plants compared to regular sunlight. A total of sixteen plants were chosen to
perform in this experiment. These plants were pansies. Pansies are C3 plants that cannot survive under dry or dark conditions. Of those sixteen pansies, there were two control groups and two experimental groups. Four plants were in each group. One control group contained four ready-grown plants that were placed in separate planters out in sunlight. The two experimental groups were the same plants except for the fact that they were held in a box lighted by a 60 watt bulb and where all other light is eliminated. The ready-grown plants were previously grown for several months under a florescent light, which is stronger and more effective than a 60 watt light bulb. The same conditions were held for all plants and the light was turned on only during sunlight. After two weeks, the plants inside the lighted box had grown from heights of 12.5 and 15 centimeters to 25 and 27.5 centimeters, while the plants kept outside were at about 17.5 and 20 centimeters. This was due to the change in habitat for the plants out in sunlight. None of the seeds had grown after two weeks. After four weeks were over, the plants in the lighted box had eventually died. The seeds in the box did not grow at all while the seeds outside grew to about 1/2 a centimeter. The plants died because the artificial light was not enough to supply the photosystems with the necessary light it needed, eventually killing off the whole photosynthesizing process for the plants. In conclusion, artificial light has a negative effect on the photosynthesis of plants compared to natural sunlight.

1767

ADULT ROBUSTICITY STUDY: A COMPARISON OF MIDDLE AND LATE WOODLAND POPULATIONS.
M. Krebs-Carter, mentor: J.E. Buikstra, Ph.D. NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

This study compares humeri and femora measurements from Late Woodland sites and Middle Woodland sites in the Lower Illinois River Valley. The objective is to determine if the shift to maize agriculture in the Late Woodland period affected skeletal robusticity or humeral asymmetry due to the decrease in overall health attributed to the sedentism and overcrowding associated with the onset of agriculture. Robusticity is a measure both of general health and an indicator of certain activities that cause bone to remodel. Maximum length and width were taken for both humeri and femora. Statistical analysis of the data revealed a few significant differences between the two populations. Female right humeri from the Late Woodland site were more robust than those from the Middle Woodland site, and males from the Middle Woodland site had more robust humeri bilaterally, as well as longer right humeri. This supports the hypothesis that the shift to maize agriculture made women more robust due to the increase in manual labor involved in the production and preparation of corn, but that it had the opposite effect on men as a result of the nutritional inadequacies of a maize-based diet. In addition, the humeral asymmetry present in Middle Woodland males disappears over time, as expected, perhaps due to the shift from the atlatl to the bow and arrow. These conclusions support the theory that the Late Woodland period was a time of high stress and decreased health due to the shift from a horticultural society growing native cultigens to an intensive agricultural society growing corn. This is anthropologically significant for populations worldwide that have undergone or are undergoing a shift to agriculture, as the problems experienced are likely to be similar to those of the Late Woodland people of the Lower Illinois River valley.
EFFECTS OF RUBBING ALCOHOL AND WITCH HAZEL ON RADISH SEED GERMINATION.
Lori Khajadourian, Mrs. V. Der Megerdichian, Holy Martyrs Ferrahian Armenian School 5300 White Oak Ave. Encino, CA 91316

The purpose of this study was to determine the effects of substances on radish seed germination. The study began with the planting of radish seeds in three containers. The first container was kept as the control and watered with only water, the second container was watered with both water and witch hazel and the third container was watered with both alcohol and water. The three plants were watered and measured every other day and all received equal amounts of water and sunlight. The results of the project showed that the addition of alcohol prevented the seeds from growing and witch hazel slowed down the growth.

DO HYDROPONICALLY CULTIVATED ALFALFA SPROUTS GROW BETTER IN A GREENHOUSE ENVIRONMENT?
L.M. Schiff and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302

The purpose of this study was to determine whether alfalfa sprouts grow better in a greenhouse environment than in an open environment. Five hundred seeds were placed on a length of cheese cloth in each of two growing containers. Water and a nutrient supplement were added to each. A plastic cover was placed over one of the containers to simulate a greenhouse environment. The two containers were placed in a sunny area for three weeks. During those weeks, additional water was added to each container when necessary and the nutrient supplement was added at regular intervals. The number of sprouts were counted at the end of each week. After one week, there were 346 sprouts in the covered container and 129 sprouts in the open container. After two weeks, the covered container held 383 sprouts and the open container held 237 sprouts. At the end of the three weeks, the covered container had yielded 391 sprouted seeds and the open container had yielded 249 seeds. The results suggest that more hydroponically cultivated alfalfa sprouts grow faster in a greenhouse environment than in an open environment. However, further testing would have to be done to confirm this.

HOW DO DIFFERENT SOURCES OF LIGHT AFFECT PLANT TRANSPERSION?
J. Brauner, T. Elfenbein, and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

The purpose of this experiment was to determine how different sources of light affect the rate at which various plant species transpire. Three Crassula Argentea (jade) plants, three fittonia plants, three Hedera Helix (ivy) plants, and three Gesneriaceae Saintpaulia (African violet) plants were placed in twelve plastic soda bottle bottoms and covered with the removable tops. One sample of each plant species was placed under the following three light sources for six hours: direct sunlight, an incandescent lamp, and a fluorescent lamp. After six hours, the water from the inside surface of each bottle top was collected and measured. The Crassula Argentea transpired 1 ml of water in direct sunlight, 0.8 ml in incandescent light, and an unmeasurable amount of water in fluorescent light. The fittonia plant transpired 1.8 ml in direct sunlight, 0.2 ml in incandescent light, and a few droplets in fluorescent light. The Hedera Helix transpired 1.5 ml in direct sunlight, 1 ml in incandescent light, and a few droplets in fluorescent light. The Gesneriaceae Saintpaulia transpired...
1.4 ml in direct sunlight, 0.1 ml in incandescent light, and a droplet in fluorescent light. The results demonstrate that sunlight impacts the rate of transpiration the most while incandescent light has a greater impact than fluorescent light.

### 1771

**WATER AND OIL WITH DENSITY.**
Stephen N. Keoseian, Andre L. Petrosian, Armen G. Derian and Anush Abrahamian (teacher). Ferrahian Elementary School, 5300 White Oak Avenue, Encino, CA 91316

This study shows that water has more density than oil. You will need one medium size jar, half a cup of cooled vegetable oil and half a cup of warm water. First pour the cooled vegetable oil in the jar and then add the warm water in the same jar. Whichever has less density will go to the top. We tried this project 3 times at home and 1 time at school. This project shows that water has more density than cooled vegetable oil. When you cool something, its density becomes more and when you heat something, its density becomes less. Even though the water was heated and the vegetable oil was cooled, the oil still went up showing that the oil is less dense than water.

### 1772

**TESTING WATER QUALITY.**
Tamar Buchakjian, V. Dermegerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak, Encino 91316

This study examined the quality of water by measuring the amount of oxygen and CO₂ gas dissolved in H₂O. 100mL of both tap and distilled water was obtained. Each water sample received 10 drops of 48% MnSO₄, 10 drops of 70% KOH/15% KI, 15 drops of concentrated H₂SO₄ and 5 drops of 2% starch solution. The color change was observed and the number of .31% sodium thiosulfate solution drops needed to turn the samples colorless was counted and converted to parts per million of dissolved O₂. It was concluded that 3.4ppm of O₂ dissolve in tap water while only 2ppm of O₂ dissolve in distilled water. Then 5 drops of phenolphthalein solution was added to different samples of tap and distilled water. The amount of CO₂ present was determined by counting the number of drops of sodium hydroxide needed to turn the sample pink. It was concluded that 5ppm of CO₂ is dissolved in distilled water but none in in tap water. These results suggest that more CO₂ but less O₂ dissolves in distilled water than in tap.

### 1773

**BIOTURBATION AT THE EVIE SITE.**
Matthew Maher, mentor: Kristen Bastis. NSF Young Scholars Programs P.O. Box 366, Kampsville, IL 62053

Bioturbation affects the formation of sites by causing artifacts to "sink" since earthworms and insects redeposit soil above the cultural material. It is hypothesized that bioturbation processes significantly impacted the Evie site, a Late Woodland site with Archaic components on the lower Illinois river valley. Specifically, it was expected that the smaller artifacts would be deeper than the larger ones. To test this, a 1x1 meter test unit was excavated with 100% of the soil collected into flotation bags, for total artifact collection. The artifact density was measured by taking 5 bags from the desired levels and floating them. This study at Evie is applicable to the lower Illinois and Mississippi river valleys and similar regions. It reminds archaeologists to consider the effects of bioturbation on artifact placement, as these can drastically alter our interpretation of the archeological record.
DO ALL PLANTS TRANSPIRE AT THE SAME RATE UNDER DIFFERENT SOURCES OF LIGHT?

A.J. Bauer, R. Balasubramanian and A. Morton (teacher). Calabasas High School, 22855 West Mulholland Highway, Calabasas, CA 91302

This experiment was performed in order to find the differences in the rates of transpiration of different plants under different sources of light. The amounts of transpiration from the polka dot plant, the jade plant, the African violet plant, and the ivy plant were all monitored under sunlight, white household lighting, a green light, and an amber light. The plants were first planted in the removable bottoms of plastic soda bottles to form a kind of convertible terrarium. One sample of each species of plant was then placed under each type of light source for twenty-four hours. This experiment was performed four times. In general, the most transpiration was released under natural sunlight. White light, amber light, and green light followed in that order. The African violet plant generally produced the most transpiration, and the ivy plant produced the least transpiration. The polka dot plant was closest to the African violet plant in amount of transpiration, and the jade plant was close behind. Based on this experiment, we can conclude that plants will transpire, and therefore grow faster, in natural sunlight.

ENZYMES OF DIGESTION: CONVERSION OF PROTEIN TO AMINO ACIDS.


The purpose of this study was to test for amino acids by breaking down protein, as in digestion. The experiment was conducted a total of 9 times, 3 times each with cheddar, cottage, and cream cheese used to represent protein entering the digestive system. Bacterial protease functioned as one of the several proteolytic enzymes present in the stomach and small intestine. A blended solution including 20 grams of cheese and 100 ml of water was prepared. Fifty ml of the solution was placed into each of two beakers, labeled A and B. One gram of bacterial protease was mixed into beaker A. After sitting for 2 minutes, 10 ml of solution from each beaker was filtered into separate test tubes and placed into a boiling bath. Ten to fifteen drops of ninhydrin solution were added to each beaker to test for the existence of amino acids (ninhydrin drops do not react with protein). Color changes were then charted after 2, 10, and 30 minutes for each solution. The test results indicated that filtering the solutions made variations in color less predominant than in the unfiltered solutions because filtration reduced the number of amino acids present. Results also showed that the ninhydrin drops had to be added after the protein had already been broken down. The reagent ninhydrin turned both solutions purple in the presence of amino acids. However, solution A was first to show results due to the organic catalyst which accelerated the rate of protein breakdown.

EFFECTS OF HOUSEHOLD SUBSTANCES ON PLANT LEAVES.

A. Bentow, and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy, Calabasas, CA 91302

The purpose of this study was to examine the effects of human products on the environment, namely plants. This examination was observed by coating leaves on an Escallonia X Exoniensis frades, a fairly strong plant, with chapstick, grease, liquid soap, motor oil, olive oil, pancake syrup, and vinegar. Separately with each substance, leaves were coated only on their top side, only
on their bottom side, on both sides, or not at all. The leaves with a substance on the bottom side, including leaves with a substance on both sides, fell off of the plants first, and leaves coated on the top side fell off second while uncoated leaves remained healthy and on the plant. Part of the reason for these results is that the stomata, openings through which the plants take in carbon dioxide, are located on the undersides of the leaves. The substances clog the stomata so that air cannot enter, but the plant still gets sunlight and water so the substances on the top sides of the leaves are not of much threat to the plant.

1777

ACID RAIN AND SEED GERMINATION.
Anna Modecki and Annie Daralgian (teacher). Chaminade College Preparatory, 7500 Chaminade Ave. West Hills, CA 91304

The purpose of this experiment was to study the effect of pollution (specifically acid rain) on the germination of wheat seeds. After soaking the 60 seeds for 8 hours, each 10 seeds were placed between layers of paper towel. Each towel was moistened with a solution of specific pH. The range of pH of the solutions was between 2 and 7 (control). The paper towels with the seeds were placed in plastic ziplock bags and kept in a warm place. The seeds were examined after 2 days and 4 days. Each time the paper towel was remoistened with the original pH solution. After 6 days the seeds were examined for germination and the number of germinated seeds at each pH was recorded. The results showed that germination happened least between pH values of 2 and 4 and most between pH values of 6 and 7. This proved the negative effect of acid rain on seed germination.

1778

ARE THE EPA STANDARDS OF MERCURY REALLY SAFE FOR STARFISH LIFE?
Patil Armenian, V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian H.S., 5300 White Oak Ave., Encino, CA 91316

This study examined the possibility that the Environmental Protection Agency standards for the marine pollutant mercury are not really safe. The effect of the standard concentration of mercury was tested by observing the regenerative powers of the starfish Protoreaster nodosus. One arm each from two identical starfish were cut off. Then the two starfish were placed in separate aquariums which contained ocean water. One was kept as a control and the other as the experimental with a mercury ion concentration of 2.1 microgram/Liter (the EPA standard). After 14 days, the control starfish regenerated its arm by 1 cm while the arm of the experimental starfish did not even begin growing yet. This result suggests that the standard of mercury is, in fact, not safe for marine life and should be correctly adjusted by the EPA.

1779

EFFECTS OF ACID RAIN ON PLANTS AND SEEDS.
N. Moini and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasss, CA 91302

The purpose of this study was to find out the effects of acid rain on the three different seeds; Zea mays (corn), Helianthus (sunflower), and Raphanus sativus (radish) and two plants known as Radermachera sinica (china doll) and Hypoestes sanguinolenta (pink splash). The three seeds and the two plants were exposed to an acid rain atmosphere under certain time periods. The acid rain environment was produced by placing the mixture of calcium carbonate and hydrochloric acid in one of the wells of a microplate. The microplate had wells which contained each of the three kinds of
seeds. These wells were half-filled with water to replenish the seeds and to see if they would grow. The microplate was then placed in a sealed plastic container which created the acid rain atmosphere. After one, three, and five days, one of each kind of seed was taken out and germinated between two wet paper towels for two days in the dark. After germination, I concluded that the seeds which stayed for one day in the exposure were still alive and well and each of the three seeds had grown a root. The three day exposure seeds were dehydrated except for the sunflower seed which grew a root, and the five-day exposure seeds were clearly dead and dehydrated. The plants were then placed in a sealed container with the acid rain mixture for two days. They had both changed to a brown color and they had this putrid smell. The conclusion of this study states that seeds exposed to long periods of acid rain will die. Also different plants exposed to acid rain have very little means of survival.

