The New Journal of Student Research Abstracts 2011

Volume XVI

Editor
Steven B. Oppenheimer
California State University, Northridge

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California State University, Northridge

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Van Nuys Airport
The New Journal of Student Research Abstracts
2011
Volume XVI
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Journal Survey Tear Off
Dr. Steven Oppenheimer (seated front row, second from left) visits the Blue Room in the White House, where he received a 2009 U.S. Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. Arden Bement, director of the National Science Foundation, is standing at the far left.

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 about 200 publications, including 14 books and book editions; was awarded over $7 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 serves on the editorial board and is editor for the United States, Canada and South America of the international journal *ACTA Histochemica*, published by Elsevier. He is recipient of 26 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.” He is a recipient of a U.S. Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.

Dr. Oppenheimer thanks the following organizations for funding his student-involved research programs: National Institutes of Health, National Institute of General Medical Sciences SCORE, RISE and MARC programs, the Joseph Drown Foundation, the Sidney Stern Memorial Trust, the National Science Foundation and California Science Project.

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About the Primary Associate Editor
Helen H. Chun received her Ph.D. and was a postdoctoral researcher at the University of California, Los Angeles. She currently is an Associate Professor in the Biology Department at California State University, Dominguez Hills. She researches the cellular response to radiation exposure, particularly in the stimulation of DNA repair and cell death.

About the Sponsor
California State University, Northridge, is ranked by the National Science Foundations in the Top 5 of over 500 similar universities in numbers of its science and social science graduates who go on to achieve doctoral degrees.

Sponsor’s website: www.csun.edu

About the Contributing Sponsor
Owned and operated by Los Angeles World Airports, Van Nuys Airport (VNY) ranks as one of the world’s busiest general aviation airports, averaging more than 330,000 takeoffs and landings annually. A facility dedicated to noncommercial air travel, VNY meets corporate, private and government aviation needs — in the process providing vital aviation services, enhancing efficiency at the region’s commercial airports, promoting business and serving as a valued San Fernando Valley community and educational resource.

As part of its community involvement, VNY supports several education programs, plus offers tours, presentations and other activities to help adults and youth alike learn about the exciting world of aviation in the San Fernando Valley and beyond.

Contributing sponsor’s website: www.lawa.aero/vny
About the Journal and Abstracts

The New Journal of Student Research Abstracts is published yearly in the fall. Continued publication is always dependent on funding.

The journal is intended to serve as (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, particularly in the areas of aviation and aerospace; and (3) a volume to disseminate student research discoveries.

Many abstracts included in the journal demonstrate good science, i.e. clear introductions describing a hypothesis to be tested, appropriate methods and data analysis, results and conclusion statements, and – most important – sufficient numbers of appropriate control and experimental samples and repetitions of experiments. Some are idea abstracts, and some are abstracts of library or Internet research projects.

Abstracts are reviewed by the teachers and the journal editors. Although the journal editors delete very poor abstracts from the publication, some abstracts herein are quite flawed, and some lack at least one component of a good science experiment. Including some of these abstracts helps make this journal very useful for classes to learn what makes for a good experiment and a good abstract vs. a not-so-good experiment and a not-so-good abstract.

Some of the abstracts are experimental plans instead of completed projects. This is especially true in the case of long-term, sophisticated research programs that require extensive setup and planning. The journal encourages abstracts on the planning and progress of such projects.

The journal editor continues to reserve the right not to publish those abstracts that are seriously flawed. The journal does not notify authors if their abstracts have been deleted.

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 California State University, Northridge, Van Nuys Airport, other contributing organizations and individuals, or the journal staff.

Submission of Abstracts

Any science teacher may submit student abstracts following the format used with the abstracts in this volume. After the title, followed by student author name(s) and teacher name (teacher), school and school street address, city, state and ZIP Code, abstracts should begin with the purpose of the study, followed by how it was done, and then the results and conclusions.

All abstracts should be typed in 11-point Arial font, error-free. Messy abstracts and those not following proper format may be discarded. The journal is not responsible for any abstracts received or for publication errors. The journal does not acknowledge receipt of abstracts and never guarantees that they will be published or that the journal will be published in any given year.

Only teachers may submit their students' abstracts to the journal. Teachers must submit each abstract as an electronic Word document to steven.oppenheimer@csun.edu. Abstracts not submitted electronically or not following the other guidelines provided herein may be discarded without notice.

The deadline for receipt of abstracts for each annual volume is June 1, but an issue may be closed at an earlier date. Publication is scheduled for each fall. Submitted abstracts are not returned to authors, so students and teachers are advised to keep a copy of all submitted materials. The only confirmation that abstracts will be published is if they appear in print.

Note: Thank you to teachers, administrators, students and parents for your input on last year's journal survey. We value your feedback and continue to work to incorporate it into future editions!

From the Editor:

Golden Opportunity for Underrepresented Science Students Interested in Careers in Biomedical Research

To those underrepresented science students who select California State University, Northridge, for your college experience: We have a golden opportunity for you. If you are a U.S. citizen or permanent resident and if you are possibly interested in a Ph.D. degree in biomedical science, you can apply for distinguished programs funded by the National Institutes of Health (Maria Elena Zavala, Director). These programs will open many doors and will pay you thousands of dollars to do research while a student at California State University, Northridge. We thank the National Institutes of Health, National Institute of General Medical Sciences MORE program for distinguished support for these student opportunities.

For more information, contact Steven Oppenheimer at steven.oppenheimer@csun.edu.
Congratulations from Van Nuys Airport to the recipient of the best aviation or aerospace abstract (as selected by the journal editor) for 2011. This student-author will receive special recognition from the airport. Great work!

Effect of Added Weight on Helicopter Ascension

Christopher Stanley and D. Shub (teacher)
Portola Highly Gifted Magnet Center
18720 Linnet St.,
Tarzana, CA 91356

This study examined the question of added weight on helicopter lift. The time in seconds needed for a model helicopter weighing 29 grams to go from a full stop on the ground to 2 meters in altitude using maximum acceleration was measured with 0, 1 and 2 pennies weighing 3 grams each of ballast added. Each experiment was repeated nine times. A mean time of 1.69 +/- 0.39 seconds was recorded for the control flights. The added weight of 3 grams increased the time required to reach the target altitude to 2.24 +/- 0.77 seconds, and adding 6 grams increased the time to 2.94 +/- 1.13 seconds. The results suggest that increasing the weight increases the amount of time needed for a helicopter to ascend.
From its origins in the 1920s as a private airport favored by daring young aviators and Hollywood’s famous faces, over 80-plus years Van Nuys Airport (VNY) has grown into one of the world’s busiest general aviation airports, averaging more than 330,000 takeoffs and landings annually.

A facility dedicated to noncommercial air travel, VNY meets corporate, private and government aviation needs—in the process providing vital aviation services, enhancing efficiency at the region’s commercial airports, promoting business and serving as a valued San Fernando Valley community and educational resource.

Today Van Nuys Airport Is:
- Home to more than 700 propeller aircraft, jets and helicopters on 730 acres of land.
- A vital economic engine, contributing more than $1.3 billion annually to the local economy and supporting over 12,300 jobs.*
- A center for fire, police and medical emergency flights that provide life-saving services to the community.
- The site of one of California’s top aircraft mechanic schools.
- A popular Hollywood filming location.

* Source: Van Nuys Airport Economic Impact Study: 2007

Get an Insider’s Look at the Airport Through:
- Our free 90-minute guided tours, which take you on a captivating journey through aviation past and present.
- See a variety of aircraft and the many activities of aviation companies and airport operations, and learn about VNY’s rich and colorful history.
- Check out VNY’s mascot Vinny—Los Angeles’ first completely kid-proof, kid-friendly educational airplane—in “Vinny’s Hangout.” The Hangout lets you explore Vinny in a safe, friendly, hands-on learning environment, where you can poke, prod and peer into the cockpit while learning about the many parts of this brightly painted orange and purple airplane with a contagious smile.