THE EFFECT OF CHROMIUM PICOLINATE ON ANIMAL FAT.
Taline Gulessarian and Mrs. V. Der Megerdichian (teacher). Holy Martyrs Armenian Ferrahian High School, 5300 White Oak Avenue, Encino, CA 91316

The purpose of this experiment was to determine if Chromium Picolinate, the new age "fat burner", would indeed affect animal fat treated with preservatives. Three containers labeled A, B, and C were each filled with one ounce of chicken, beef, and pork fat respectively. These were the controls. Three containers marked A1, A2, and A3 were each filled with one ounce of chicken fat respectively. Container A1 received 100 mg of Chromium Picolinate. Container A2 received 200 mg and container A3 received 300 mg. The same was done for the beef fat (B1, B2, and B3) and pork fat (C1, C2, and C3). Of all the samples, the chicken fat that received 300 mg of Chromium Picolinate showed the most noticeable change. The results suggested that Chromium Picolinate does have a minute effect on animal fat treated with preservatives.

EFFECTS OF LAUNDRY DETERGENT ON SEA URCHIN FERTILIZATION.

This investigation examined the involvement of laundry detergent in sperm-egg interaction of sea urchin, *Lytechinus pictus*. One drop of laundry detergent was mixed with 5 mL of distilled water and was then combined with solution of pH 8.0 artificial sea water containing eggs. Sperm was then added to the solution and percent fertilization was recorded. During the first trial, 1 of 50 eggs was fertilized; during the second, 0 of 50 eggs; during the third, 0 of 50 eggs. Compared to the control results, where 88%+ -6% of the eggs were fertilized, these results demonstrate that laundry detergent completely inhibits sperm-egg interaction is *Lytechinus pictus*. While observing these eggs under the microscope, no sperm were visible after the laundry detergent was added, which indicates that the detergent deactivates the sperm. Based on these results, detergents dumped into the rivers and oceans will inhibit the fertilization and production of sea urchin and possible other sea creatures.
THE MAKING OF AN UNDERWATER VOLCANO.

This experiment will show that water can float on water. Hot water always rises to the surface because it is lighter. With this experiment we'll show how a "volcano" erupts under water and send up a huge plume of "smoke". Add food coloring into a small bottle that has hot water. Then lower it into a bigger jar which is filled with cold water. The hot water will rise from the bottle like smoke from an erupting volcano.

CAN FISH REMEMBER THEIR WAY THROUGH A MAZE?

This study examined whether or not pet goldfish can remember their way through a maze. I made a simple 21" by 15" maze with six different pathways. After training six fish to move through the maze until they find food once every day for five weeks, information on how long it took them to find food and the amount of errors they made were recorded. On some test days, the fish found the food very quickly without any errors. On the following test day, they made many errors and took a long time, over ten minutes, to locate the food. If the fish did remember the correct way through the maze, they would have consistently found food in a short time without any errors. However, due to frequent fluctuations in the fish's results, I conclude that fish cannot remember their way through a maze.

DO THE HUMAN BODY, AQUATIC PLANTS, AND AQUATIC ORGANISMS UNDERGO CELLULAR RESPIRATION?
C.P. King and A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302.

The purpose of this study was to determine if cellular respiration takes place in the human body, aquatic plants, and aquatic organisms. Bromothymol blue indicator was used to test for the presence of carbon dioxide. In Test 1 a human blew through a straw into a container of bromothymol blue indicator, which quickly turned from blue to green to yellow. In Test 2 a sprig of the aquatic plant elodea was placed in a covered container of bromothymol blue indicator, which slowly turned from blue to green to yellow. In Test 3 a small goldfish was placed in a container of distilled water for 24 hours, then removed. Bromothymol blue indicator was prepared using this water, which turned from blue to green to yellow. Each test was repeated three times. The presence of carbon dioxide shown by the bromothymol blue indicator proved that the human body, aquatic plants, and aquatic organisms all undergo cellular respiration.
INFLUENCING THE RATE OF PHOTOSYNTHESIS.
Lauren Mikailyan, Mrs. V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave, Encino, CA 91316

This study examined the rate of photosynthesis of the Elodea leaf under different conditions by monitoring the number of oxygen bubbles released. The Elodea leaf was placed in warm water, and light intensity and the amount of carbon dioxide were altered. When a 40 watt lamp was placed 5 cm away from the plant for 5 minutes during 2 trials, the average number of oxygen bubbles released was 22. As the lamp was moved 20 cm away from the plant, during 2 other 5 minute trials, an average number of 8 bubbles was observed. When sodium bicarbonate was added and the lamp was placed 5 cm away, an average number of 8.5 bubbles was released during 2 more 5 minute trials. The results suggest that as light intensity is decreased photosynthesis is limited. As carbon dioxide is increased, the medium of the water becomes acidic, and again, the rate of photosynthesis is decreased.

TESTING WATER QUALITY.
Michael Huff and Annie Darakjian (teacher). Chaminade College Preparatory, 7500 Chaminade Ave., West Hills, CA 91304.

This study examined the amount of dissolved oxygen (DO) in two samples of water. The samples of water were collected from Balboa Lake and the Pacific Ocean at Ventura County. To 100 mL of each water sample the following solutions were added consecutively: 10 drops of 98% magnesium sulfate, 10 drops of 70% potassium hydroxide and 15% KI, 5 drops of conc. sulfuric acid, and 5 drops of 2% starch solution. After swirling each time a solution was added, 0.31% of sodium thiosulfite was added drop by drop until each water sample turned colorless. The number of drops of thiosulfate was converted into ppm of oxygen in each water sample by dividing the number of drops by 20. The results showed that ocean water had 4.5 ppm DO and lake water 9 ppm DO.

SEED ADAPTATION.
Linda Monaskanian, Mrs. V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Avenue Encino, CA 91316.

This study determines, whether water temperature can alter the rate of seed germination, and if scraping seed coats can alter seed germination. This was a controlled experiment in which the materials used were 40 radish seeds, plastic bags and paper towels. In the first part of the experiment, 10 seeds were put into cold water, then admitted to a dry paper towel which was put into a plastic bag. In the second part of the experiment, 10 seeds were put into hot water, then admitted to a dry paper towel, which was put into a plastic bag. In the third part of the experiment, 10 seeds were applied onto a moist paper towel then put into a plastic bag. In the final stage of the experiment, 10 seeds were scraped on sand paper, then put into a moist paper towel, and later in a plastic bag. The results of this experiment were that, there was no germination in hot and cold water, but 70% germination in the scraped seeds, and 50% germination in the moist paper towel.
GEOTROPISM IN GERMINATING BEAN SEEDS.
J. Konier and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302

The purpose of this study was to see how a plant's response to the earth's gravitational pull determines the direction in which the leaf and root structures grow. First the beans were soaked in water overnight. The next day I prepared a 2% solution of bleach by adding 20 drops of bleach to 50 mL of water. The beans were soaked in this for 30 minutes before starting the experiment. I took a petri dish and, using a nail, made 9 holes in the bottom of the dish. Vermiculite was placed in the bottom of the dish on top of the holes. I chose four plump lima beans and placed them in the dish on top of the vermiculite in the positions of 12 o'clock, 9 o'clock, 6 o'clock and 3 o'clock. After adding additional water, the cover was placed on the dish and then taped on. Using a small mound of modeling clay, the petri dish was set on end. I made daily observations as to what directions the roots were growing. The roots of the seed at the bottom arched over itself. The roots of the seeds at the right and left bent downward. The roots of the seed at the top grew directly downward. The results suggested that plant roots are geotropic and respond to the gravitational pull of earth.

SEE PLANTS DRINKING.
N. H. Touloumdjian, A. S. Minassian, D. W. Gharakhanian, Z. Nercessian and A. Abrahamian (teacher), Holy Martyrs Armenian Elementary School, 5300 White Oak Avenue, Encino, CA 91316

Plants need water to live, just as you do. By making some flowers change color, you can see how plants absorb water. Water flows through a plant's stem and into its leaves and petals. Trim the stems of the flowers. Split part of the stem of one flower in two. Put a flower in each glass of colored water. The split stem goes in two glasses. Leave the flowers in a warm room. Very slowly they change color.

THE EFFECTS OF ELECTRICITY ON PLANTS.
M. Collette, L. Gross, A. Watson, S. Young and A. Morton (teacher) Calabasas High School 22855 West Mulholland Highway Calabasas, CA 91302

The purpose of this study was to identify the effects of various electrical voltages on plants. First, five battery packages were prepared, each with a different voltage. The voltages used were 1.5, 6, 12, 15 and 27. A positive and negative wire leading from the battery package was then clipped to the stem of the Sonnet Rose (Antirrhizum majus) plant. Each of the five battery packages was clipped to the stems of five different plants of the same species and approximately the same height, for one hour each day for two weeks. One plant was not subjected to the electrical current and served as a control. The conditions, such as sunlight, water and soil were kept the same for all plants. The plants used have a herbaceous stem (non-woody). The area around where the clips were attached turned brown. At a voltage of 1.5, an area of about 1/4 an inch turned brown. As the voltages increased, the area of browning increased as well. By voltage 27, the area of browning was about 3/4 of an inch. This experiment was done a total of three times, with similar results each time. Although skin damage to the plant was observed, the plants all continued to grow as the control did. The results suggest that although small voltages of electricity can damage the skin, no great harm is done to the plant.
STUDY OF THE GROWTH AND DEPLETION OF YEASTS.
J. Jordan and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy, CA 91307

This study examined the conditions necessary to grow yeasts as well as the conditions of depleting it. Yeast, sugar, and water were used for the first part of the experiment. Four 2-liter glass bottles were filled half way with room temperature water. Four more bottles were filled half way with sugar water. Two bottles from each group received half a mg. of yeast. A balloon was placed over each neck of a bottle in which the expansion of the balloon indicated yeast activity. Each group contained a plain water bottle "W", a sugar water bottle "SW", a sugar yeast bottle "SY", and a water yeast bottle "WY". One group was placed in a warm climate and the other in a cold climate to see if temperature had any effect over the growth. They were left there for seven hours. Every hour any changes in the liquid and balloon were recorded. The result was that the "SY" bottle in both climates produced more yeast activity than any other bottles. Though the "SY" bottle in the warmer climate did produce more in the end. But I went further and asked myself what could deplete or completely deteriorate the yeast. I went to one of the top Chinese herbalists in the country and he gave me the herbs that could possibly cause the depletion of the yeasts: Paeonia suffruticosa (Moutan), Sophora flavescens (Sophora Root), Phellodendron amurense (Phellodendron), Smilax glabra (Smilax), Patrina scabiosaefolia (Patrina), Gardenia jasminoides (Gardenia), Laminaria japonica (Laminaria), and Dendranthema grandiflora (Dandelion). These were added in a 1 mg. formula to the "SY" bottles. They were left for seven hours. Again, every hour I recorded the changes in the liquid and added an additional half mg. to the bottle. After the seventh hour the yeast was nearly depleted. This procedure was done twice to ensure a correct hypothesis. Not only did the experiments prove that sugar and yeast in a warm temperature is the most rapid and efficient ways that yeast grows, the experiment also showed that herbal medicines can be used effectively in the depletion of yeasts.

DIFFUSION AND OSMOSIS THROUGH A SEMIPERMEABLE MEMBRANE.
Mariam Reganyan, Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian H.S., 5300 White Oak Avenue, Encino, CA 91316

The study examined the diffusion and osmosis of substances through a semipermeable, cellophane membrane. For diffusion a large test tube was filled with water and a few drops of .1% alcoholic phenolphthalein solution was added. The test tube was covered with cellophane and inverted over an open bottle of ammonia solution. As the ammonia gas rose in the bottle and through the cellophane membrane, the phenophthalein indicator in the test tube turned from colorless to red. For osmosis, a funnel was filled with a sugar-water solution and covered with cellophane and inverted over a large mouthed beaker filled with water. After a short time the level of water was rising in the funnel. The results indicate that ammonia gas and water can diffuse through a semipermeable cellophane membrane.

A NOVEL PROTOCOL FOR CULTURING VIBRIO FISCHERI.
Cecilia Harvey and Taneya Gethers, teacher: D. McDonnell. Sherman Oaks Center For Enriched Studies, 18605 Erwin Street, Reseda, CA 91335

During recent studies of Bioluminescence in Vibrio fischeri, an economical protocol for the culturing of V. fischeri was established. Previous literature describes the use of Photobacterium
media as necessary for Vibrio fischeri cultures. Photobacterium media is expensive to purchase pre-mixed, as well as to make from scratch. Our laboratory has shown that during the growth phase, V. fischeri reproduces well in L.B. Broth enriched with 3.0% NaCl, at 28° C. Yet, in order to achieve luminescence, plating onto Photobacterium agar is needed. This laboratory is continuing work on identifying economical protocols for the successful use of bioluminescence in the high school laboratory.

EFFECTS OF THE TEMPERATURE OF SEA WATER ON SEA URCHIN FERTILIZATION.
Jason Williams, Suzanne Maness, and Mr. Van Duzee (teacher). Saugus High School, 21900 W. Centurion Way, Saugus, CA 91350

This study examined the question of possible involvement of the temperature of sea water in sperm-egg interaction in the sea urchin Lytechinus pictus. 25 mL of sea water was heated to 40°C, mixed in a 1:1 ratio with 20°C sea water and eggs on a slide, and then sperm was added. In repeating the experiment, the mixing of 20°C and 40°C sea water was found to reduce the fertilization rate to 23% + 1%, while control values were at 88% + 6%. This experiment is a representation of the effects of thermal pollution—the addition of heated water, usually from industries and power plants, to a body of water which upsets cycles and reduces the amount of oxygen that water can hold. As the results demonstrate, sea urchin reproduction cycles are not able to completely adjust to thermal pollution.

ANALYSIS OF CERAMIC DISTRIBUTION AT THE EVIE SITE.
Matthew C. O'Neill, mentor: Anne Cobry. NSF Young Scholars Program, P.O. Box 366, Kampsville, IL 62053

This project analyzes ceramics from the Late Woodland Jersey Bluff phase collected at the Evie site, in the Lower Illinois River Valley. Through an examination of the distribution of the ceramics collected in 1994 archeologists will be provided with different means of determining the settlement patterns and economic life of the inhabitants. Specifically, this paper will analyze the distribution of the ceramics found at the Evie site between 1993 and 1995. To better understand the range of the Late Woodland habitation a spatial sample of twenty-eight rim sherds was collected. There were two primary areas of ceramic concentration, Feature 4 and Feature 1. Feature 1 contained strictly Jersey Bluff ceramics. However, in Feature 4 there was mixture of Early Bluff and Jersey Bluff ceramics. The features were each analyzed and both were designated as roasting pits. Two hypotheses are proposed: first, the Evie site could have been inhabited during two separate periods (Early Bluff then during Jersey Bluff); alternately the Evie site could of been continuously occupied through the evolution of Early Bluff to Late Bluff ceramics.

THE DIFFERENT AFFECTS THAT CHEMICALS HAVE ON PLANTS.
Mher Sayadian, Mrs. Der Megerdichian, (Teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316.

The purpose for this project was to see what happens to Viola Princess Purple with white face plant when Bleach, Windex, and Alcohol are added to it. There were four plants. Water was added to one of the plants. Bleach was added to the 2nd plant. The third plant Alcohol was added to it. And the fourth plant Windex was added. After this, the plants were left alone for approximately 3 days. The plant, which water was added to, continued to grow. The plant with the Bleach looked
dull and its color had changed. The plant with Windex had dropped and the plant with alcohol also dropped. The results showed that all three solutions effect plant growth.

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EFFECT OF FOUR DIFFERENT FERTILIZERS ON THE GROWTH OF MARIGOLDS
Trina Johnson, Jennifer Craig, Teacher: D Leffelaar, Stanley Humphries Secondary, 720-7th Avenue, Castlegar, B.C., Canada VIN 1R5

We studied the effects of fertilizers on the growth of radish plants. We planted 270 radish seeds, dedicating 20 plant pots (3 seeds in each), to the four different fertilizers and 10 pots to the control. The four fertilizer used were Miracle-Gro, Alaskan Mor-Bloom, Alaskan Fish fertilizer, and bone meal. We found that the radishes with fertilizer initially grew faster than the control. After approximately the twelfth day however, the control group was equal in size to some of the fertilizer groups. Alaskan Mor-Bloom grew the fastest and the strongest with Miracle-Gro coming in close behind. Of the four different fertilizers we found that Alaskan Mor-Bloom was most effective, resulting in plants 10 cm tall after twenty days of growth. This compared to 9 cm for the Miracle-Gro, 8.5 cm for the control, 8 cm for the Alaskan Fish, and 7 cm for the bone meal. We concluded that overall, the fertilizers had little effect on the growth of the radishes. It may be possible that the soil we used already contained enough nutrients. Therefore, we suggest that it may be a good idea to use nutrient poor soil. This would help to determine whether the fertilizers are having any effect on the growth of the plants

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THE EFFECTS OF ACETAMINOPHEN ON THE RATE OF YEAST RESPIRATION
J. Phillips, N. Sanders, Van Duzee (teacher), Saugus High School, 21900 W Centurion Way, Saugus, CA 91350

This study examined the effects of acetaminophen on fermentation. The control of our experiment was a plastic cup with 1/2 cup warm water, 2 tsp sugar, and 2 tsp yeast. In our experimental cup we added 500 MG of ace aminophen to the materials used in the control. After stirring, both cups sat at room for twenty minutes. At the end of the twenty minute interval the amount of foam produced was measured. The experiment was repeated eight times and the results were averaged. We found that on average the yeast in our control produced 1 3/4 mm ± 1/8 mm of foam. We discovered that when acetaminophen reacts with yeast and sugar it produces 2 1/4 mm ± 1/8 mm. These results indicate that the presence of acetaminophen speeds up the fermentation process.

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TESTING WATER QUALITY
Talin Christine Djabourian, Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian H.S., 5300 White Oak Ave, Encino, CA. 91316

This study examined the measure and amount of dissolved oxygen and carbon dioxide to determine if the water samples were polluted. Different solutions were added to 100 ml of distilled water and tap water. The solutions used to test the amount of oxygen present were different concentrates of, 10 drops of manganous sulfate, 10 drops of potassium hydroxide and potassium iodide, 15 drops of sulfuric acid and 5 drops of starch solution. The drops of sodium thiosulfate used to change the deep blue color until it became colorless was counted. The result showed that distilled water, 9 drops of sodium thiosulfate was added and the amount of oxygen was 10/20 ppm, tap water used 15 drops of sodium thiosulfate and the amount of oxygen was 15/20 ppm. To test the amount of carbon dioxide 5 drops of phenolphthalein solution was added to the water samples. Then sodium
hydroxide was added until the water samples became light pink. The result was that distilled water had carbon dioxide present and 1 drop of sodium hydroxide was used. The amount of carbon dioxide is 5 ppm. There is no carbon dioxide present in tap water.

HUMAN REMAINS: THE ANTHROPOLOGICAL PERSPECTIVE.
Deborah Chase, Paula Cross (mentor), NSF Young Scholar’s Program. P.O. Box 366, Kampsville, IL 62053.

In the past decade an extremely controversial issue has arisen in the field of anthropology. The issue of human remains and the excavation of burial sites is causing renewed tension between Native American and archeologists. Native Americans view the excavation of burial mounds as a direct violation of their religion and the desecration of their sacred grounds. The main objective of the majority of archeologists is to study and understand the past through the excavation of many different types of sites. Burial grounds and skeletal remains hold valuable information (i.e. diet, health, determination of descendants through physical comparison, social organization) for all related fields of anthropology. In order to obtain and utilize this information to the fullest, burial sites must be excavated, remains examined, and skeletal remains curated for future examination with improved methods. While the concerns expressed by Native Americans need to be addressed by the archeological community, the quest for scientific knowledge must not be hindered by this controversy.

THE EFFECTS OF DIFFERENT WAVE LENGTHS OF LIGHT ON RADISH SEED GROWTH
J. Sperber, S. Sperber (teacher). Sherman Oaks Center for Enriched Studies, 18605 Erwin St, Reseda, CA 91335

This study examined the study of different waves lengths of visible light on radish seed growth. One hundred radish seeds were each placed in one of three different trays covered with different colored gel paper. One tray covered with red, one with blue and one with clear. Each tray was watered every other day and all kept in the identical light conditions. After two weeks each tray was checked as to the number of successful growths in the different lights the red tray showed an 84% germination, the blue tray showed a 96% germination and the tray covered with the clear gel showed a 93% germination. The results suggested that radish seeds subjected to red wave lengths of visible light do not grow as well as those subjected to either blue or white light.

SEED ADAPTATION.
Taline Galoosian, Mrs. Der Megerdichian (teacher). Holy Martyrs Armenian High School, 5300 White Oak Ave., Encino, CA 91316.

This experiment determined whether the temperature and scraping of seeds can change the amount of seed germination. The controlled experiment consisted of 40 radish seeds, 4 plastic bags, and 4 paper towels. Ten seeds were placed in cold water, and the other ten in hot water. Later the seeds were taken out of the water and were placed in two different paper towels and two different plastic bags. Ten seeds were scraped with sandpaper and placed in a moist paper towel. Another ten seeds were placed in a moist paper towel. Later the seeds were paced in different plastic bags. The 40 seeds in the plastic bags were placed aside for 48 hrs. The result of the experiment showed 60% germination in cold water and 80% germination in hot waters, but no germination in scraped and unscraped seeds.
COMPARING DIFFERENT AGE GROUPS WITH THE HABIT OF CIGARETTE SMOKING.
J. Luan, E. Lim and J. Belg (teacher). Henry Middle School, 17340 San Jose Street, Granada Hills CA 91344

A survey was made on the amount of cigarettes smoked by different age groups. A total of 444 people were surveyed. 7 people reported having cancer (5 skin; 1 colon; 1 basal cell). Of those who never smoked, 65% were under age 20, 47% were in the 20-39 age group, 49% were in the 40-59 age group (1 skin cancer; 1 basal cell), 60% were over age 60 (2 skin cancer; 1 colon cancer). Of those who smoked a few cigarettes to one-half pack a day, 25% were under age 20, 36% were in the 20-39 age group (1 skin cancer), 31% were in the 40-59 age group, and 24% were over age 60. There was not a significant difference between the age groups for those who smoked 1-2 packs a day (1 skin cancer). Our conclusion is that more than 50% of those between the ages of 20 and 59 smoked and that there were over 60% under the age 20 and over the age 60 who were non-smokers. In this survey there did not appear to be a correlation between smoking and cancer as 5 of 7 cancers (3 skin, 1 basal cell and 1 colon) were from respondents who had never smoked.

THE EFFECT OF DISSOLVED CARBON DIOXIDE ON WATER QUALITY.
Nicole Hakim and Annie Datian (teacher). Chaminade College Preparatory, 7500 Chaminade Ave., West Hills, CA 91304.

This study examined the amount of carbon dioxide dissolved in two water samples. The water samples were taken from a tap and a gutter. Five drops of phenolphthalein solution were added to each water sample. The color of water samples did not change into pink indicating the presence of carbon dioxide in the water samples. To measure the amount of carbon dioxide dissolved, sodium hydroxide was added drop by drop until the color of the water samples became light pink and remained pink after swirling. The number of sodium hydroxide drops used multiplied by 5 indicated the ppm of carbon dioxide dissolved in each sample tested. The results showed that tap water had 5 ppm, while gutter water had 25 ppm of carbon dioxide. This indicates that the gutter water contained organisms (most probably decomposers) which by decomposing organic matter resulted into the formation of carbon dioxide. 25 ppm of carbon dioxide in a water sample will result in an acidic pH reducing the chances small aquatic organisms to survive.

THE EFFECT OF MAGNESIUM SULFATE ON PLANT GROWTH.
Hourig Mardirossian, teacher: Mrs. Der Megeberdichian, Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave, Encino CA 91316

In this experiment the effects of Magnesium Sulfate on plant growth were examined. Two different flowers were used Diathuses and Primroses. The first group of flowers, one from each type of flower, received two tablespoons of Magnesium Sulfate in their water. The second group received one tablespoon, the third received half a tablespoon, and the fourth received only water, as control. Their growth was recorded over a one week period. The control grew the least (about half an inch). The ones with the most Magnesium Sulfate grew the most (about two and a half inches). As a result it is concluded that Magnesium Sulfate speeds up the growth of Diathuses and Primrose plants.
COMPARATIVE LATE WOODLAND POTTERY ANALYSIS OF THE EVIE SITE IN THE LOWER ILLINOIS RIVER VALLEY.

C. B. Swope, mentor: L. E. Varnado, NSF Young Scholars Program P.O. Box 366, Kampsville, IL 62053

Late Woodland pottery sherds were excavated at the Evie site in the Lower Illinois River Valley. The excavations started in 1993 and have continued until the present by the Center for American Archaeology National Science Foundation Young Scholars Program and the University of Chicago field school. This research is important because we must obtain a more exact assessment of the chronology of the Evie site in order to address questions of diachronic change in the economy and settlement pattern. The complete sample of rim sherds from Evie are compared to samples from other sites which have been previously dated with radiocarbon dates. It is hypothesized that the rim sherds from the Evie site are of the Jersey Bluff phase (A.D. 800-1200). The Columbia Farms site, the Joan Carrie site, and the Columbia Quarry site are utilized as comparisons to the ceramics of the Evie site to test this hypothesis. Results indicate that both a Jersey Bluff and Early Bluff component are present.

EFFECTS OF SODIUM CHLORIDE ON IRON.

Nareg Titizian, and Ms. Der Megerdichian (teacher). Ferrahian High school, 5300 White Oak, Encino, CA

This experiment was performed to compare how Sodium Chloride in water acts as a catalyst to speed up the process of oxidation and corrosion on an iron nail. An iron nail was placed in one container with distilled water and another was placed in a second container with a 35% salt water solution. At 28 hours the nail in the salt water solution clearly showed signs of rust, however the nail in the first container remained unoxidized. Six days later the first nail in distilled water started to show signs of corrosion. This experiment was repeated using different amounts of salt in the solution. Each time corrosion occurred at a different rate. These results suggest that most likely sodium chloride in water speeds up the oxidation and corrosion process of iron, thus forming rust.

DOES ASPIRIN REALLY HELP PLANTS GROW?

Elise Cheng, Farnaz Zand, and A. Morton (teacher) Calabasas High School, 22855 W. Mulholland Hwy, Calabasas, CA 91302

When deciding on what to do for our project, we heard a rumor stating that aspirin helps plants grow. We decided to test this theory. For our experiment, we planted four different types of beans: pinto, red, lima, and pink. All beans were planted in the same amount and type of soil and given equal amounts of light, providing equal conditions for all the plants. The plants were allowed to grow normally for three weeks before experimenting with aspirin. Four of each type of bean were planted. One served as a control group, which we watered regularly. The other three plants were watered with 75 mg, 150 mg, and 300 mg of aspirin daily. After a week all but the plants in the control group died. The more aspirin a plant was given, the faster it died. This leads to our conclusion that aspirin does not help plants grow, proving the theory wrong. Aspirin is acetylsalicylic acid; therefore, we suspect that the plants died due to the acidity of the aspirin. However, we have no way to prove this.
THE EFFECTS OF BURNING CANDLES.
Hee Jin Lee and M. Simonds (teacher). Portola Magnet Center, 18720 Linnet Street Tarzana, CA 91356

The purpose of this experiment was to test to see if there was a chemical reaction when the candles are burned. Three candles of different sizes were lit and beakers of different sizes were placed over them. Then the smallest candle in the smallest beaker extinguished, then the larger one, and finally the biggest candle. Then I noticed droplets of liquid at the bottom of the beakers. To test if it was a liquid, I used cobalt chloride paper and, of course, it was a liquid. To test if the liquid was a gaseous product, I burned one candle again but this time I placed a flask over the candle. After the candle goes out, I poured 20 mL of limewater and another flask with the same amount. Limewater is a clear chemical that tests to see if carbon dioxide is present. Then I compared the results. The flask which had been over the candle became a milky white color when limewater was added, but the flask with only air in it stayed the same. So ended my research. In conclusion, when a candle is burned, carbon dioxide is created.

HOW CAN YOU OBSERVE CHROMOSOMES IN CELLS?
Sevan Haserjian. Mrs. V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316.