Tours are offered to groups of 15 or more—including school classes—and are available some weekdays and select Saturdays by reservation. For more information, visit www.lawa.aero/vny (click on “News & Facts” on the left-hand side and then on “Airport Tours”) or call 818.442.6526.

To learn more about additional VNY community and educational programs designed to make the airport a valuable resource and encourage aviation-related career and training opportunities, visit www.lawa.aero/vny or call 818.442.6526.
From the Editor:

AWESOME AVIATION PROJECT IDEAS

Here are some aviation projects you can consider for your next assignment:

• What designs of paper airplanes make them fly best?
• What thickness or weight of paper makes paper airplanes fly best?
• Using purchased model airplanes (rubber band or electric or glider), what can be done to the design to make them fly best? For example, add weight to different areas of the airplane.
• Design ways to analyze what makes for a better flight. For example, develop quantitative criteria that can be used to evaluate flight.
• Using purchased toy helicopters, what can be done to them to improve their ability to fly?

Remember that good research includes many repeats of experiments, and, if applicable, many experimental and control samples.

Also, it's best to conduct experiments with a hypothesis — meaning your assumption, or tentative explanation, for what you expect to occur once you conduct your experiment. For example, you might say, “My hypothesis is that paper airplanes made with heavier paper will fly best.” Then you test the hypothesis with your experiment and discuss the results and possible conclusions.

Check out more project ideas, cool aviation resources and fun facts on the following websites:

• Aeronautics Learning Laboratory for Science, Technology and Research: www.allstar.fiu.edu
• Aviation & Aeronautics & Aerodynamics: Science Fair Projects and Experiments: www.juliantrubin.com/fairprojects/engineering/aviation.html
• Aviation for Kids Program: www.avkids.com
• NASA Quest: http://quest.nasa.gov/
• San Fernando Valley 99s Aviation Explorers 747 Program: www.sfv99s.org/explorers.html
• Women in Aviation Resource Center: Education: Just for Kids: www.women-in-aviation.com/Education/Just_For_Kids/
• Young Eagles Program of the Experimental Aircraft Association: www.youngeagles.org

For more information about Van Nuys Airport, visit www.lawa.aero/vny — and for fun kids’ stuff, check out Vinny’s Hangout by clicking on the “Kid Page” link under the “Information” tab.

For information about the other airports owned by Los Angeles World Airports (LAWA), log onto www.lawa.aero. You can find more cool kids’ aviation activities by going to the LAWA “Kid Website” page at www.lawa.aero/kidswebsite/mainpage.html.
STUDENT ARTWORK
**WHAT IS A SCIENTIST?**

Artwork by

**Sarah Karkenny**

Ernest Lawrence Gifted/Highly Gifted Magnet

**Greg Zem, Teacher**

Curious
- is interested in finding out new things

Patient
- is able to watch & wait for results

Diligent
- works hard & puts a lot of effort into everything

Smart
- knows about science & what they are doing

Creative
- comes up with new ideas, doesn't stick with the basic things

- trophies
- books about science
- calendar
- periodic table
- goggles
- gloves
- beaker
- microscope
- weight scale
- ruler
- lab coat
WHAT IS A SCIENTIST?

Artwork by

Jasmine Regalado
Ernest Lawrence Gifted/Highly Gifted Magnet

Greg Zem, Teacher
WHAT IS A SCIENTIST?

Artwork by

Katherine Chavez
Ernest Lawrence Gifted/Highly Gifted Magnet

Greg Zem, Teacher
After that, D. Van Dusen and D. Gaughen (teacher) threw to me. Once I finished my experiment, I concluded that after you gain strength you can speed up your hitting skills.

We constructed four standard Microbial Lava Lamps (MLL) using the King and Tomasek protocol. MLLs use colored glass/alginate/yeast beads that generate CO2 bubbles in a one-liter sugar-water solution, which has been placed in a two-liter soft drink bottle. The CO2 bubbles cling to the beads, causing them to rise to the water's surface. The glass powder within the beads causes them to fall when the CO2 is released. A fermentor (bubbler) is affixed to the top of the two-liter bottle. The bubbler records CO2 production. We found that a 20% sugar solution was optimal for CO2 production and recorded the CO2 production for four MLL bottles. They all matched our control bottle. To the three non-control bottles, we added 20 mg. of silver powder, 260 mg. of silver nitrate and 1.05 g. of sodium citrate, respectively. These chemicals were recommended by the NanoSystems Institute at UCLA. Silver has long been known as a germicide and sodium citrate is an electrolyte found in energy drinks. Our hypothesis was that the silver should kill the yeast and the sodium citrate ‘energize’ the MLL. Our findings proved to be just the opposite. We found no discernable difference from our control of CO2 production in the two bottles containing the two forms of silver (ions and particles). Also, CO2 production ceased in the bottle containing sodium citrate. Our conclusions were that we did not add enough silver and too much sodium citrate. A more analytical conclusion might be that the glass/alginate matrix in the beads protected the imbedded yeast from the silver. Also, the citrate created an acid with a pH<3. This acid concentration was most likely to be detrimental to the yeast by penetrating the glass/alginate bead matrix. It should be noted that carbonic acid created in the MLL is much weaker than the citric acid created by the addition of the citrate.

I conducted this experiment to see if running and push-ups have an effect on your hitting skills (in baseball). By doing this I was able to see if exercise has an effect on hitting. The procedure for my experiment was simple. To start my experiment I mixed the ingredients, 3/4 cup of vegetable oil, 1/2 cup of milk (acidic ingredient), 1/4 cup of vegetable oil, 1 teaspoon of vanilla, a dash of salt and 1 teaspoon of cinnamon in a cake mixer. Then I preheated the oven to 350. I added 2 cups of sugar, 4 eggs, 1 1/2 cups of all-purpose flour, 1 cup of milk (acidic ingredient), 1/4 cup of vegetable oil, 1 teaspoon of vanilla, a dash of salt and 1 teaspoon of cinnamon in a cake mixer. Then I preheated the oven to 350 and I poured one cup of the cake mixture in a cup marked A. Then I added 1/2 tablespoon of baking soda and poured another cup out and marked it B. I did this four more times until I had cups A, B, C, D, E and F, each with the perfect amount of baking soda. My hypothesis was correct because running and doing push-ups did increase the percentage of pitches I could hit, which is what I predicted.
and rose too much. I also found out that the cakes with the least amount of baking soda kept their oil in and didn't leave oil droppings on the plate as much as the ones with the most baking soda. That would mean that baking soda makes a cake healthier, because most of the extra oil gets released. I also noticed that the cakes with less baking soda needed more time to finish baking than the ones with more baking soda, which burned quickly.