The purpose of the experiment was to observe chromosomes in bean cells. Ten drops of aceto-orcein stain and one drop of hydrochloric acid were added to a test tube containing two root tips from a bean plant. Ten minutes later, the contents of the test tube were heated on a Bunsen burner. After cooling, each stained root tip was placed on a glass slide, with the addition of a coverslip, along with two drops of water. The well stained chromosomes were observed using low and high microscope power. The chromosomes were diagramed and the first two phases of mitosis were observed, which were prophase and metaphase. The collected data was recorded.

EFFECTS OF CENTRIFUGATION ON DEVELOPMENT OF SEA URCHIN EGGS
R. Spivey, T. Swearingen, and S.L. Shultz (Teacher). Sherman Oaks Center for Enriched Studies, 18605 Erwin Street, Reseda, CA 91335

The effects of centrifugation on fertilized eggs of Strongylocentrotus purpuratus were examined to determine if stratification of cellular components would irreversibly damage or change development of the zygotes. Three experiments were performed using six control embryo cultures and six centrifuged embryo cultures. Eggs were fertilized in FSW at 22°C and were divided into two groups: the controls, which were left to develop on their own, and the experimental cultures, which were centrifuged for the length of time it took for the first division of the control cultures to occur. Experimental cultures were then taken out of the centrifuge and left to develop along with the control cultures. Results indicate that among the controls, 95% developed normally to the 16-cell stage, while among the centrifuged cultures, approximately 50% of the zygotes were damaged at 1200 g, while 25% did not develop further and the other 25% proceeded toward normal development to the 16-cell stage. It was determined that among intact undamaged centrifuged embryos, stratification of cellular components only lengthened the overall time frame of development.
PATTERNS OF EARLY AMERICAN LAND PURCHASES AND SETTLEMENTS IN CALHOUN COUNTY.

C. E. Boylan, mentor: S. Studenmund. NSF Young Scholars Program, PO Box 366, Kampsville, IL 62053

In order to get a clear and complete picture of human use of the landscape, it is important to look at both the prehistoric and historic components of the area. This project focuses on a six square mile area located near the Evie site in Calhoun County, Illinois. The Evie site is a Late Woodland Jersey Bluff phase settlement (AD 850-1200) which lies in the lower Illinois River Valley. By using nineteenth century land entry data from the county, which includes purchaser's name, date of purchase, and location of property, as well as other information, it is possible to find many patterns of land purchase and settlement, such as spatial distribution of properties, types of areas purchased first, and average size of purchases. Used in conjunction with United States Census data from 1830, 1850, and 1860, the land entry data also makes it possible to ascertain whether the purchasers were permanent or temporary settlers or merely land speculators. These patterns are used to create a model of purchases and settlements in this area and a better understanding of the early stages of settlement in the county. The model created with this project can be tested in the future by applying it to other sections of the county.

EFFECT OF SOAP ON THE PROLONGED LIFE OF A DAISY.

G.W. Ketchijian, Mrs. V. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

This experiment was done in order to question if soap would possibly prolong the life *Gaillardia grandiflora*. Ten specimens were cut to have 10 inch stems and were divided equally in two containers. One contained only filtered water and the other a teaspoon of the natural soap shavings dissolved in filtered water. The experiment was for 7 days and each day the water of flowers were changed and put in the solutions. After the experiment was competed the only changes that were observed were, that the color of the plant in the soap dissolved water was a lighter shade, that the diameters of the flowers when starting was four and a half inches and when measured after the experiment the one in soap dissolved water was one inch smaller. Another result was that the one that was in the soap water kept its aroma.

EFFECTS OF DIFFERENT LIQUIDS ON THE GROWTH OF PLANTS.

Julia Cho and Mrs. Simonds (teacher). Portola Highly Gifted Magnet Center, 18720 Linnet Street, Tarzana, CA 91356.

This experiment was conducted to see whether different liquids had any effects on the growth of plants. Water, milk, and orange juice, common drinks among people, were used to water hybrid flowers of the genus *Dianthus*. All of the plants received the same amount of light and liquid. Plant A was given water, plant B was watered with orange juice, and plant C received milk. The plants were watered every morning for five weeks. Each week, the height and the number of blossoms of each plant were recorded. By the end of the trial, plant A developed greater than the rest, plant C grew second best, and plant B's growth was the worst. In conclusion, water is ultimately the best liquid to give plants. Fresh milk may also help a plant's development. Orange juice helps a plant grow rapidly at a time, but overall it may not be a good idea to water plants with it.
HOW DOES CHANGE IN SALINE CONCENTRATION EFFECT THE FERTILIZATION RATE OF STRONGYLOCENTROTUS PURPURATUS EGGS?

The purpose of this study is to examine the effect of change in saline concentration on the fertilization rate of Strongylocentrotus purpuratus eggs. For the control group a drop of sea urchin eggs was spread evenly on a glass slide and viewed under a microscope, at medium power. Then one drop of sea urchin sperm was added. The number of eggs fertilized in each field was determined by the appearance of an outer membrane. Three separate fields were counted. This procedure was performed six times. For the experimental group, one drop of one percent (1%) salt solution was added to the sea urchin eggs prior to the addition of the sea urchin sperm, thus making the experimental groups solution less solute. Three separate fields were again counted and the procedure was performed six times. The average percent fertilization of the control eggs was 19 2/3% and the average percent in the experimental group was 34 113%, a difference of 14 2/3%. We can conclude that changing the salt concentration significantly affects the fertilization rate of Strongylocentrotus purpuratus eggs.

COMPUTER ELECTRONICS IS BASED ON THE CONTROLLED GROWTH OF SILICON CRYSTALS.
S.V. Parseghian, H.A. Khanjian and A. Abrahamian (teacher). Armenian Ferrahian Elementary School, 5300 White Oak Ave., Encino, CA 91316

This experiment showed how to start and grow crystals. Saturated Solution (S.S.) was made by gradually adding Sodium Acetate salt to lukewarm water in a test tube, until not all of the salt will dissolve. The S.S. in the test tube was placed in a flask with boiling water until all the excess salt dissolved. More salt was added and dissolved. The test tube was then transferred to a jar of ice cold water. After 90 seconds a pinch of salt was added, the light was turned off, and the flashlight directed on the test tube. Beautiful needle-like crystals started to form right where we added the pinch of salt, and started growing rapidly downward until it filled the test tube. We concluded that in order to start the crystallization, we needed the first block on which another crystal could build onto the first, then another onto the second..., etc. The last pinch of salt that was added was the building block.

CHLOROPLAST PIGMENT ANALYSIS.
C.Kevorkian, V. Der Megerdichian (teacher), Holy Martyrs Ferrahiain Armenian H.S., 5300 White Oak Avenue, Encino, CA 91316

This study examined the different pigments present in the spinach leaf. Spinach was mixed with ethyl alcohol and boiled, thereby creating a leaf pigment solution. A chromatogram chamber was prepared with a cork, thumb tack, filter paper strip, and a test tube. Twenty drops of the leaf pigment solution were placed about 2 cm from the tip of the filter paper. The paper was then placed in the test tube which was 0.5 cm full of ethyl alcohol. The tip of the filter paper was just barely dipped into the solvent, but the chlorophyll circle did not touch it. After waiting fifteen
minutes, shades of yellow, orange, and green were present on the filter paper. This indicated the presence of carotene, xanthophyll, and chlorophyll.

THE VIABILITY OF STRONGYLOCENTROTUS PURPURATUS AFTER A PERIOD OF 43-HOURS.
R.S. Tanouye, K.A. Suzuki, E. Velasquez, B. McHugh, K. Kusondra, and M.L. Weitkamp (teacher), Chaminade College Preparatory High School, 5700 Chaminade Avenue, West Hills, CA 91304

The primary objective of this experiment was to test the viability of the sea urchin S. purpuratus gametes after a 43-hour time period. Eggs and sperm were harvested with the injection of KCl 43-hours before fertilization. They were then refrigerated at 8.5° C. Eggs and sperm were applied to a clean, dry slide, then diluted with 2 drops of sea water. In three separate fields of the microscope, the percentage of successful fertilization was determined by observing intact fertilization membranes. With the aid of cooperative teams working 20 trials were completed, each using three fields of the microscope per trial. The average percent of fertilization was found to be 11.8%. Based on our observations, we concluded that S. purpuratus gametes can be fertilized in vitro but perhaps not at the same rate as newly harvested gametes.

SEEING SOUND.
Seva- Mahsererejian and Sarkis Wakimian, Mrs. Anoush Apraham'an; Holy Martyrs School, 5300 White Oak Avenue, Encino, CA 91316

Sound is made by vibration. When you sing or shout, the air rushing from your lungs passes through your vocal cords and makes them vibrate, producing pressure waves that travel through the air like ripples in water. You need a balloon, a pair of scissors, a soup or juice can both sides removed, rubber bands, tape, clue, tiny piece of mirror and a flashlight. Cut the neck of the balloon and stretch remaining part tightly over I end of the can. Hold the balloon in place with rubber bands and tape. Glue the piece of mirror to the stretched balloon, about a third way in from the edge of the can. Shine the flashlight onto the mirror at an angle, so that you can see a bright spot from the mirror reflected on the wall. Put the can on a table and shout into the open end of the tin. When sound waves hit the stretched balloon, they make the balloon vibrate. This in turn, starts both the mirror and the light reflecting from it, vibrate.

EFFECTS OF ACID RAIN ON RADISH PLANT GROWTH IN VARIOUS SOILS.

This experiment tested the growth of radish plants, Raphanus sativus, in various soils while being watered with acid rain (lemon juice substitute). Radish plants were grown in four different ecosystems using potting soil, calcium-enriched soil, or chalk-enriched soil, while being watered with lemon juice (pH 4.0). Four radish seeds were planted in three different locations in each ecosystem; while each experiment was repeated three times. The calcium-enriched ecosystem grew the best totaling 55 leaves in the ecosystem, while the control group grew well with 51 leaves. The acid rain group, sprouting 42 leaves, did not grow quite as well as the chalk-enriched soil which had a satisfactory growth rate and contained 47 leaves. The results indicate that the calcium-enriched environment counteracted the acidity in the water while feeding nutrients to the radishes.
EFFECTS OF ELECTROMAGNETIC FIELDS ON PLANTS.
Amanda Kramar and Ms. A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

The purpose of this study was to determine if an electromagnetic field would have an effect on the growth of plants. Eight young plants were selected for study. Four violet plants were placed in a shallow growing tray in planter’s mix. Then a magnet was placed next to the base of each plant. At first, the magnets were created by wrapping wire around “u”-shaped bolts, but the power of the batteries to which they were attached diminished so these were replaced with permanent magnets. Another group of four plants were similarly planted but without magnets. Each group of plants received the same amount of sun and water over the next several weeks. Each week measurements were taken of the plants’ growth; specifically height and greatest width. Photographs were also taken periodically to document the growth. The results suggest that while there no appreciable measurable effects on the plants caused by the electromagnetic fields, the plants subjected to the EMF appeared to be healthier and greener.

THE EFFECTS OF SALINIZATION ON RAPHNUS SATIVUS GERMINATION.

This study detected the effects of various concentrations of salt on Raphanus sativus germination. Three experiments were run for each salt concentration level on twenty seeds each. The salt concentrations were 0.05%, 0.1%, 0.3%, 0.4%. The results of each experimental container were compared to a control, which contained distilled water. 0.05%, 0.1% and 0.3% concentrations all did not have a significant impact on the germination and growth of the seeds. The mass of the Raphanus sativus in the salt concentration was greater than the mass of the control. 0.4% salt concentration effected the germination and growth of the seeds by reducing it in comparison to the control.

PLANT GROWTH WITH DIFFERENT CHEMICALS
Annie Mahroukian, Mrs. V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave. Encino CA 91316.

In this study the effect on clorax on the rate of radish plant growth was examined. Seven containers of plants were grown in identical conditions. Three were left as a control and the other four were the experimental group to which 7 drops of Clorox was added, once a day for one week. The radish plants to which clorax was added were shorter and wilted. The result suggested that Clorox slowed the growth of radish plants.

FERMENTATION AIDED BY YEAST.
Eugene Lee, Eric Haren, and A. Morton (Teacher). Calabasas High School, 22855 West Mulholland Dr., Calabasas, CA.

This study examined the results of fermentation aided by yeast with different substances. The substances were powdered sugar, table sugar, brown sugar, pancake syrup, and flour. This study
consisted of two experiments. In the first, we mixed water, yeast, and one of the substances and put this solution in the oven at 90°C. Flour was the only substance which had an immediate reaction. But after three minutes in the oven, the rest of the substances showed many foamy bubbles. After five more minutes in the oven, there was no change in the results. Ultimately, the powdered sugar had the greatest reaction among different food samples. The results of this experiment showed that samples containing sugar (glucose) reacted well with yeast during the process of fermentation, and that flour had some sugar (glucose) content.

In the second experiment, the temperature was set at 32°C, the solution had a total volume of 1.5 ml., at 60°C had a total volume of 33 ml., at 90°C had a total volume of 39 ml., at 120°C had a total volume of 33 ml., and the substance at 150°C had a total volume of 5 ml. The results of this showed that the greatest reaction was at a temperature of around 90°C. Yeast, a type of plant, had to be in the right temperatures to live and produce carbon dioxide and alcohol.

EFFECTS OF SALT ON A PLANT.

This investigation was designed to study the effects on a plant when salt is added to the soil. Three sets of 20 pea seeds were planted and watered with 0%, 0.1%, and 0.5% of salt, respectively. These plants were watered and monitored for 13 days. The experiment was repeated 3 times. The control (0%) plants averaged a growth of 7.5 cm. The first experimental group (0.1%) plants averaged a growth of about 8 cm. The second experimental group (0.5%) plants averaged a growth of about 4.25 cm. The final results suggest that the growth of pea plants are hindered by ground water containing 0.5% salt concentration.

THE POTENTIAL OF ELECTROCHEMICAL CELLS.
Armen Akaragian, Mrs. Der Megechian (teacher). Ferrahian Armenian High School, 5300 White Oak Ave, Encino, CA 91316

This experiment was done to determine which substances used together will have the highest potential difference. Strips of copper, lead, and zinc metals were obtained, sanded, and each was placed in its corresponding ion solution, with a salt bridge between each of zinc and copper; zinc and lead; lead and copper electrodes. The voltage was observed as following: copper and zinc.395V 10 minutes later .269V and 20 minutes later .258V copper and lead-.630V 10 minutes later .525V 20 minutes later .485V; zinc and lead-.103V-.109V (not stable) 10 minutes later .032V 20 minutes later .006V. The results showed that lead and copper electrodes produced the highest voltage and lasted the longest.

WHAT ARE THE EFFECTS OF SECOND-HAND SMOKE ON RADISH PLANTS?
A Tsai, A. Kim, C. Canning and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302.

This study examines the harmful effects of tobacco smoke on plants. It is now known that cigarette smoke can cause various diseases in humans. But how does it affect plants? Three groups of radish plants were grown in a small greenhouse. Group 1, the control, was not exposed to any smoke. Group 2 was exposed to one cigarette per day for 10 minutes. Group 3 was
exposed to double that amount, two cigarettes per day for a total of 20 minutes. This process continued for 15 days. The tobacco smoke stunted the growth or killed the radishes. In group 3, all radish plants shriveled up and died. In group 2, only a few plants survived, but they were very small compared to those of group 1. As expected, the control group grew at an average rate. The results clearly show that second-hand smoke does have a detrimental effect on plants.

1828

NATURAL VS. ARTIFICIAL DRAINAGES: DO VEGETATION AND SOIL CHARACTERISTICS DIFFER BETWEEN THEM?

A variety of water drainages exist at The Nature Conservancy's Hart Prairie Preserve including both natural and artificial channels created by diverting natural flow. Separate diversions occurred approximately 90 years ago, and again 15 years ago. A community of *Salix bebbiana*, Bebb's willow, a species rare in Arizona and at the southernmost end of it's range at Hart Prairie, appears to be in decline, perhaps impacted by the change in drainage patterns. This study was conducted to determine if significant differences exist among vegetation and soil characteristics between the natural and artificial drainages. Data was collected on cover, density, and frequency of plant species as well as soil moisture, pH, and temperature. No differences were found in any soil characteristic among the three drainages. Flora in the most recently diverted channels was significantly different from flora in both the older diversions and the natural channels. Flora in the old diversions and the natural drainages did not differ. These data will be utilized to determine the impact of restoring the artificial drainages to their historical, natural route with the purpose of rescuing the community of Bebb's willow.

1829

EFFECTS OF CAFFEINE AND CAFFEINATED BEVERAGES ON THE MEMORY
D.J. Brennan and D. Shah (teacher). Portola Highly Gifted, 18720 Linnet Street, Tarzana, CA 91356

This study examined just how deep the side effects of caffeine can go as far as the memory. After finding a group of ten to be tested, I divided them into two subgroups, experiment group A and control group B. I then isolated them individually and gave them a ten word phrase "the man stalked by, crushing the remains of a trilobite." after examining it for a timed 5 second period. The 8 person experiment group A was then given 5 oz. of regular brewed coffee, dripolator. This is 150 mgs. of caffeine. Control group B was not. I then proceeded to individually question the people to see how much of the given phrase they remembered. Control group B had no apparent trouble reciting the phrase, however group A had lapses in about 75% of it's members. So the evidence suggests that caffeine and caffeinated beverages can cause a mild effect on the memory.

1830

EFFECTS OF DIFFERENT FERTILIZERS ON PANSIES.
B. Stam and A. Morton (teacher). Calabasas High School, 22855 Mulholand Highway, Calabasas, CA 91302

The purpose of my study was to find if certain kinds of fertilizers and minerals could change the flower color or speed up the growth of the plant *Viola wittrockiana* (pansy). I fertilized four white flowered plants and didn't use any fertilizer, on the fifth plant. On the first plant, I used Miracid, which contains mostly nitrogen, phosphoric acid, and soluble potash. On the second plant, I used
a Bandini Citrus Food, which contains nitrogen, sulfur, phosphoric acid, calcium, and potassium. On the third plant, I used an aluminum sulfate fertilizer, and on the fourth plant, I used a compound containing stump remover and potassium nitrate. I put the plants outside and recorded the results over a two week period, fertilizing them again after the first week. The experiment was repeated four times. The control samples consistently grew one to two centimeters and the flowers showed no color change. Although the flower color did not change in any of the fertilized plants, the first plant, the second plant, and the fourth plant consistently showed faster growth than the others while the third plant showed no or very little change. After they were fertilized a second time halfway through the experiment, all the plants showed the same results except for the second plant, which stopped growing and became unhealthy and brown. The results show that the fertilizers used do not effect the color of the flowers, but the Miracid and Potassium Nitrate fertilizers increased the growth rate in the pansies, as did the Bandini Citrus Food, until it caused the plant to turn brown after the second fertilization.

HOW DOES SMOKING AFFECT LUNG CAPACITY?
T.M. Boyadjian, Der Megerdichian (teacher). Holy Martyrs Ferahian Armenian High School, 5300 White Oak Ave., Encino CA 91316

The purpose of this experiment was to show that people that smoke have less lung capacity than people that don’t smoke. Each person’s lung capacity was measured by having them blow into a balloon 25-9”. The diameter of the balloon was then measured and converted into volume in cubic centimeters. There were three age groups of which 5 male and 5 female smokers and nonsmokers were tested. In the first age group of 13-30 nonsmokers the average male capacity was 3230 cubic cm and females 2530 cubic cm. The male smokers averaged 2880 cubic cm and females 2375 cubic cm. The second age group of 31-55 male nonsmokers averaged 4550 cubic cm and females 2630 cubic cm. The male smokers averaged 2825 cubic cm and females 2420 cubic cm. The third age group of 56-90 male nonsmokers averaged 2860 cubic cm and females 1945 cubic cm. The male smokers averaged 1990 cubic cm and females 1535 cubic cm. These results prove that smokers have less lung capacity than nonsmokers.

THE AMERICAN INDIAN MOVEMENT AND THE REBURIAL AND REPATRIATION ISSUE.
Lillian Calendrillo-Guzlowski, mentor: Paula Cross. NSF Young Scholars Program, P.O. Box 366, Kampsbridge, IL 62053

The reburial and repatriation issue, which involves returning of human and sacred remains to Native Americans, is a very controversial issue in archeology today. The various Native American groups are at a very different position from the archeologists where this issue is concerned. This project is designed to present a fair and respectful portrayal of the Native American side of the burial ethics issue. Through interviews and conversations with members of the Central Illinois American Indian Movement, I collected a great deal of information about the views of one portion of the Native American population. Some of the information that I collected included: the motivations behind the actions of AIM, the plans that AIM has for reburial of human and sacred remains including the remains that can not be traced to existing tribes, views on non-Native American burial sites, and the possibilities of future education and excavation of burial and sacred sites.
HOW THE WEATHER AND EXERCISE AFFECTS ASTHMATICS.
C. D. Reed, A. Flores and A. Flagen (teachers). Ramona Convent Secondary School, 1701 West Ramona Road, Alhambra, CA 91803

This study examined the question of the possible connection between exercise of short duration and the weather, on asthmatics. Three asthmatics: a child, an adolescent, and an adult, were asked to exercise for 3 minutes with a 1/2 minute break in between. They were also asked to record the average temperature for each day of the experiment. They were also asked to record their daily breathing rate, before and after exercise, with a peak flow meter (a device used to measure airway capacity). The experiment took place over a time period of ten days. The results suggest that children, on the average, respond positively (their peak flow rate was improved) to exercise and cold weather. Adults respond negatively (their peak flow rate decreased), and sometimes positively to exercise, but their response depends more on the weather conditions, such as cloudy, partly cloudy, windy etc., if they respond positively or negatively, or if they stay the same. The study also suggests that adolescents respond more positively to cold weather and exercise.

THE EFFECT OF SUN ON RADISH PLANTS.

This study examined the effect the sun has on how healthy a radish plant will grow. 25 plants were planted outside where they could get sun, and 25 plants were planted in a pot and placed under the bed. All plants were watered the same. The plants which were planted outside grew firmer and healthier than the ones placed under the bed. The results suggest that plants need sunlight to grow strong and healthy.

WATER WONDER.

This expert examined the question of how much more you can put into a full glass of water. A glass was filled to the top with water colored with a few drops of food coloring. Coins were then gently dropped into the water. The top of the water bulged out above the top of the glass as the coins were added. Because water molecules have a strong attraction for one another, 23 coins were added to the glass before the water spilled. The result suggests that inside the glass, the molecules that are surrounded by other molecules are attracted in all directions. But the molecules at the surface have no water above them, so they are strongly attracted downwards by the molecules below them. These attractive forces are strong enough to keep the water from spilling over the top of the glass, even when level rises quite a bit beyond it. But eventually, the volume of water above the rim of the glass becomes too great for the surface tension to hold.
EFFECTS OF SOIL pH ON THE AVAILABILITY OF NUTRIENTS FOR PLANT GROWTH.
A. Nahapetian, V. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

This study examined the question of a possible effect of soil pH on the availability of the nutrients: phosphorus, nitrate, and calcium. Three soil samples were taken. Sample A was given 20mL of citric acid, sample B was given 20mL of citric acid diluted with 10mL of distilled water, sample C, the control, was given 20mL of distilled water. Using ammonium molybdate solution, inadequate amounts of phosphorus for plant growth were found in samples A and B. Using diphenylamine solution, inadequate amounts of nitrate for plant growth were found in samples A and B. Using ammonium oxalate, inadequate amounts of calcium for plant growth were found in sample A. Each test was conducted three times to ensure accuracy. The results suggest that low pH is possibly the cause for inadequate amounts of phosphorus and nitrate for plant growth, and highly acidic soil is possibly the cause for inadequate amounts of calcium for plant growth.

IF A LITTLE IS GOOD, IS MORE BETTER?
B. Barron and A. Morton (teacher). Calabasas High School, 22855 W. Mulholland Hwy., Calabasas, CA. 91302

The purpose of this experiment was to see if varying amounts of the growth hormone, SUPERthrive, would produce a measurable difference in plant growth. Four groups of four identical plants each were used. Each plant was watered daily, and received equal amounts of sunlight. The control group (A), was not given growth hormone. The three other groups were given varying amounts, with group B receiving ten (10) drops of growth hormone per week; group C, twenty (20) drops per week; and group D, thirty (30) drops per week. Results were measured by visual inspection and were noted. Group A remained healthy, but showed no remarkable growth. Group B grew at a rate similar to that of group A. It appeared that for this group the growth hormone had no effect. Group C grew at a more rapid rate, producing noticeable differences in plant size and new growth. Group D failed to thrive, showing limpness of leaves and poor appearance. In conclusion, my experiment showed that twenty (20) drops of the growth hormone, SUPERthrive, was optimal for plant growth, and that if a little is good, more is not always better.

THE EFFECTS OF METHYL-PREDNISOLONE ON PLANT GROWTH.
A. Mody, A. Tolia, M. Vener, and Mrs. A. Morton (teacher). Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

The purpose of this study was to determine if methyl-prednisolone (a steroid) effects the growth of plants. The plants we used were Pelargonium hortorum, also known as the Sundancer, which is part of the Geranium plant family. A concentration of 1.5 cc of methyl-prednisolone was injected into the base of the stem in one plant, and another plant was left as the control group. This experiment was repeated three times. The plants were put outside at 6:30 a.m. and were taken inside at 5:30 p.m. for a total of six weeks. The plants received the same amount of sunlight and water. We measured the stem of each plant and the results concluded that the plants with methyl-prednisolone grew about one millimeter in width more than the control group over a four day period. The plants with methyl-prednisolone also grew about 1.5 millimeters in height more than
the control group over a weekly period. Therefore, we concluded, from our experimental results, that the injection of methyl prednisolone increases the growth rate of plants.

EFFECTS OF FILTERED LIGHT ON THE GROWTH OF RADISH AND WHEAT PLANTS.

This study examined the question, "Do plants grow differently in different colors of light?" In this experiment wheat and radish plants were grown under filtered fluorescent light for 15 days straight. Next they were measured by length in millimeters. 80 radish and 80 wheat plants were grown (40 of each color). The plants were grown under red, blue, green, and clear light filters. The average results were: radishes' red grew best, then blue then green, and then clear, In the wheat plants blue grew best, then red, then green, and then clear. Therefore this study reflects the surprising result that plants under full spectrum light grew the least.

EGG-CELLENT CHALLENGE.
Shahan Madzounian, Shirag Shemmassian and Anush Abrahamian (teacher). Ferrahian Jr. and High School 5300 White Oak Ave. Encino, CA 91436

This experiment answered the question about density. Mark one egg with the letter F (float) and the other egg with the letter S (sink). Place the egg with the letter S in 1 cup of hot water and it will sink, then place the egg with the letter F in 1 cup of hot water that also has 1/2 cup of sugar in it and it will float. The items to float, they have to be less dense than the stuff to float it in. Eggs are denser then water but the less dense then water with enough stuff dissolved in it like sugar. Sugar in the water is keeping the egg from sinking.

EFFECTS OF A HYPERTONIC SOLUTION ON RADISH GROWTH.
M. Soroky and A. Morton (teacher). Calabasas High School, 22855 West Mulholland Highway, Calabasas, CA 91302

The purpose of this study was to determine how radish plants would grow when watered with a hypertonic solution. My hypothesis was that the hypertonic solution would cause plasmolysis in the seeds, stunting their growth. Radish seeds were planted in 2 separate plastic containers. The seeds of one container were watered with normal tap water. For the other container, 1/2 teaspoon of salt was added to 8 oz. of tap water, making the water 2% hypertonic. This hypertonic water was used to water the seeds in the other container. This experiment was repeated 3 times. The radish plants were watered for a period of 3 weeks. At this time, the results were conclusive. The radishes watered with normal water had grown, while those watered with hypertonic water had not. The results suggest that a hypertonic solution stunts the growth of radishes.
EFFECT OF ADDING SODIUM NITRATE SOLUTION TO SEA URCHIN FERTILIZATION.
S. Aratounians, T. Boyajjian, R. Buchakjian, M. Ghalian, A. Gregorian, L. Mikailyan, A. Nahapetian, R. Ouzounian, A. Tchakerian, Mrs. V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

In this study the effect of sodium ions was studied in the process of fertilization in the sea urchin Lytechinus pictus. In a controlled experiment 3 drops of sodium nitrate solution was added to sea urchin eggs before introducing the sperms. There were three trials with control and experimental groups respectively. The controlled group showed an average of 48.75% fertilization while the experimental group with sodium nitrate solution showed an average of 98% fertilization. The result suggests that sodium ions favor fertilization in Lytechinus pictus.

CARD GAMES.
Shahan Madzounian, Shirag Shemmassian and Anush Abrahamian (teacher). Ferrahian Jr. and High School, 5300 White Oak Ave. Encino, CA 91436

This experiment answered the question about air pressure. Place the card on top of a glass filled with water and turn it upside down, then let go of the card. The water stays in the glass held by the card. Air around the card pushes up against the card much harder than the water pushing it down on the card. That's why the water stays in the glass. You would need a glass of water that is 30 feet high before it could weigh enough to push the card down.