4852
The Effect of Various Solutions and Electrodes on the Efficiency of Electrolysis
Michael Rasbein and S. Tanaka (teacher)
Gaspar de Portola Middle School
18720 Linnet St.
Tarzana, CA 91356

The purpose of the study was to find out which solution was most efficient for electrolysis. This will be important to know in the next few years when more cars and devices are powered using hydrogen. My hypothesis was that more baking soda or salt added to my solution while using copper electrodes, because they have a large surface area, would yield the most hydrogen and oxygen gas. In the study I used different concentrations of baking soda and salt in water as my solutions, along with tap water for a baseline. I also used both graphite and copper wire as my electrodes and used a 12-volt battery. For each of my 10 tests I prepared 92 mL of my solutions of 5.336 g of salt, 2.668 g of salt, 9.752 g of baking soda, 4.876 g of baking soda, and tap water in a graduated cylinder. I then weighed the graduated cylinder on a sensitive scale. I made sure that all of the additives were dissolved and wrote down my data. After graphing my data, I came across the results that my hypothesis was mostly incorrect. I found out that when using baking soda, neither the amount of surface area nor the type of electrode made a difference. A higher concentration of the solution did seem to produce a higher amount of gas. Although, when using a large amount of salt, graphite performed better than copper, and when using half that concentration, the copper performed better than the graphite. The worst results I received were when using tap water with no electrolyte. My hypothesis was not performed better than copper, and when using half that concentration, the interfering with my results, including the duration of my electrolysis trial both copper and graphite electrodes, a battery. For each of my later repeated these five tests again with pencils for graphite electrodes. I placed two copper electrodes into the cylinder without them touching. I then heated the graduated cylinder for 10 minutes for each solution. After removing the electrodes and shaking off any excess water, I then weighed the graduated cylinder. When I finished testing my solutions on both copper and graphite electrodes, I calculated the differences in weight and wrote down my data. After graphing my data, I came across the results that my hypothesis was mostly incorrect. I found out that when using baking soda, neither the amount of surface area nor the type of electrode made a difference. A higher concentration of the solution did seem to produce a higher amount of gas. Although, when using a large amount of salt, graphite performed better than copper, and when using half that concentration, the copper performed better than the graphite. The worst results I received were when using tap water with no electrolyte. My hypothesis was not correct because using more of a salt additive did not always make it produce more gas and the best electrode was not copper. This experiment used the weight loss of the solution during electrolysis to measure the efficiency of my solutions and electrodes, instead of directly measuring the hydrogen and oxygen produced. Although I kept as many variables as possible from interfering with my results, including the duration of my electrolysis trial and the voltage of my battery, many factors could have disturbed my results and my conclusions may be inaccurate due to very small weight changes that are measured. I learned that different chemicals and concentrations of chemicals may yield different amounts of gases produced; therefore, one solution and electrode type may be best at water electrolysis.

<table>
<thead>
<tr>
<th>COPPER</th>
<th>Weight Before Electrolysis</th>
<th>Weight After Electrolysis</th>
<th>Weight Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.336 g Salt / 92 mL Solution</td>
<td>129.7 g</td>
<td>129.5 g</td>
<td>0.2</td>
</tr>
<tr>
<td>2.668 g Salt / 92 mL Solution</td>
<td>129.1 g</td>
<td>128.8 g</td>
<td>0.3</td>
</tr>
<tr>
<td>9.752 g Baking Soda / 92 mL Solution</td>
<td>133.2 g</td>
<td>133.0 g</td>
<td>0.2</td>
</tr>
<tr>
<td>4.876 g Baking Soda / 92 mL Solution</td>
<td>130.5 g</td>
<td>130.4 g</td>
<td>0.1</td>
</tr>
<tr>
<td>92 mL Tap Water</td>
<td>128.4 g</td>
<td>128.4 g</td>
<td>0</td>
</tr>
</tbody>
</table>

4853
Saponification
Aldric Gutierrez and S. Tanaka (teacher)
Gaspar de Portola Middle School
18720 Linnet St.
Tarzana, CA 91356

Saponification is the chemical reaction of a vegetable oil or animal fat mixed with a strong alkali, producing soap and glycerin. For this process, water is needed to accompany the alkali, which comes as a dry powder. Saponification literally means "soap making." Soap making originated around 2800-2500 B.C. in ancient Babylon. The common name for the alkali is lye, which is sold as a drain-cleaning agent.

My hypothesis about this experiment is that by combining lye and beef fat, I will get healthy, glycerin-rich, natural soap. The materials I will use in this experiment include five pounds of rendered fat that has been melted and heated to 120-130 degrees F, 12 oz. of lye, one quart of cold water, newspaper, rubber gloves, an apron, heavy glass, stoneware or other non-aluminum sturdy container (lye reacts with aluminum), wooden spoon or spatula, two stainless steel meat thermometers or floating dairy thermometers, a cardboard box lined with a damp cloth, and a sheet of cardboard large enough to cover the box.

First, I dissolved the lye in the quart of cold water. This mixture will heat up to around 200 degrees F, so I let it cool down to about 95-90 degrees F. Next, I heated the fat in the non-aluminum pot to proper temperature for mixing (for the tallow, I let it heat to up to 120-130 degrees F). When the lye and fat were at their proper temperature, I poured the lye mixture in a thin, even stream into the fat. Stirring steadily and slowly, I kept repeating this process until the mixture turned thick and light colored. Then, I poured the mixture into the cloth-lined cardboard box (or baking dish if you prefer). Next, I covered the box with a cardboard layout and with a folded blanket to insulate it. I let it rest for 24 hours, then I uncovered the soap. At this point I could cut it into bars. This soap had to cure for at least two weeks before it could be used. Lye, which is a very caustic agent, would be still active within a couple of weeks.

The results were that when I used the soap for washing my body, it left my skin so clean and moisturized that I didn't need lotion afterward. The soap is rich in glycerin. My conclusion came to be that this is, by fact, one of the finest soaps you could use for cleaning your body, washing your hands, or even washing clothes if you choose. As a result, I can say that if you want good quality soap, I recommend making this soap at home for yourself.

4854
Capsaicin: the Fire on Your Tongue
Daisy Martin and S. Tanaka (Teacher)
Gaspar de Portola Middle School
18720 Linnet St.
Tarzana, CA 91356

When you have consumed more spicy food than your tongue can handle, what do you automatically reach for? Do you drink a glass of water or milk to put out the fire? The purpose of the study was to see what lessens the burning sensation on your tongue when you eat something spicy. By doing so, I can see what works best and why. My hypothesis is that sugar or milk will work best because they are sweet. To begin my experiment, I gathered

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Weight Before Electrolysis</th>
<th>Weight After Electrolysis</th>
<th>Weight Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.336 g Salt / 92 mL Solution</td>
<td>131.0 g</td>
<td>130.6 g</td>
<td>0.4</td>
</tr>
<tr>
<td>2.668 g Salt / 92 mL Solution</td>
<td>129.4 g</td>
<td>129.2 g</td>
<td>0.2</td>
</tr>
<tr>
<td>9.752 g Baking Soda / 92 mL Solution</td>
<td>132.9 g</td>
<td>132.7 g</td>
<td>0.2</td>
</tr>
<tr>
<td>4.876 g Baking Soda / 92 mL Solution</td>
<td>130.7 g</td>
<td>130.6 g</td>
<td>0.1</td>
</tr>
<tr>
<td>92 mL Tap Water</td>
<td>126.3 g</td>
<td>126.2 g</td>
<td>0.1</td>
</tr>
</tbody>
</table>

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six items I thought would relieve the spiciness: water, orange juice, ketchup, milk, sugar, and bread with butter. I chose these because they contain a high quantity of sugar, which I believe would help. I chose water because that is everyone’s first instinct when something is too hot or when they don’t like the taste of something. Next, I picked five chili peppers from my garden and began the experiment, recording the results. My mother, father, and two younger cousins participated in the experiment alongside me. We bit into the peppers, inducing the hot, burning, and quite painful sensations on our tongues. While testing the six items — water, orange juice, ketchup, milk, sugar, and bread with butter — we recorded how effective each one was at getting rid of the spiciness and how quickly it did so. We went down the line of the various food items trying to figure out the answer to my hypothesis while we were also trying to extinguish the fires on our tongues. Finally, the flames were put out; the spiciness was diluted. As a result of completing the above procedure, I found that milk, bread with butter, and sugar helped the best and fastest, with milk being the most effective. Although sugar helped, once the sugar dissolved it didn’t help much but the milk and bread with butter provided permanent relief. I also found that water, orange juice and ketchup provided little to no help in relieving the hot taste. The water appeared to help at first but after a few moments, the spiciness returned — a couple people’s results even showed it felt worse. The most effective were milk, bread with butter, and sugar, which were sugary foods, while the least effective were water, orange juice and ketchup, which were watery foods. Now, I wanted to know why I got these results. It didn’t quite make sense to me yet. If sugary foods and drinks put out the fire on your tongue as I had thought, why didn’t orange juice or ketchup help? Orange juice and ketchup do contain sugars, but they didn’t help. To figure this out I read a science article about the active ingredient present in chili peppers and another about why chili peppers taste hot to humans. I learned that capsaicin, the active component of chili peppers that incites the burning sensation on your tongue, is fat-soluble, not water-soluble; therefore, only foods high in fats could get rid of the spiciness. Sugar had nothing to do with it.