FRUITS AND SEEDS
Patrick Tatarian, Der Megerdichian (Teacher) Holy Martyrs Ferrahian Armenian High School, 5300 Whiteoak Avenue Encino, CA 91316

In this study the traits of six different fruit types were examined: String bean, peach seeds, pistacio, peanuts, cucumber, green pepper, and okra. Seeds were soaked in water. The inside and outside of each seed were observed with a hand lens. The okras were fleshy, seed edible, and have evidence of flower parts. The peaches were fleshy, weren't seed edible and had evidence of flower parts. The pistacios were dry, edible, and didn't have evidence of flower parts. The peanuts were dry, seed edible, and didn't have any sign of flower parts. The cucumber were dry, wasn't seed edible and had evidence of flower parts. The green peppers were fleshy, weren't seed edible, and showed signs of flower parts.

THE COMPARISON OF DIFFERENT SKIN COLOR GROUPS TO THE AMOUNT OF FRUITS EATEN DAILY
E. Andjunyan and G. Sorensen (teacher), Henry Middle School, 17340 San Jose Street, Granada Hills, CA 91344

The purpose of my survey was to find out the amount of fruits eaten by people of different skin colors. Recent cancer research has indicated that a diet high in antioxidants, which are found in fruits, may reduce the risks of developing some cancers. There was a total of 341 people surveyed. In the very paleskinned group, 11 out of 30 (or 37%) claimed they occasionally ate fruits. In the
white-skinned group, there was not a significant difference between those who ate fruits occasionally and those who ate fruits once a day. In the olive-skinned group, 35 out of 102 (or 34%) said they ate fruits once a day. However, 26 people (or 25%) in this same group said they ate fruits more than twice a day. There was not a significant difference between those who ate fruits occasionally and those who ate fruits once a day in the brown-skinned group. There was not enough black-skinned people surveyed to make a conclusion. Based on the connection of diet and the development of cancer, individuals in the olive-skinned group should have the least risk of developing cancer.

**DRY AS A BONE.**
Shahan Madzounian, Shirag Shemmassian and Anush Abrahamian (teacher). Ferrahian Jr. and High School, 5300 White Oak Ave. Encino, CA 91436

This experiment answered the question about air being invisible. Crumple the sheet of paper and stuff it into the bottom of a glass. Turn the glass upside down. Without tilting it push it down under the bowl water. Then take it out of the water and notice that the paper stayed dry. The reason is that because the air inside the glass took up space. Air left no room for the water to reach the paper.

**ARE INSECTS AS DUMB AS WE THINK?**
D. Ahdoot, M. Bonburg, J. Hakakha, R. Shallenberger and A. Morton (teacher), Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

This experiment set out to investigate associative learning in the common fruit fly (*Drosophila*). To establish a number of *Drosophila* colonies, we placed a glass jar outside with tangerines in the bottom. After three days we brought the jar inside, placing a layer of cheesecloth over the jar. After several days larvae appeared. We then placed the fruit flies in a wind tunnel to see how they responded to various odors after being raised only on tangerines. Inside the tunnel, we placed the fruit they had been raised on (tangerines) and a piece of foam on inverted drinking glasses. A box fan on low was placed behind the tunnel to help carry the plumes of the fruit. We then switched positions of the foam and fruit. Initially the fruit flies' flight pattern was a casting from side to side, trying to locate the source of the odor. As they moved closer to the source they zeroed in on it and landed on the tangerines. Next, we replaced the foam with bananas, and again, the flies located the tangerines. It was found that if the fly lost the tangerine-odor plume and detected the banana plume it did not land immediately on the banana but continued to search, casting back and forth in a larger arch. Occasionally a fly would land on the bananas, but it did not stay long and began searching again. We then offered bananas and apples to the tangerine-raised flies. The number of flies landing on each fruit was about equal, though the searching process seemed to take longest during this part of the experiment. This experiment proved that fruit flies can learn through association, an important part of their survival in an environment filled with various chemical scents and visual cues.
ICE FLOATS
Tanya Berkian, Mrs. Abrahamian (teacher), Holy Martyrs Ferrahian School, 5300 White Oak Ave., Encino, CA 91316

Why can’t you sink an ice cube? It’s because an amazing thing happens when it freezes. This project proves that water expands when it freezes. Water does just the opposite—it expands. When water freezes, its tiny molecules arrange themselves in an ordered array called a crystal. This arrangement of the molecules takes up more space than the haphazard arrangement found in liquid water. In this experiment place the empty jar in the freezer. Set it where it will stand upright and stay steady. Close the freezer and come back in three hours and see what has happened. This is the reason for another amazing fact about water—the same volume weighs less when frozen than when liquid. That’s why ice cubes float in a glass of water and why icebergs float in the ocean.

THE EFFECTS OF REFRIGERATION VERSUS STORAGE IN THIN STEM POLYETHYLENE PIPETS ON THE VIABILITY OF SEA URCHIN EGGS AND SPERM.
C. Chang, K. Araneta, C. Tenggardjaja, A. Magill, S. Hwang, and M.L. Weitkamp (teacher), Chaminade College Preparatory, 7500 Chaminade Avenue, West Hills, CA 91304.

In this experiment, we set out to find whether gametes from the purple sea urchin, Strongylocentrotus purpuratus, are better preserved through long term storage in refrigerated sea water at 8.5° C or in thin stem polyethylene pipets. Our hypothesis was that the gametes stored only in refrigerated sea water would be better preserved because they would suffer from loss trauma. After 2 vials of sea urchin eggs and sperm were stored in a refrigerator for 44 hours, a group was taken out and stored in thin stem polyethylene pipets for 2 more hours. We compared the viability of the group of eggs and sperm left in the refrigerator with the viability of the group of eggs and sperm stored in the pipes. Eggs and sperm from each group were allowed to fertilize. The fertilization rates of 7 trials of only refrigerated eggs and sperm in at least 3 fields of the microscope was examined. We also examined the fertilization rates of 10 trials of eggs and sperm stored in thin stem polyethylene pipets in at least 3 fields of the microscope. We found the mean, median, and mode fertilization rates of the only refrigerated sex cells passed our criteria of being 5% greater than the fertilization rates of the sex cells transferred to the thin stem polyethylene pipets. Since the fertilization rates were greater, we concluded that the viability of the sex cells of S. purpuratus were better preserved in a refrigerated environment.

THE OPENING OF THE STOMATA
M.H. Kugler, J.A. Greenlinger, and A. Morton (teacher). Calabasas High School, 22855 W. Muilholland Hwy. Calabasas, CA 91302

The purpose of this experiment was to track the activities of the stomata. Portions of the leaves of the pathos plant were soaked in four different concentrations of potassium chloride (KCl): 4 parts KCl and no parts water, 3 parts KCl and 1 part water, 2 parts KCl and 2 parts water, and 1 part KCl and 3 parts water. The leaf portions were then examined under a microscope at x650. The image was transferred to a television monitor where the opened stomata were measured. The experiment was conducted 3 times. In the highest concentration of KCl, the stomata opened 2 mm on the television screen. In the next lowest concentration, the stomata opened 3 mm on the television screen. The 2 part KCl concentration opened the stomata 4 mm. The lowest
concentration, 1 part KCI, opened the stomata 8mm wide. Our research has shown that KCI has an influential power on the opening of the stomata.

CREATING GAS
P. Davoodian, K. Surmenian, L. Tomassian and A. Abrahamian (teacher), Holy Martyrs Armenian Elementary School, 5300 White Oak Avenue, Encino, CA 91316

This experiment was performed to determine what happens when baking powder and vinegar are combined (mixed together). A small glass jar, with a small top, was filled with vinegar to which baking powder was added. Quickly a balloon was placed on the top. After the baking powder was added, air bubbles formed. The air bubbles filled the balloon, which got bigger and filled with gas.

EFFECTS OF SUGAR, ASPIRIN AND SODA ON FLOWERS
G. E. Berberich, Ph.D. (teacher), Van Nuys High School, 6535 Cedros Ave., Van Nuys, CA 91411

We had heard that aspirin, sugar and soda pop would help preserve the life of flowers so we set out to find out if this was true. For this study we used several different types of flowers. Some flowers we placed in water only. Others were placed in water with sugar or aspirin or soda. Some we used combinations of sugar and aspirin or aspirin and soda, etc. We observed that the flowers with the additives did live longer. We did not observe any significant difference for those with combinations (of more than one additive) over those with only one. We could clearly discern, however, that the additives did improve the longevity of the flowers above water alone. We concluded that the aspirin and soda were better conducted by the xylem in the stem of the flower and that the sugar acted as food for the flower.

VASCULAR PLANTS OF THE LOS ANGELES RIVER
L.V. Baumbach, L. Hasz (teacher), Notre Dame High School, 13645 Riverside Dr., Sherman Oaks, CA 91423

This study concerns the biota of the Los Angeles River. The focus of this study is the flora (specifically the vascular plants) of the L.A. River. This study is based upon previous studies conducted by Gary D. Wallace, section of botany, Natural History Museum of L.A. county. Since September 21, 1995, the study has been conducted at the Sepulveda Basin section of the L.A. River. The following is a list of the vascular plants classified during this study: (plants in the water) Pontedriace Eichhornia, Polygonaceae Rumex crispus, P. Polygonum amphibium, Solanum nodiflorum, Scrophulariaceae Mimulus cardinalis, (plant on the sandy bank) Compositae Helianthus s., Leguminosae Melilotus albus. (plants on the upper bank) Solanaceae Datura meteloides, S. Nicotiana glauca, Braccharis viminea, Cruciferae Brassica nigra. This study is continuing.
EFFECTS OF POLLUTION ON THE ECOSYSTEM.
J. Choi, S. Chung, G. Kim, J. Lee and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302.

The purpose of this study was to determine the damage pollutants can inflict on our ecosystem. Abiotic substances (gravel), primary consumers (fish and snails), primary producers (plants), and decomposers (bacteria) were each placed inside four fish bowls, which created individual ecosystems. After each ecosystem was stabilized, smoke was added to one bowl with a sealed cover and household chemicals were poured into a different bowl. The third bowl was placed under continuous light and heat in order to test the greenhouse effect, and the last ecosystem remained a control so the differences could be distinguished. Our experiments resulted in the failure of the ecosystems to thrive except for the control group. The living organisms were all eventually killed by the pollutants. Our results suggest that pollution causes dramatic changes in the functioning of our environment.

BLUE LIGHTING VS. REGULAR LIGHTING
Sharon Mah, S.B. Minassian (teacher). Schurr High School, 820 N. Wilcox Ave., Montebello, CA 90640

The purpose of this lab was to see under what light conditions seeds germinate fastest. The control group consisted of forty radish seeds grown under regular lighting. The experimental group consisted of forty radish seeds grown under blue lighting. After fourteen days, the seeds under blue lighting germinated faster than the seeds under regular lighting. The average height of the seeds under regular lighting was two inches, while the ones under blue light their average height was four inches. Therefore, this experiment proved that seeds grown under blue lighting germinated faster and also grew at a faster rate than seeds grown under regular lighting.

CONDUCTIVITY AND CHEMICAL BONDING.
Arbi Aghadjanian, Mrs. Der Megerdichian (teacher), Holy Martyrs Armenian High School, White Oak Avenue, Encino, CA 91316

This experiment was done to see whether ionic or covalent compounds were better conductors of electricity. A conductivity apparatus was made and the wire in which the electricity flowed was cut so that there were two pieces of wire with one connected to the lamp and the other to the electric source. The cut end of one wire was connected to a short metal strip and the same was done with the other cut end. The metal strips were put into 30 cm (cubed) of distilled water and the electric current was turned on and the result was observed. This procedure was repeated for 30cm (cubed) of tap water, alcohol, NaCl, sucrose, and sodium bicarbonate solutions respectively. The distilled water, alcohol, sucrose and sodium bicarbonate did not conduct electricity because the lamp did not turn on while with the NaCl solution and tap water the lamp did turn on. This suggests that ionic compounds conduct electricity while covalent compounds don't.
STUDY OF THE ALGAE IN THE SEPULVEDA BASIN DAM REGION OF THE LOS ANGELES RIVER
A. Belli, A. Leh and L. Hasz (teacher). Notre Dame High School, 13645 Riverside Drive, Sherman Oaks, CA 91423

In this study, we examined the types of algae in the Los Angeles River. We took samples from four key locations going downstream. Site 1 was an area of the river in which the water consists only of street runoff, Site 2 was an outlet from Lake Balboa which is fed by tertiary water treated by the Tillman Water Plant. Site 3 was just beyond the junction of water flowing from Site 1 and Site 2. Site 4 was about a quarter mile further downstream from Site 3. Samples were taken about once a week over a four-month period from October 1995 to January 1996. Air temperature, water temperature, water flow volume and overall weather conditions were taken down each time we visited the river. The algae samples that we have found consists of single-celled, multi-celled and attached filamentous. Generally, we have found the largest quantities of algae at Site 1 where the river is wide and the water flow is slow. We have found little to no algae at Site 2 where the water is in a cement channel and flows more swiftly. During December, we have found a few samples of algae at Site 3 where the water flows more quickly due to the narrowness at that spot. Even though one wouldn’t expect to find algae at Site 3 because of the water’s high velocity, we attribute our findings to the rainfall in December. There is an abundance of algae at Site 4 because it’s further downstream where the river widens causing the water’s speed to decrease. In the future, we plan to classify and scientifically quantify our algae samples.

THE EFFECTS OF DIFFERENT PLANT MEDIA ON PLANT GROWTH AND HEALTH.
Y. Osuga, J. Hinkes A. Richter, and A. Morton (teacher). Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302

The purpose of this study was to determine if several different growth media could sufficiently sustain plant growth. *Pisum sativum*, or the common garden pea, and *Raphanus sativus*, or the common garden radish, were both planted in a controlled environment in five different media. The media were common potting soil, potting soil soaked with acid solution, potting soil soaked with base solution, cotton, and sand. All plant environments were given an equal amount of water and sunlight except for the base and acid which were watered with acid solution and base solution respectively throughout the experiment. Each experiment was conducted 4 times. The regular potting soil had the average growth; the peas grew on an average of 32 centimeters while the radish grew 9 cm. In acid, the peas grew 15 cm while the radishes grew 6 cm. In base, the peas grew 18; radishes grew 7 cm. In cotton, pea 25 cm; radishes 7 cm. In sand, pea 28 cm; radish 8 cm. The results suggest that regular potting soil with ample water and sunlight is the best media for plant growth. However, cotton and sand can be used as substitutes. Sand is the primary media for many types of plants. Neither acid-soaked soil nor base-soaked soil are suitable media for plant growth.

COMPARISON OF AGE GROUPS IN RELATION TO SUN EXPOSURE.
Joanne Daher, G.M. Sorensen (teacher), Henry Middle School, 17340 San Jose St., Granada Hills, CA 91344

In Los Angeles, many people go to the beach to tan. My survey determined by age group, how many people allowed themselves to tan. There were 236 people in my survey. 6 people reported to have cancer (4 skin cancers; 1 colon; 1 basal cell). To the question “Do you allow yourself to tan
occasionally?” Each age group responded in the following manner: 51% of those under 20, (61 of 120); 46% of those between the ages of 20 - 39, (52 of 112) - 2 reported skin cancers; 58% of those between the ages of 40 - 59 (60 of 104) - one reported basal cell cancer; and 65% of those over the age of 60, (13 of 20) - one reported skin cancer and one colon cancer; said that they allowed themselves to tan. To the question “Do you always use sunscreen?”, each age group responded in the following manner: 12% of those under 20 (14 of 120); 9% of those between the ages of 20-39, (10 of 112); 11% of those between the ages of 40-59 (11 of 104); and 5% of those over the age of 60 (1 of 20) - one reported skin cancer; said that they used a sunscreen. From this research, I think that people who were surveyed liked to tan themselves occasionally run a higher risk of skin cancer (3 skin cancers reported), that the few people who wore sunscreen to protect themselves from the effects of the sun (one skin cancer).

SEED ADAPTATIONS
Rita Buchakjian and V. Dermegerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

This study examines the possible effects of temperature & scraping on the amount of seed germination. 3/4 of a cup of water was boiled and put into a jar and 3/4 of a cup of cold water into a second jar. 10 bean seeds were put into each jar. After 15 min. all seeds were removed from the jars, and each group was wrapped in separate paper towels. Each moistened towel was placed in a plastic lunch bag, labeled "hot" or "cold". Ten bean seeds were placed between wet paper towels in plastic bags, and labeled "unscraped". Another 10 seeds were scraped on sandpaper exactly 10 times. The seeds were placed between wet paper towels in plastic bags, labeled with "scraped". The bags were set for 4 hours. The same procedure was done again but the plastic bags were placed in a dark cabinet, again for 48 hours. 90% of the seeds left in hot water had germinated and 30% when left in the dark cabinet. The seeds from cold water had 80% germinated and 0% in the dark. 70% of the scraped seeds were germinated and 20% from the dark. From the unscraped seeds 60% germinated and 10% from the dark. Results show that hot water increases the germination rate, also cold water but not as much. Scraping also increases germination rate. When the seeds aren’t exposed to light the germination rate decreases.

ENVIRONMENT OF PILL BUGS
S.K. Kazandjian, E.S. Isagholian, K.M. Payosiyan, Mrs. Abrahamian (teacher), Ferrahian Elementary School, 5300 White Oak, Encino, CA 91316

Materials: 1. six pill bugs, 2. pie pan, 3. aluminium foil, 4. paper towels, 5. water. Procedure: 1. cover half the pan with foil; 2. place three pill bugs under the foil and three on the uncovered part of the pan; 3. see how many pill bugs go under the foil; 4. remove the foil and pill bugs; 5. put two separate pieces of paper towel on each half of the pan; 6. wet one of the pieces of paper towel; 7. place three pill bugs on the dry paper towel and three on the wet paper towels; 8. see how many pill bugs go to the dry paper towel and how many pill bugs go to the wet paper towel. Results: The results of this project suggest that pill bugs prefer wet and damp areas.
GHOSTLY SALT
Adrienne Lisa Miyamoto, Sr. Miriam Donald, Aulikki Flagan (teachers), Ramona Convent Secondary School, 1701 West Ramona, Alhambra, CA 91803

My science project, "Ghostly Salt", is to find out which area has more percentage of salt in the same amount of salt water, the Salton Sea or the Pacific Ocean? To find out, first I went to the Salton Sea State Recreational Area and to the Santa Monica Beach to collect the salt water. Next, I weighed the same amount of salt water and subtract it from the weight of its bottle. That is to get the weight of the water only as its total. Then I evaporated the water to get salt. The salt left behind from the water is divided from its total to get its percentage. For the results of the four experiments, my hypothesis is correct that the Pacific Ocean has less salt. I conclude that the Salton Sea is about 1.4% saltier than the Pacific Ocean, since the average for the Salton Sea is 4.5% and the Pacific Ocean is 3.4%.

HOW DO THE STREAMS AND LAKES DIFFER IN CALIFORNIA VERSUS PENNSYLVANIA?

This study examined the differences of the east and west coast streams and rivers. We examined how the different water sources in Pennsylvania and California varied in current rate, temperature, pH, hardness and water quality. Many samples were collected from streams in both states. The temperature and current rate were measured and recorded. The temperature was tested using a Fahrenheit thermometer. To find the current rate we used a standard stick and measuring tape, measuring the distance the stick traveled per 30 seconds. Using chemical water testing kits, we then tested for the pH, hardness and quality. Three tests were completed for each sample. The results are that the east coast water sources tested are colder and faster moving and the pH is lower. The quality is better and there is less organic matter in the water on the east coast. The water sources tested on the West coast are slower moving and warmer with higher basidity, hardness, and lower quality. The conclusion we have come to is that the overall quality of Pennsylvania water sources are much better than California water sources.

TESTING WATER QUALITY.
Arthur Yavrouian. Mrs. Der Megerdichian (Teacher). Holy Martyrs Fehrahian Armenian High School, 5300 White Oak Ave., Encino CA 91316

This study examines the judging of water quality by determining the amount of Oxygen gas and Carbon Dioxide gas dissolved in water. First taking 100mL of two different types of water samples (boiled and carbonated tap water) and placing them in small flasks (or beakers). Flasks were labeled and recorded in a table. Ten drops of solution A (Manganous Sulfate) were added to the each water sample with a dropper. Then ten drops of solution B (70% Potassium Hydroxide and 15% potassium iodide) were added to the water samples. Then the contents were mixed. Then after it settles I add 15 drops of solution C (Concentrated Sulfuric Acid) to each then mix. Then 5 drops of solution D (2% Starch) was added to the water sample then the water samples turned blue. After I added solution E (.31% Sodium Thiosulfate) until the water became to its true color. The results were that the tap water had more ppm (parts per million) than the boiled water because there was more oxygen in the tap water than the boiled.
EFFECTS OF CEPHALOSPORIN ON SEA URCHIN FERTILIZATION.
J.K. French, J.T. Talac and Mr. W.P. Van Duzee (teacher). Saugus High School, 21900 Centurion Way, Saugus CA, 91350

This experiment examined the effects on sperm-egg interaction in the sea urchin Lytechinus pictus of an Antibiotic, (Cephalosporin), used to treat bacterial infections. Sperm and eggs were administered the Antibiotic Cephalexin (generic for Keflet) and compared to those without. 500mg of Cephalexin and 10 mL of tap water were used. The sperm and eggs were incubated for 10 minutes at 25 degrees celsius in pH 8.0 artificial sea water and the percent of fertilization was noted. The experiment was run three times. The addition of Cephalexin did not influence the rate of fertilization, which was 86%. Cephalexin was also introduced to the sperm and eggs separately, with negligible impact on either. The control value for fertilization for this experiment was at 89%±6%. The results indicated that Cephalexin does not interact or hinder the fertilization of eggs in Lytechinus pictus.

EFFECTS OF DIFFERENT TREATMENTS ON THE GROWTH OF AFRICAN VIOLET PLANT SEEDS AND THE RELATION TO ITS SEED ADAPTATIONS.
D. Sevanesian and V. Der Megerdichian (teacher). Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

The study examined the effect of various environmental treatments on the growth of seeds and how this relates to the adaptations of the seed. The three treatments were temperature differences (hot & cold), the seed coat being scraped or unscraped, and indirect or direct sunlight. For each trial, ten African violet seeds were used in each bag, two bags per experiment. The seeds were placed in a plastic bag between moist paper towels and were examined 48 hours later. The results were that 40% more seeds germinated in cooler water, 40% more seeds germinated when their seed coats were scratched, and 50% more seeds germinated under direct sunlight. The results proved that the African Violet's seed has the tendency to germinate in cool to warm weather (springtime) under the presence of sunlight and if coat of seed is scratched in nature, germination will occur faster.

THE DESIGN OF CARS IN RELATION TO THEIR SPEED
Jessica Fisher and M. Simonds (teacher), Portola Magnet School, 18720 Linnet Street, Tarzana, CA 91356

This experiment researched the role of a car's shape in relation to its speed traveling down a ramp. Toy cars of approximately the same weight were raced down a ramp ten times in four groups, and the order in which the cars reached the end of the ramp was recorded. Before each group was tested, a prediction of which car would travel fastest based on the shapes of the cars was recorded. It was necessary that the cars all be the same weight for the experiment to work properly, or the heaviest car would have reached the bottom first. In the first group, the prediction of which car was correct; the car that was lowest, thinnest, and most streamlined ended first. In the second group, the prediction was correct again. This car, like the first, was small and streamlined. In the third group, the prediction was wrong. A delivery truck was being raced against two smaller pick-ups, and the delivery truck landed first; the reason for this is yet unknown. In the last group, the prediction was correct and the car which was shaped most efficiently won. When all four of the winners were raced together, the heaviest one, as expected, landed first. The results of this study suggest that the shape of a car does influence its speed and velocity.
WHICH PLANT FOOD WORKS BEST FOR PLANTS?
S.J. Sacket, M.L. Golde and A. Morton (teacher), Calabasas High School, 22855 Mulholland Hwy., Calabasas, CA 91302

The purpose of this study was to discover which type of plant food provided the best results in the growth of the plant *Hypoestes* or otherwise commonly known as “Pink Polkadot.” Each of the six plant pots was assigned a number, and the number was then written on the plant pot. Plant number four was made a control plant. On day one, each plant was measured in its pot against the ruler. The measurement was recorded, and each plant’s photograph was taken. Five solutions were made up, one of each food according to the manufacturers’ instructions. Fifty to one hundred milliliters of solution were given to each plant periodically. Control plant number four was given plain water in equal amounts to the other plants’ solution. Records of the feedings were taken. We observed the growth of the plants over a four week period, and recorded the growth of each plant. Based on our results, we concluded that the most successful plant food was “Rogers Oxygen Plus.”

COMPARING DORMANT AND GERMINATING SEEDS.
Monica Ghailian, Mrs. V. Der Megerdichian (teacher), Holy Martyrs Ferrahian High School, 5300 White Oak Ave., Encino, CA 91316

This study compared the amount of oxygen used by different seed types. The rate of respiration occurring in dormant and germinating seeds was compared. Measures and records were taken of the height of water which rose in each chamber to indicate the amount of oxygen used by each seed type. Two test tubes were prepared one containing five germinating bean seeds and the other containing five dormant bean seeds. Half a teaspoon of soda lime was added and a cotton plug was put on top. A 3rd test tube, the control, was prepared containing only half a teaspoon of soda lime and covered with cotton. All three test tubes were placed in a glass cup containing 30 ml of colored water and after a 24 hour period the height of water that rose in each test tube was measured. The water in the dormant seed test tube rose 1.4 cm. while the water in the germinating seed test tube rose 3.3 cm. The water in the controlled test tube rose 3.7 cm. The results show that seeds use oxygen then release carbon dioxide. The soda lime is a chemical which then absorbs or removes carbon dioxide from the air.

TESTING THE ACIDITY OF VARIOUS SUBSTANCES.
Shant Boyadjian, V. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

The purpose of this experiment was to test various medications to see if they were acids or bases. About 1 oz. of each of the following chemicals was dissolved in 10 mL of water and placed in different test tubes. These chemicals are: Bayer (active ingredient: aspirin), Mylanta (active ingredient: sodium bicarbonate), Visine A.C. (active ingredient: zinc sulfate), Ampicillin, Vicks 44M (active ingredient: acetaminophen), Dextromethorphan Hyd bromide, Promethazine w/wd, and Fluocinolone Acetamide. Two inches of pH paper was put into each container. One minute later, the color of each paper was compared to a color pH scale (1-12). The results were Bayer: 5, Ampicillin: 8, Vicks 44M: 5, Dextromethorphan Hyd bromide: 8, Visine: 6, Promethazine w/wd: 6, Fluocinolone Acetamide: 6, and Mylanta: 6. These results suggested that most medications are acidic.
EFFECTS OF STORAGE ENVIRONMENT UPON FORTY-FOUR HOUR OLD *STRONGYLOCENTROTUS PURPURATUS*.
K. Nizami, C. Witcher, J. Horner and M. Weitkamp (teacher). Chaminade High School, 7500 Chaminade Ave, West Hills, CA 91304

This study investigated the effect of differentiated storage environments upon the fertilization rate of the sea urchin *Strongylocentrotus purpuratus*. The percent fertilization rate of sperm and egg stored in 8.5°C seawater was compared with the sperm and egg stored in thin stem polyethylene pipets. The fertilization rate was obtained by observing the ratio of eggs with fertilization membranes to the total number of eggs in each field of the microscope. Each experiment was repeated seven times, incorporating three fields in each trial. The fertilization rate of eggs stored in sea water and polyethylene pipets was 19 percent and 13 percent, respectively. The results suggest that the polyethylene pipets reduced the fertilization rates by six percent. This six percent difference in fertilization rates can be attributed to the separation of the sperm and eggs from their natural sea water habitat and to the unusual time period of storage without insemination.

SEED ADAPTATIONS
Vatche B. Meserlian, Mrs. Der Megerdichian (teacher), Holy Martyrs Ferrahian High School, 5300 White Oak Ave., Encino, CA 91316

This experiment studied seed adaptation. Ten seeds were put in boiling water, and ten in cold water. After 15 minutes, they were removed, and wrapped with separate towels. Then, each of the towels was placed in moistened separately, each bag was labeled hot or cold. Each bag was set aside for 48 hours. The same procedure was used for scraped and unscraped seeds. 8 out of 10 germinated from cold water, 3 out of 10 germinated from boiling water. 6 out of 10 germinated from scraped seeds, 2 out of 10 germinated from unscraped seeds. In conclusion, 80% of the seeds from the cold water germinated, and 30% of the seeds germinated from the boiling water. 60% of scraped seeds germinated, and 20% of unscraped germinated.