As a result of completing my procedure and research I have concluded that the reason the milk and bread with butter helped the fastest and completely removed the burning feeling was because these two items contain high amounts of fat that dissolves the capsaicin, diluting the spiciness. I have also concluded that the orange juice, ketchup and sugar did not help much because sweetness does not dilute capsaicin, it only helps temporarily. I could also determine that the water wasn’t effective because capsaicin is not water-soluble. My hypothesis was only partly correct. The milk worked in diluting the spiciness but not because it was sweet, it helped because milk is high in fat. The sugar did not help in diluting the spiciness. It only helped temporarily while it was in our mouths, but once it dissolved it provided no relief because the capsaicin was still present. Next time you eat too much spicy food and want quick, permanent relief, reach for milk, dairy products or other foods that are high in fat.

**4856**

**Can Solar Cells Power a Plane?**

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My question was, can I fly a plane on only solar power? Many houses now have electrical power generated by solar panels, so why not planes? Since I am only a teenager the chances of someone lending me a plane to retrofit with solar cells is very slim, or more accurately nonexistent. Therefore, I went out and bought two model airplanes, one being slightly more expensive than the other. My hypothesis was that the airplanes would fly perfectly on a good day. Before I put solar cells on these planes I wanted to test fly them with their stock batteries. The first plane was designed to fly in circles, while the other expensive plane had a controller. The first plane flew wonderfully, while the other expensive plane crashed on the first flight and the wing snapped. Using common sense I chose the plane that flew perfectly and did not break. The plane uses 2x1.5V AA batteries to charge a 1.2V battery in the plane. I took the battery out of the plane and replaced it with solar cells mounted on the wings. I chose to mount the solar cells on the wings of the plane vs. the tail because it evenly out the weight lost when taking out the battery. Sadly, in the time I had to do this experiment, there were no sunny days. Instead of dropping this experiment I decided to use an alternative energy source, incandescent lights. The propeller spun correctly, but to double-check I used a voltmeter. The voltmeter showed that the solar cells were giving out the proper amount of volts. After some thinking I decided that the plane could have flown on a good day because the sun gives out more energy than an incandescent light on a good day. I believe my hypothesis was correct that the plane would fly, but it still needs to be tested.

**4857**

**Crossed Eye/Hand Dominance Is Advantageous in Playing Basketball**

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Some athletes in all types of sports are constantly trying to find an advantage over the competition, unlike others who are naturally gifted. Ocular or eye dominance refers to the eye that has more visual input than the other, which is rather similar to the right- or left-hand dominance. Notably, the eye- and hand-dominant sides do not always match. It has been claimed that it is advantageous to have crossed hand/eye dominance (being dominant on the opposite eye of the hand) in playing sports such as baseball and basketball. The purpose of this study is to further confirm whether crossed hand/eye dominance helps when shooting basketball free throws. The hypothesis is that people with crossed hand/eye dominance will have a higher free throw percentage than those who have uncrossed hand/eye dominance (being dominant on the same eye side as the hand). The reason for this hypothesis is that when uncrossed people hold up the ball to shoot their shot, the ball is leveled by their dominant hand and blocks their dominant eye.
The average scored free throw percentage for the 56 uncrossed hand/eye dominance subjects was 15.9%, whereas for the 44 crossed hand/eye dominance subjects it was 41.8%. I also analyzed these results in relationship to gender, race and number of years having experience in playing basketball.

Crossed male subjects made an average of 48.8% of free throws, while the crossed females made 26.9%. Among the uncrossed subjects males made an average of 19.2%, while females made 10.0% of free throws. The average free throw percentages based on race for the crossed subjects were as follows: African American, 62.2%; Caucasian, 39.3%; Latino, 34%; and Asian, 16.7%. For uncrossed subjects the percentages were African American, 40%; Caucasian, 16.6%; Latino, 16.8%; and Asian, 18%. Crossed and uncrossed subjects with five or more years of experience in playing basketball made an average of 53.5% and 18.2% of free throws, respectively, whereas crossed and uncrossed subjects with less than five years of experience made 29% and 15.3% of free throws, respectively.

In conclusion, my data showed that crossed eye/hand dominance subjects made more than twofold the number of free throws than uncrossed subjects. Therefore, my data supported the hypothesis that crossed hand/eye dominance helps when shooting basketball free throws. My data also showed the same result in male and female groups when analyzed separately. Further, the data showed that African Americans are the best in free throws compared to other ethnic groups. It is noteworthy that 90% of the African American subjects were crossed, whereas only 50% to 50% of other races were crossed. This observation should be further confirmed with a higher number of African American subjects in the study group.

Interestingly, the data also showed that having more years of experience in playing basketball helps one to be better in free throws only in crossed eye/hand dominance subjects. It is also notable that 52% of crossed and 20% of uncrossed subjects had equal or more than five years of experience in playing basketball. These findings suggest that since crossed eye/hand dominance people are naturally gifted, they pursue playing basketball more than uncrossed people.

4859

What Impacts Balance the Most for Dancers?
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The purpose of my experiment was to determine which factors affect a dancer’s ability to balance the most. By manipulating different aspects that might control balance, I will find out what is needed for balance and what is not. My hypothesis was that I would be able to hold my balance the longest while blindfolded in my starting position of balancing on one leg with my heel off the floor. To start my experiment, I decided that I would test how the absence of sight, the absence of hearing and different body positions would affect my balance. I used a blindfold, earplugs and a timer. I had a partner time me three times for each different factor I tested. I recorded the times and then calculated the average for each factor. I had the worst balance blindfolded, with an average of 5.2 seconds of holding my balance. The second worst was when I held my leg out, with an average of 2.2 seconds, followed by a tie with my leg turned out and my arms up, both with an average of 3 seconds. When I balanced on my right leg instead of my left, I averaged 3.3 seconds, and with earplugs I averaged 4.3. Holding my arms out to the side gave me an average of 4.5, and finally the best average I got was in my starting position, 4.6 seconds. My hypothesis failed miserably, as completely the opposite of what I thought would happen happened. I did some research to find out why I could not hold my balance without sight and found out that it is one of the three components necessary for balance. Along with the inner ear and proprioception, vision is important so the body can know its position in relation to its surroundings. The top three averages succeeded because they were all fairly simple positions to hold, and because hearing doesn’t affect balance as much as other factors. As a result of completing my experiment, I found out that the ability to see your surroundings affects balance the most, the ability to hear doesn’t affect it much, and body position moderately affects balance probably because of how some positions are more stable than others and easier to hold.

4858

The Effects of Music on Heart Rate
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The purpose of my experiment was to determine which factors affect our heartbeats, and if it did, to see how it varied from each specific genre. My hypothesis was that out of the genres classical, soft rock, rap and punk/alternative, punk/alternative will increase the heart rates due to its screaming and loud guitar, and classical music will decrease the heart rates because it’s slow and peaceful. To start, I needed a timer and a playlist of four different kinds of music. To conduct the experiment, I got together a group of four people around the same age. I then took each of their starting heart rates before they listened to any music. To do this I timed the number of pulses per six seconds, and then multiplied by 10. Next, I put on classical music for 10 minutes. When it finished, I retook all of their heart rates. Everyone’s heart rate dropped. After a minute to return to normal, I played soft rock music for 10 minutes also. When I retook their heart rates, I found everyone’s heart rate increased slightly from their normal rate. Again, after a minute’s rest, I put on rap music for 10 minutes. Compared to the subjects’ normal rates, their heart rates increased drastically. One specific person’s rate even went from 65 to 90. For the last 10 minutes, I played punk/alternative. The subjects’ heart rates rose only slightly from their normal heart rates. My hypothesis was wrong, because although classical music did bring down their heart rates, rap increased the heart rates the most, not punk/alternative. By knowing this information, I can decide which genre is best to listen to when performing a certain activity. If I wanted to sleep, classical music would be a great choice to relax me. Since the heart rates rose when I played rap music, it would be good to play while exercising or dancing. According to the studies, a nice choice to have on as background music at a gathering would be soft rock or punk/alternative. This way you aren’t being pumped up too much, but you aren’t dozing off either. In conclusion, music does have an effect on the heart rate.

4860

Effects of the Time of Day on How Much Bacteria Is on Mall Food Court Trays
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This study looked into the role time of day has in the amount of bacteria found on mall food court trays. Samples were taken of the surface area of mall food court trays and cultured in nutrient agar. The petri dishes containing the samples were kept at a temperature of 27 degrees C for three days. Notes on observations were taken every day as well as the counting of the colonies. There were three petri dishes for each time of day. In the 10am time period petri 1 had 218 colonies, petri 2 had 168 colonies and petri 3 had 90. In the 1257 time period petri 1 had 187 colonies, petri 2 had 267 colonies and petri 3 had 185 colonies. In the 1820 time period petri 1 had 120 colonies, petri 2 had 97 colonies and petri 3 had 531 colonies. There was no clear difference that can be credited to the time of day; in fact one of the petri dishes from each time period got one of the top three highest number of colonies.
4861

Study Comparing Bacterial Levels Present on a Kitchen Sponge, a Game Controller and a Toilet Seat

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This study tests a toilet seat, a game controller and a kitchen sponge for the presence and quantity of bacteria growing on their surfaces. Three cotton swabs were rubbed across each object and then rubbed on the surfaces of nutrient agar medium in petri dishes. Then the dishes were incubated for a week. The kitchen sponge was shown to contain significantly more bacteria than the game controller and toilet seat. A second trial was conducted to confirm the findings in the first test and a set of control petri dishes was added to confirm the bacteria came from the swabbed objects.

4862

See Which Pond Has the Most Planaria

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This study was to see how much planaria you could catch in a lake. A piece of raw chicken liver was put into a nylon stocking and was fished with in three lakes. Each experiment was repeated four times. In the experiment I went to three lakes: Lake Balboa, Lake Lindero and Lees Lake. The results were that in the four tries for the experiment, at Lake Balboa, altogether 62 planaria were caught. At Lees Lake 41 planaria were caught. For Lake Lindero, 66 planaria were caught. The conclusion is that the lake with the greatest number of planaria is Lake Lindero and the lake with the fewest number of planaria is Lees Lake.

4863

The Effects of Weight on Model Suspension and Beam Bridges

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The study that has been attempted is an experiment that will show what type of bridge, out of two different types, is the best at standing up to weight. The two bridges that will be tested are suspension and beam bridges, seeing as they are the most used types of bridges in the United States. In the experiment, model beam and suspension bridges were subjected to as many bricks as they could carry. The strongest bridge would be determined by how many bricks each could hold until it broke. When the experiment was repeated, the common winner was the suspension bridge, with a grand total of 21 bricks, vs. 17 bricks as the maximum on the beam bridge. Therefore, the best bridge that should be used is the suspension bridge.

4864

Effects of Orange Juice and Vinegar on the Rust of Iron Nails

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This study examined the effects that orange juice and vinegar had on the rust of iron nails. Iron nails were submerged in either orange juice or vinegar for five days. This test was repeated three times. Orange juice removed rust at an average of 45% on the second day, 80% on the third day and 100% on the fourth. Vinegar removed rust at an average of 25% on the second day, 55% on the third day, 80% on the fourth day and 100% on the final day. The results are that orange juice is the best remover of rust from iron nails.

4865

The Flavor of Gum That Lasts the Longest

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This experiment questioned which flavor of gum lasts the longest out of green apple, strawberry, cinnamon, mint, juicy fruit, citrus to mint, apple with citrus, tropical, mint chocolate chip, and bubble gum. The gum chewer chewed each type of gum separately, and in between each, waited a few minutes to cleanse the palate. The results were that the cinnamon-flavored gum lasted the longest and the green apple-flavored gum lasted the least amount of time.

4866

Difference of Genders in Identifying Real and Fake Smiles

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This study examined whether males or females were better at identifying real or fake smiles. Subjects of both genders were tested on an Internet test and the percentages were recorded. Each experiment was repeated three times. Males had an average of identifying between real and fake smiles 60% of the time. Females had an average of identifying between real and fake smiles 65% of the time. The results suggest that females are more likely of the genders to identify more real and fake smiles.

4867

The Effectiveness of Different Toothpastes on Eggshells

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This experiment examined the question of which toothpastes’ whitening claims were real. The toothpastes that were used were Arm & Hammer Complete Care Toothpaste Extra Whitening, Aquafresh Whitening Toothpaste Ultimate White, Crest Whitening Toothpaste Plus Scope and Crest Pro-Health Clean Mint. Each eggshell was left in Coke, coffee or soy sauce for 70 minutes. There were two eggshells for each substance, resulting in six eggshells total. Then the eggshells were taken out and brushed for 1 minute. This experiment was repeated two times. The results were that Arm & Hammer had a score of 3.5, Aquafresh had a score of 3, Crest Whitening had a score of 3 and Crest Pro-Health had a score of 2.5. This means that Arm & Hammer Complete Care Toothpaste Extra Whitening was the most effective in whitening the eggshells.
Effects of Different Liquids on Radish Plants
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This experiment examined if different liquids instead of water used on a common radish plant (Raphanus sativus) would make it grow faster. Sixty milliliters of either water (control), milk, Sprite or SunnyD were given and sprouting rates were recorded. Each experiment was repeated three times. Although they were my control, the plants that were given water sprouted first, in 4.5 days on average. Milk, Sprite and SunnyD sprouted in 6.5 days, 11 days and didn’t sprout at all, respectively. These results suggest that water is the best liquid for growing Raphanus sativus, followed by milk.

Stroop Effect and Interference
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This testing examined the theory that the concept of interference affects the Stroop Effect and, if so, how much shorter or longer it takes a person to read material. Words with the Stroop Effect, the Stroop Effect and interference (clockwise), and a control were printed on sheets of paper with an equal number of words. These papers were then given to a variety of people to see how long it would take them to read each one. The results suggest that it takes a shorter amount of time to read words with interference and the Stroop Effect, rather than words with just the Stroop Effect.

Amount of G-Forces on Different Rides
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This study tested on which parts of a roller coaster there are the most g-forces. Predetermined points on a ride were tested using a homemade accelerometer. The rides tested were Apocalypse, Revolution and Gold Rusher. An extra ride called Scrambler was also tested. Each ride was ridden three times. Revolution had a high of 3 g-forces, Apocalypse had a high of 2 g-forces, Apocalypse had a high of 2 g-forces, Apocalypse had a high of 2 g-forces, Apocalypse had a high of 2 g-forces. Scrambler had a high of 2 g-forces. The results conclude that Revolution has the most g-forces of all of the tested rides.

Effect of Added Weight on Helicopter Ascension
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This study examined the question of possible signal interference of radio waves with a small electromagnetic generator. Radio frequencies on the AM wave were received with or without a model vehicle with an electromagnetic generator for no more than 10 seconds, at times with no visible interference, while data and level of interference were recorded. Each experiment was repeated 15 times. The small electromagnetic generator interfered with the signal on most frequencies to the point of no decipherable signal being received, only interference. This suggests that electromagnetic fields interfere with radio waves (also an electromagnetic wave).