SEED ADAPTATIONS
Adam Lazarnejad, Mrs. V. DerMegerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino CA, 91316

In this controlled experiment, 40 radish seeds, 4 plastic bags and four paper towels were used. In the first bag, 10 seeds were soaked in cold water than put on a paper towel that was then put back in the bag. In the second bag, 10 seeds were placed in hot water using the same procedure as the first. In the third bag, 10 seeds were put directly to a moist paper towel, then in the bag. In the fourth bag, 10 seeds were scraped with sandpaper then put on a moist paper towel. They were put in identical conditions for 2 days. The result was as follows: there was no evidence of germination in bags one and two although germination occurred in bags three and four.
WHICH ARE SMARTER: RATS OR MICE.
Lenny Rachitsky and A. Morton (teacher), Calabasas High School, 22855 Mulholland Highway, Calabasas, CA 91302

This project tested the intelligence of rats and mice to see which is smarter and which has a better memory. Two rats and two mice were put into a maze separately and were given a certain time to explore it. Then they were put back into the maze at a different time and were timed. This was done five times with each animal. This test was to see how good their memory was. A second test was done to see how intelligent they were. Each animal was put into a sort of fork-in-the-road. On the right side, there was food and water and they were free to do whatever they wanted. On the left side, they were picked up and played with roughly. They were free to go to any side they desired. The animals were put into it 10 times to see if they learned not to go to the left side. In each test, the rats chose the right side which roved that rats are smarter.

THE BIOLOGICAL EFFECTS OF SINGING.
N. Nicola, D. Shah (teacher), Gaspar De Portola Middle School, Highly Gifted Magnet, 18720 Linnet Street, Tarzana, CA 91356

This study was designed to answer the question of song’s effect on the human body. Two classes, Show Choir (C. Palmer, teacher), and biology (D. Shah, teacher), had their temperature and blood pressure measured before and after 20-minute blocks of class. Of the singers, the mean increase in temperature was 0.84 degrees Fahrenheit. Their blood pressure dropped an average of 3.88 mm (systolic) and 10.66 mm (diastolic). The biology class, my non-singing control, had an average temperature increase/decrease of 0, and a blood pressure change of -.5 mm (systolic) and 10 mm (diastolic). This suggests that singing, perhaps as a result of the increased respiration, reduces blood pressure and, due to the physical exertion, increases temperature. The biology class showed no temperature change, with no physical activity, and a sharp increase in blood pressure. The fact that these two statistics are so opposite leads me to believe that singing is a far more relaxing activity, as a whole, than science.

THE COMPARISON OF DIFFERENT SKIN TYPES TO THE EXPOSURE TO THE SUN.
Y. Choi and J. Belg (teacher), Henry Middle School, 17340 San Jose Street, Granada Hills, CA 91344

A survey was made on how much sun exposure people of different skin types allowed themselves to receive. There were 294 people who were surveyed. Six people stated that they had cancer (5 skin cancer; 1 basal cell). 81% (21 of 26) of very pale skinned people (2 reported skin cancers), 60% (68 out of 114), white-skinned people (1 reported skin cancer; 1 basal cell cancer), 44% (40 out of 91) olive-skinned people (1 reported skin cancer), 40% (22 out of 55) brown-skinned people sometimes let themselves tan in the sun. 4% (1 out of 26) very pale-skinned people, 18% (21 out of 114) normal white-skinned people (1 reported skin cancer), 20% (18 out of 91) olive-skinned people, 11% (6 out of 55) brown-skinned people always used sunscreen so they almost never tanned or burned. There were not enough black-skinned people to evaluate their behavior. My conclusion is that normal white-skinned people and olive-skinned people use sunscreen more often to protect themselves from burning and tanning (1 skin cancer) compared to those who were very pale-skinned, normal white-skinned, and those who were brown-skinned (six reported cancers- 5 skin cancers).
USING DIFFERENT CHEMICALS TO DETERMINE PLANT GROWTH.
Sophia Mikhael, V. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino, CA 91316

This study examined how a chemical could have an effect on plant growth. In 6 foam cups, with 4 seeds in each cup, radish seeds were planted. 3 of the foam cups were used to put the chemical Glass Plus in while the other 3 were left as control. The plants were left in the sun and were given the same amount of water. After adding the chemical Glass Plus the effects were observed for 5 days. The chemical in Glass Plus retarded the growth of radish plants.

HOW MUCH VEGETABLES DO YOU EAT EACH DAY?
J. Jung and A.P. Munch (teacher), Henry Middle School, 17340 San Jose Street, Granada Hills, CA 91344

Cancer research seems to indicate that a high intake of vegetables in the daily diet reduces colon cancer risk. The purpose of my survey was to see which skin color group ate the largest amount of vegetables. A total of 80 people were surveyed. In this survey, I found that the olive-skinned people had the highest vegetable intake with 37% (33 out of 90) of this group responding that they ate vegetables twice a day. However, 41% (16 out of 9) of the very pale-skinned people, 44% (77 out of 174) of the white-skinned people, and 43% (29 out of 67) of the brown-skinned people all responded that they ate vegetables only once a day. Although there were only 10 black-skinned people surveyed, 4 out of the 10 said they ate only occasionally. Based purely on the connection between diet and colon cancer, the olive-skinned individuals should have the least risk of developing colon cancer.

EFFECT OF ADDING WEIGHT TO A MODEL RAILROAD LOCOMOTIVE.
B.M. McCarthy, A. Flagan (teacher), Ramona Convent Secondary School, 1701 W. Ramona Rd., Alhambra, CA 91803

This project examined what happened to the ability of a model railroad locomotive to pull weighted freight cars up a grade as weight was added to the locomotive. An 8' long test bed was constructed with an 8% grade (the board rose 4" in a 50" length). Track was laid on the board and hooked to an electric throttle. Freight cars were weighted to the point that the locomotive's wheels slipped and it was unable to pull the cars up the hill. The cars were then weighed (a total of 22.5 oz.). Next the locomotive was weighed (7oz.). A starting point was marked on the test bed and half throttle was applied. A mark was made where the locomotive's wheels slipped. The train was brought back to the starting point and 1/2 oz. of weight was added to the locomotive. The process was repeated and the position was again marked. As weight was added, the locomotive's ability to pull the cars up the grade was improved. When a total of 4.5 oz were added, the locomotive was able to pull the cars the full length of the grade. The conclusion is that adding weight increases the traction of the locomotive and therefore its ability to pull cars up a grade.
WHAT TYPES OF SOLUTIONS PRESERVE FLOWERS THE LONGEST?
S.N. Selfridge, H. L. Borden, A. Morton (teacher). Calabasas High School, 22855 West Mulholland Highway, CA 91302

The purpose of this experiment was to determine what solutions preserve flowers the longest. The 6 solutions we used were tap water, bottled water, saline solution, bleach and water, aspirin and water, and floral preservative with water. The proportions of the solutions in the experiment were: tap water - 1 1/2 cups, bottled water - 1 1/2, saline solution - 1 tsp. salt to 1 1/2 cups of water, bleach solution - 1 tsp. of bleach to 1 1/2 cups of water, aspirin - 1 tablet to 1 1/2 cups of water, and floral preservative - we followed the directions on the back of the packet. We put carnations in the solutions and once a day wrote down any changes. All of the variables such as: sunlight exposure, amount of solution, solution temperature, and solution proportions were kept constant. We repeated the experiment 3 times. The first 2 times we used 8 carnations in each solution and the third time we put 5 specimens in each solution. We kept them in the solutions for 14 days each. The results showed that tap water and floral preservative do an equally good job of preserving flowers.

USING DIFFERENT CHEMICALS TO DETERMINE PLANT GROWTH
Lena Vayvayan, V. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian High School, 5300 White Oak Ave., Encino CA 91316

The purpose of this experiment was to compare the normal growth of plant and the growth of plant while chemical mouthwash has been added. Rye seeds were planted in 6 foam cups. All of the seeds were given the same amount of water and sunlight. After the seeds had germinated 3 of the plants were used as control experiment and the other 3 experimental. On the experimental group drops of the chemical mouthwash once everyday was added. After 4 days the results suggested that the chemical mouthwash has killed the rye plant.

DO RADISH SEEDS GROW MORE THAN WATER CRESS SEEDS? WHAT LIVING CONDITIONS AFFECT THIS?
D. Greene, J. Miller, and A. Morton (teacher). Calabasas High School, 22855 W. Mulholland Hwy., Calabasas, CA 91301

The purpose of this study was to see if radish seeds tend to grow more than water cress seeds, and if so, what living conditions affected the growth. Samples of radish and water cress seeds were put into ten cups, five for each seed type, labeled cups 1-5. Cup 1 received water and sunlight each day, and cup 2 received sunlight but no water each day. Warm water was put in cup 3, which also got sunlight. Cup 4 was put in a refrigerator, for cold temperatures, and received water every day, while cup 5 was put in a dark, warm box, with water added each day. We observed how the seeds grew for a period of seven days. After the seven days, we observed that the seeds grew in cups 1, 3, and 5, but hardly in cups 2 and 4. In each of the cups that grew, the radish seeds grew more than the water cress seeds. Both types of seeds grew the most in cup 1, while the seeds in cup 5 grew almost as much. This experiment was done three times. These results show that radish seeds do have a tendency to grow more than water cress seeds, and water and sunlight are the living conditions that help both seeds grow the most.
EFFECTS OF CHEMICALS ON PLANT GROWTH.
T. Apelian, Mrs. Der Megerdichian (teacher), Holy Martyrs Ferrahian Armenian School, 5300 White Oak Ave. Encino, CA 91316

This study examines the question of chemicals put in the soil of a radish plant to see if it will affect the growth. Two groups were set containing 3 cups in each group. The first group was marked control. The second group was marked experimental. In the experimental group each radish plant was filled with soil, radish seeds, and a chemical. In the control group each radish plant was filled with soil, radish seeds, and water. Both groups were then put in front of a window for the same amount of sunlight. For the experimental group 1/2 teaspoon of the ammonia was added to the plant, once every three days. At the end of 14 days, radish plants in the experimental group grew faster. Even though the bleach and witch hazel didn't grow in the experiment, the result supports that ammonia promotes the growth of radish plants.

EFFECTS OF POLLUTANTS ON PLANT GROWTH AND DEVELOPMENT.
J. Ghaemmagharni, D. Valk, L. Valk, F. Viola, and A. Morton (teacher), Calabasas High School, 22855 W. Mulholland Hwy., Calabasas, CA 91302

The purpose of this experiment was to determine the effects of common pollutants on the growth and development of plants. Over a period of one month we subjected the plants to pollutants such as carcinogens found in cigarette smoke, water contamination via sodium chloride, noise pollution, the development of plants through the absence of light, and the effects of radiation through a microwave. For experiment #1 we placed plants in a sheltered environment containing a hole at the top. Within the environment a lighted cigarette was placed on the soil of the plant and was left on the plant until it burned out, exposing the plant to the harmful chemicals found in a cigarette. In experiment #2 plants were watered with a solution of water and sodium chloride. In experiment #3, we exposed plants to constant rap, alternative, and classical music. In experiment #4, plants were placed in a room containing no light. In experiment #5, plants were placed on top of a microwave where they received ample amounts of radiation through the vents of the microwave. The results of experiment #1 showed that the plants subjected to smoke died gradually while the control continued to grow. The results of experiment #2 showed that the plants watered with the salt water were killed immediately due to dehydration. In experiment #3 the plants exposed to alternative and classical music remained the same in size and continued to grow. The plants exposed to rap music was comparatively smaller and stunted in growth. The results of experiment #4 showed the death of the plants not exposed to light and the growth of the plants kept in light. In experiment #5, the results of the radiated plants were stunted growth and withered leaves. In conclusion most plants exposed to pollution died. This conclusion proves that pollutants can be harmful in the growth and development of plants and possibly other life forms.

SEED ADAPTATIONS.
Lucy H. Topjian and Der Megerdichian (teacher), Holy martyrs Ferrahian Armenian High School, 5300 White Oak Ave., CA 91316

In this investigation, the effect of temperature on seed germination of radish seeds was studied. It was a controlled experiment. The materials used were 40 radish seeds, four plastic bags, and four paper towels. In the first bag 10 seeds were put in a cold water then transferred into a paper towel then into a bag. In the second bag 10 seeds were put into a hot water then taken into a paper towel.
which went in the plastic bag. The third bag consisted 10 seeds which were put in a moist paper towel which went in the bag. The fourth bag consisted 10 seeds which was taken and scraped 10 times on sandpaper then transferred into a moist paper towel which was put in a bag. These bags were put away for 48 hours. The result of germination after 48 hour was the cold watered seeds 0% germination, hot watered seeds 0% germination, unscraped seeds 80% germination, scraped seeds 90% germination.

A COMPARISON OF SEA URMICHN FERTILIZATION.
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This experiment compared the rates of fertilization in the species Strongylocentrotus purpuratus. The comparison was based on the fertilization rates of sea urchin sperm and eggs stored in either thin stem polyethylene pipettes for two hours or in refrigerated sea water at a temperature of 8.5°C. We took sea urchin eggs and sperm samples from both environments and allowed proper time for fertilization to occur on a slide. By examining three fields of the microscope, we determined the fertilization rate by counting the number of eggs that had developed a fertilization membrane and dividing this count by the total number of eggs. We performed ten trials of at least three fields of the microscope. The mean rate of fertilization for the eggs and sperm stored in refrigerated sea water was 18.48%, compared to 11.18% for the eggs and sperm in polyethylene pipettes. The results suggest that fertilization in S. purpuratus will more likely occur for eggs and sperm stored in refrigerated sea water as opposed to storage in polyethylene pipettes.

THE EFFECTS OF CAFFEINE ON RAPID RISING YEAST
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This study examined the question posed whether or not Rapid Rise yeast is affected by doses of caffeine. We used two identical glasses. Our control was the first of the two glasses which contained one cup of luke warm water, one teaspoon of sugar, and one teaspoon of yeast. To an equivalent solution we added four hundred milligrams of caffeine. Both glasses were mixed, timed, and measured. In the first three minutes, the control was measured at 8mm ± 1mm and the mixture increase with caffeine was measured at 4mm ± 1mm. There was a 50% increase in the rate at which the control rose. After a period of 6 1/2 minutes, which was the final timing of the tests, both measured at 10mm ± 1mm. The experiment was repeated 4 times for accuracy, and the results suggest that caffeine inhibits the rate at which the foam rises, but without completely stopping it.