Effects of a Magnet’s Magnetic Field on Voltmeter and Light Bulb
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This experiment was to study and further investigate the potent energy given off by a magnet’s magnetic field. Horseshoe, small and bar magnets were collected to be each measured by a voltmeter measured in ACV, the standard unit for voltage. A metal coil was wrapped around each time on every magnet with the end touching a switch while moving the magnet rapidly. Each experiment was tested three times and produced very similar results. The horseshoe magnet produced 2.15 volts, while the control produced about 2.6 volts. The bar magnet also produced 2 volts and the small magnet produced 1.5 volts. With these amounts of voltage produced, it may cause the light bulb to react.

Effects of Water pH on Plant Growth
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This study examined plant growth differentiation with different water pH in the plant specimen Oregon Giant pod. These plants were watered with room temperature water pH 2.5, 7 or 11.5 every morning for three weeks between 6 am and 7 am. Each experiment was repeated five times. The pH 7, or clean water, grew the plants normally and increased plant height by an average of 8.18 cm. The pH 2.5, or acidic water, increased plant height by 7.02 cm, stunting growth by 1.16 cm. The pH 11.5, or alkaline water, increased plant height by 4.22 cm, stunting growth by 3.96 cm. The results suggest that alkaline water is the most differentiating water pH for the Oregon Giant pod.

Effects of Electromagnetic Fields on Radio Wave Reception
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This study examined the question of possible signal interference of radio waves with a small electromagnetic generator. Radio frequencies on the AM wave were received with or without a model vehicle with an electromagnetic generator for no more than 10 seconds, at times with no visible interference, while data and level of interference were recorded. Each experiment was repeated 15 times. The small electromagnetic generator interfered with the signal on most frequencies to the point of no decipherable signal being received, only interference. This suggests that electromagnetic fields interfere with radio waves (also an electromagnetic wave).
4875  
**Effects of Weights on an Ice Skater While Spinning**  
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This study examined the effects of weights and placement of weights on an ice skater’s spin. One- or 2-pound weights were added to an ice skater’s wrists or ankles. She performed a scratch spin with and without the weights and her time per quarter revolution was recorded. Each experiment was repeated three times. For the overall rate of rotation, the spin with no weights was fastest, and the spins with weights on the wrists (1 and 2 pounds) were faster than the spins with weights on the wrists. However, with the 2-pound weights on the wrists and ankles, the skater had a faster acceleration than with no weights, but she also had a faster deceleration. The results prove that the placement of weights rather than the amount of weights makes a greater difference in the skater’s overall rate of rotation.

4876  
**Amount of Energy and Money Saved in One Year By Unplugging Unused Appliances**  
Elliot Kang and D. Shah (teacher)  
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This science project examines the waste of energy and money by not unplugging appliances when they are not in use. Some of the appliances that were tested included a printer, a mini toaster oven and the Wii video game station. The appliances were left plugged in and left in off mode in order to see the amount of energy used by the appliances. To measure the number of watt-hours consumed by the appliances, the Kill-A-Watt energy monitoring device was used. This device shows an appliance’s energy consumption in different energy measures such as volts, watts and kilowatts. The Kill-A-Watt was plugged into an outlet and the appliance was then plugged into the Kill-A-Watt. Each appliance consumes a fixed amount of energy, so there will only be one set of results. Five out of the 11 appliances tested consumed no energy when left in off mode. The results showed that a total of about 30.2 watt-hours were consumed by all of the unused appliances in one hour and about 260.9 kilowatt-hours were wasted in the span of one year. By multiplying that number by the United States’ average cost per kilowatt-hour in 2010 for residential homes of 11.97 cents, about $31.43 can be saved in one year.

4877  
**Can Middle School Students Identify a Food Flavor Without the Sense of Smell?**  
Emily Filkin and D. Shah (teacher)  
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This study examined the question of possible smell involvement in the process of tasting food. Test subjects were given cookies that contained cinnamon. They were first asked to pinch their noses and tell what food flavor they could taste. Then, they were asked to release their noses, taste the cookie again and state the flavor. This experiment was repeated 59 times with a total of 60 different students. Thirteen students (22%) were able to identify the flavor without the sense of smell, 33 (55%) weren’t able to identify the flavor without the sense of smell, but could with it, and 14 (23%) could not identify the flavor at all. The results suggest that the sense of smell contributes to the recognition of taste.

4878  
**More Electricity in Dry or Fresh Lemons?**  
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This test was to find out if lemon electricity is higher, dried or fresh. Lemons were dried two hours, four hours, one day and three days. Lemons were dried in a room without sunlight. They were tested by a multimeter. Experiments were done three times. All tests were surprising and interesting. The results said fresh and too much dried didn’t have a lot of electricity.

4879  
**Seriousness of Stroop Effect on Older People Compared to Younger People**  
Fiona Corcoran and D. Shah (teacher)  
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This study examined the effect of the Stroop Effect on younger people compared to older people. In an experiment similar to the one conducted by J.R. Stroop, two groups of people were assembled, one of adults and one of children. Each person took a test of 40 words in which the names of colors were printed in a different color from the one named. The tests were timed and the results of both groups were compared. The end result was that the group of adults took longer to read the 40 words correctly than the group of children. The results of this study suggest that as a person gets older, the Stroop Effect occurs more often.

4880  
**Effects of Chewing Gum on People’s Concentration and Focus**  
Frederick Kim and D. Shah (teacher)  
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For the experiment, 30 randomly selected people were tested to see whether or not chewing gum helped studying. Each person was given a picture and had to study it for exactly one minute. Then, they were given a 10-question quiz on it. The scores were tallied while they were studying another, different picture. This time, they were given a piece of Juicy Fruit gum to chew while studying the picture. After the minute was over, they were given another quiz. They had to chew the gum while taking the quiz. The final results showed that 57% of the people did better while not chewing gum. Twenty-seven percent of the people did better with gum and 16% of the people got the same score on both tests. This experiment concludes that the majority of the people who were tested did better without gum. Most people probably disagree with these results and think that gum helps them focus. They are not wrong. If gum works for you, you should chew it while doing your work. If it doesn’t, try to avoid it while studying.

4881  
**Effect of Gravity on Root Growth Direction**  
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This experiment studied how gravity affects the direction that roots grow. Four radish seeds were placed in each of six CD cases. Two cases were stood straight up with modeling clay. Two cases were laid down on plates. Two cases were stood straight up with clay and then were turned once every two days. The roots in the first two cases grew parallel to gravity. The roots in the second two cases grew off the surface of the CD case. The roots in the last two cases curved and twisted because of the change in the direction of gravity. The results show that gravity does have a huge effect on the way roots and shoots grow.
4882  The Measurement of Direct Current Voltage From Fruits and Vegetables
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This experiment examined the question of which fruit or vegetable would be able to produce light for a 2.8-volt light bulb. The four fruits and vegetables of a lemon, orange, onion and potato were each cut up into two pieces. The two pieces of the same fruit or vegetable were then connected with alligator wires from zinc-coated nails and copper wires. This was repeated three times for each fruit and the result was that none of the fruits and vegetables was able to produce a sufficient amount of voltage to light the 2.8-volt light bulb. The potato, however, conducted the most DCV of 1 volt.

4883  Fruits and Vegetables Generate Electricity
Harry Ahn and D. Shah (teacher)
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This study examined the question of which fruit or vegetable would be able to produce light for a 2.8-volt light bulb. The four fruits and vegetables of a lemon, orange, onion and potato were each cut up into two pieces. The two pieces of the same fruit or vegetable were then connected with alligator wires from zinc-coated nails and copper wires. This was repeated three times for each fruit and the result was that none of the fruits and vegetables was able to produce a sufficient amount of voltage to light the 2.8-volt light bulb. The potato, however, conducted the most DCV of 1 volt.

4884  Effect of Music on Blood Pressure
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This study questioned what effect music has on blood pressure. People were tested by having an average blood pressure taken before any music was listened to. After the average blood pressure was taken, the subject listened to classical music for two minutes, and while the classical remained playing, the subject’s blood pressure was taken and recorded. After one minute to cool down, the subject repeated the process with pop/country music, and then with rock music. In the end, most people's blood pressures acted the way they were expected to (down for classical, averaging out for pop/country and rising for rock).

4885  Can People Tell the Difference Between Artificial and Natural Smells?
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This experiment showed if people could tell the difference between artificial and natural smells. Oranges, bananas and strawberries were compared to artificial extracts of the same fruit. This experiment was repeated 21 times. The results showed that 47% guessed all of the smells right, 24% guessed 2/3 right, 19% guessed 1/3 right and 10% got none right. These results lead to the conclusion that people can tell the difference between artificial and natural smells.

4886  Best Kind of Music for Students to Listen to While Testing
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This study examined the question of letting young adult students listen to music while studying, testing or completing homework. Thirty students were given four one-minute quizzes of 100 questions each and were asked to complete as many problems as possible. The first test was given without music and was used as the control. The remaining tests were given with metal, country and classical. The final results showed that metal is good to listen to, giving proof that some students should listen to metal while testing.

4887  Rate of Change in the Angle of the Sun
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This experiment examined the rate of change in the angle of the sun. The length of the shadow of a 150-cm pole was measured and recorded at 2:00 pm every five minutes until 2:30 pm for 10 days. The angle of the sun that produced each length was then calculated. Each day the shadows were shorter and the angles were greater. This suggested that a day was shorter than 24 hours and so the Earth would rotate more than a full rotation 24 hours later. The angle of the sun changed at an average of .145 radians per hour (2π radians is a full rotation). If the angle of the sun changes at this rate, it would be too slow to turn a full rotation in 24 hours. There must have been a flaw in the experiment. Perhaps the Earth rotates at different speeds at various times of day.

4888  The Effectiveness of Different Types of Salts Melting on Ice the Fastest
Jenny Ha and D. Shah (teacher)
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This experiment examined the question of which type of salt melts ice faster. The salts that were used were Morton table salt, Epsom Salt and sea salt. The salts were placed into each of the three cups. Two pieces of ice cubes were added to each cup and the timer was started. The timer was stopped whenever each piece of ice in a cup was completely melted. This experiment was repeated two more times. The results were that the Epsom salt melted the ice the fastest in experiments #1 and #3. The Morton table salt melted the ice the fastest in experiment #2. The sea salt was last for all three experiments. This means that the Epsom salt melts ice the fastest.

4889  Which Flavor of Gum Lasts the Longest?
Jenny Goosenberg and D. Shah (teacher)
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This experiment examined the question of how long a flavor of gum lasts in your mouth while chewing it continuously. Gum was placed into the mouths of 15 people, who chewed it constantly until there was no more flavor. The time that the flavor lasted in each specific person’s mouth was recorded. Each experiment was repeated nine more times by each person with a different type of gum each time. The gum Extra (peppermint flavored) lasted a total time of 238 minutes and 38 seconds after being chewed by 15 different people. The results show that Extra (peppermint flavored) has a flavor that lasts the longest in a person’s mouth while being chewed constantly.
4890

What Methods of Preservation Preserve Oranges the Best?
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This study is about what methods of preservation preserve oranges the best. Orange slices were oven dried, refrigerated, and preserved in salt for 24 hours. The oven was at 60°C and the oranges were placed on a metal tray. Each process was repeated three times to maximize the range of data. The dried orange had no change, whereas the salted one had little change and the refrigerated oranges ended completely covered in mold. The controls were all the same orange type, thickness of slice, amount of time preserved, and container and space in which they were placed. The variable was the method used. The results suggest that oven drying is the most effective type of preserving.

4891

Which Ball Bounces Highest From a 4.42-Meter-High Platform?
Juan Campos and D. Shah (teacher)
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This experiment answered my question of what ball bounces the highest. The method I used was that the longer the ball was in the air, then the higher the ball was in the air. I tested a bouncy ball, basketball, soccer ball, tennis ball, ping pong ball and golf ball. I tested each five times and came up with an average for each. I dropped each ball from my roof, which is approximately 4.42 meters high. I recorded how long the ball was in the air five times for each ball. The result I got was that out of a basketball, soccer ball, bouncy ball, ping pong ball, golf ball and tennis ball, the bouncy ball average told that the bouncy ball bounced the highest. I believe this is so because of the rubber material the bouncy ball is made from.

4892

Most Effective Sorbent That Cleans Up Simulated Crude Oil
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This experiment studied how well hair, clay and peat moss are able to retain oil without absorbing as much water. One cup of clay, hair or peat moss was placed in a coffee filter and was submerged in an oil and water mixture (400 mL oil, 700 mL water) for 30 seconds. It was taken out after the time was up and was held over the measuring cup filled with the oil and water mixture for an additional 30 seconds to let the excess liquid drip off. Remaining amounts of oil and water were recorded in milliliters. Each experiment was repeated three times. Clay only absorbed an average of 133 mL of oil and 8 mL of water. Hair absorbed an average of 212 mL of oil and 13 mL of water. Peat moss absorbed an average of 167 mL of oil and 67 mL of water. Hair absorbed more oil per water than clay or peat moss, so hair by far did the most effective job.

4893

Effect of Cow Manure and Miracle-Gro on Narcissus Flowers
Kate Wyler and D. Shah (teacher)
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This study examined the question of whether Miracle-Gro or cow manure made Narcissus flowers grow faster. The objective of this experiment was to find out whether the cow manure or Miracle-Gro works better on the flowers. The methods were to use Miracle-Gro Bloom Booster on two flowers and cow manure fertilizer on the other two flowers and to also measure the growth. The result suggests that Miracle-Gro works better for the plants than the cow manure.

4894

Can Exposure to Different Colored Sheets of Paper for Three Minutes Induce Stress on the Average Human While Working on a Simple Sudoku Worksheet?
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Two test subjects, a male and a female, were tested for their blood pressure and body temperature before and after the stress test. The heart rate was measured by a sphygmomanometer with a cardiac monitor built in, and the body temperature was measured with a thermometer. A simple Sudoku worksheet was printed on a half sheet of colored paper. Four sheets of the same color were placed on the table to maximize the effect. The tests were taken, and the subject had three minutes to work on the Sudoku worksheet. Fifteen seconds before the timer rang, the subject was tested again. The results were recorded, and the tests were repeated four times for each color. The possible colors tested were red, blue, green and yellow. The results suggest that the brighter colors such as yellow and red induced more stress, and green calmed down the subjects. Also, for every single test the body temperatures were raised, but the female's heart rate lowered 50% of the time, and the male's heart rate was always lowered after the test (calculated through averages of the colors).

4895

Effects of Added Coils to an Electromagnet
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This study examined if coils are added to an electromagnet, will its level of magnetism increase? An electromagnet was made with 20 coils. It was then used to pick up nails. The largest nail picked up was recorded. Ten coils were added and the experiment was done again. It was done until 50 coils were used. All of this was done three times. When the coils were added, the larger the nail became. The results suggest that when coils are added to an electromagnet, the level of magnetism is increased.
4896  
**Effect of Music on Basketball Shots**  
Leor Bases and D. Shah (teacher)  
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Tarzana, CA 91356

The study examined music’s effect on the accuracy of basketball shots. The process was as follows: The participants listened to an iPod playing several songs (Changes by 2Pac, I Gotta Feeling by The Black Eyed Peas, A Day in The Life by The Beatles and Beethovens Symphony No. 9 in D Minor) and then took 20 shots. Then the participants took the same number of shots not listening to any music, the control. Each shooter shot three times, so there were three trials (as seen on the graphs and charts). The percentage of change was recorded along with the number of baskets made out of 20. The average number of shots made in the control was 44.46. The average percent of change for hip hop was a 15.55% gain, a 3.33% gain for pop, a drop of 5.5% for rock and a 5.5% drop for classical. So as the data proves, music had the most beneficial effect on the accuracy of basketball shots when the subjects listened to hip hop or pop music. But, when listening to rock or classical music, most people saw a drop in their accuracy. Hip hop also helped the most overall than any other type of music tested.

4897  
**Volume of Water Used for Bathtub, Shower, Sink and Hose**  
Mason Rosenthal and D. Shah (teacher)  
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This experiment examined the volume of water (in liters) used in a regular household when a bathtub, a shower, a sink and a hose were turned on. A bathtub, shower, sink and hose were turned on at full blast for five seconds each. A timer was used to record the five seconds each utility was turned on. Each experiment was repeated three times. The experiments were tested another time on a different day. This was done to see if there was any hazard that may have blocked some water in the pipeline. The results, however, proved to be the same. The bathtub used an average of 2.5 L of water, the shower used an average of 0.77 L of water, the sink used 0.65 L and the hose had a 4 L water use. These results suggest that a hose would use the most water if turned on at the same power as its competition.

4898  
**Effects of Packaging on Taste**  
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This study examined the question of what impact the packaging of food can have on how it tastes. Identical pieces of chocolate were placed in two different packages. One was in a Trader Joe’s chocolate wrapping and one was in a Godiva chocolate box. Subjects were asked to eat a chocolate from both and record which tasted better. The subjects’ preference was recorded on ballots and tallied. This experiment was repeated five times by submerging five slices of bread in each substance. By the end of the nine days, vinegar grew absolutely no mold, milk grew a very large amount of mold, water grew about half as much as the milk did, coffee grew only a small bit of mold, and the laundry detergent and control grew no noticeable mold either. The results suggest that vinegar performs best when preventing mold growth.

4899  
**The Effects of Toothpastes Across a Brand on Typical Tooth Stains**  
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This study examined whether different Colgate toothpastes cleaned coffee, tea and blueberry tooth stains differently. Hard-boiled eggs were stained with each and left to set overnight. Each egg stain was cleaned with each of four Colgate brand toothpastes. Each experiment was repeated three times. Colgate Total Advanced Clean Plus Whitening Paste cleaned the best, but not significantly so. Colgate Total Clean Mint cleaned the worst every time, but not significantly so. The results suggest that there isn’t much difference in the cleaning ability on stains across a brand of toothpaste.

4900  
**Effects of Liquids on Bread Mold Growth**  
Molly Echlin and D. Shah (teacher)  
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This study examined the effects of different substances on the amount of mold growth on bread. Slices of bread were submerged in red vinegar, milk, tap water, liquid laundry detergent and black coffee. The experiment was repeated five times by submerging five slices of bread in each substance. By the end of the nine days, vinegar grew absolutely no mold, milk grew a very large amount of mold, water grew about half as much as the milk did, coffee grew only a small bit of mold, and the laundry detergent and control grew no noticeable mold either. The results suggest that vinegar performs best when preventing mold growth.

4901  
**Effects on Red Onions’ Growth With Different Types of Fertilizer**  
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This study examined how rats react to different types of animal hair, predator or non-predator. A rat was exposed to seven different animal hairs in an enclosed box. The rat was exposed to each hair three times and his heartbeat was taken and recorded before and after each trial. His reaction also was recorded on a scale of one to three, with three being a strong reaction and one being little to no reaction. The rat instinctively knew
which was predator hair and reacted strongly to the predator hair, even though the rat is a domesticated rat and has never had to deal with predators before. The results suggest that a rat’s sensitivity to predator hair is an inherent trait and not an acquired one.

4903
Effect of a Higher or Lower Voltage Applied to a Motor
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This study examined the effect of a higher or lower voltage applied to a motor. A robotic arm was used to test this effect. Different voltages were applied to the arm to see how many grams it could pick up with each voltage. Each experiment was repeated six times. When 9 volts were applied, the arm could pick up was 25 grams. When 6 volts were applied, it was 23 grams. When 1.5 volts were applied, the average dropped to 4 grams. The results suggest that a higher voltage gives a motor a little bit more power, but a lower voltage drops a motor’s power tremendously.

4904
The Remembrance of Colored vs. Black and White Text
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In this experiment, students ages 10-15 were tested to see which type of words the students remembered most, colored or black and white. Subjects looked at three different lists (one for each trial) containing assorted words in color and in black text. An hour after the subjects studied the words, the subjects were given a second paper. This second list held all the words on the first list and additional words, but the words were in black text. Students had to check off the words they remembered. The results were in favor of the hypothesis made. The outcome proved that overall, colored text was more easily remembered. This study’s focus was to test people’s visual memory, and colored text was definitely the winner.

4905
The Amount of Electricity Passing Through Each Solution
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This study examined the question of which solution allowed the most electricity through. Circuits were connected in each solution and the amount of electricity passing through was recorded. The control had 18 volts pass through. The orange juice had 16.66 volts allowed through. The vinegar allowed only 16.5 volts to pass. The corn oil allowed 16.33 volts to pass. Water let an impressive 17.16 volts pass. Diet Coke let only 15.5 volts pass. The solution that let the most through was milk, with 17.66 volts allowed through.

4906
Effects of the Stroop Effect and Confusion
Sana Ahmed and D. Shah (teacher)
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This study examined the effect of interference in the act of determining the color of words. People were tested by saying the color of some words on two sheets of paper. On one page were matching colors, and on the other were non-matching colors. The people were timed, and their time was recorded. This was done 63 times in three groups. The average for the matching words was a minute less than the average for the non-matching words. The results suggest that interference and confusion occur when the subject is reading the non-matching words.

4907
Which Brand of Band-Aids Stays Best Under Water: Nexcare, Johnson & Johnson Band-Aid or Curad?
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This experiment questioned which brand of bandage would stay the longest under water. All three brands were under lukewarm water at the same time. This experiment was repeated three times. The results are Johnson & Johnson’s Band-Aid brand last the longest amount of time and Curad’s brand lasted the shortest amount of time.

4908
Effects of Various Amounts of Baking Powder in Muffins
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This study examined the involvement and importance of baking powder in the quick bread muffin. Four teaspooons of baking powder were used in the first batch of muffins, baked at 358° C for 20 minutes. The height and weight of the muffins were recorded. Each experiment was repeated three times, with varying amounts of baking powder. Batch 2 had no baking powder at all, batch 3 had 1 teaspoon and batch 4 had 6 teaspoons. The control was the first batch (4 teaspoons of baking powder) and the variable was the amount of baking powder used in the following batches. The results suggest that the more baking powder used, the more height and mass there are in a muffin.

4909
Effectiveness of Three Household and Kitchen Products in Extracting DNA From Strawberries
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Strawberry has an octoploid (8n) chromosomal complement, allowing for DNA extraction outside the laboratory using ordinary household and kitchen products. However, sufficiency and yield of DNA extraction using these products may differ according to the availability of proteases and enzymatic properties of these reagents. This study examined which protein removers—pineapple juice, meat tenderizer and contact lens solution—were most effective for extracting DNA from strawberries. One milliliter each of pineapple juice, meat tenderizer and contact lens solution was added into a bowl of extraction buffer and mixed with mashed strawberries. Results demonstrated that the meat tenderizer was the most effective for extracting strawberry DNA. Average yields based on five trials were 0.186 g, 0.100 g...
and 0.08 g, for meat tenderizer, pineapple juice and contact lens solution, respectively. The differences seen in the yield of DNA can be attributed to the role of the protease, bromelain, which is concentrated in meat tenderizer as a commercial product, less concentrated in pineapple juice, and not present in contact lens solution.

4910
What Is More Effective for Cleaning Oil From the Gulf of Mexico, Styrofoam or Hay?
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This study tested if Styrofoam or hay could absorb oil better in saltwater (the Gulf of Mexico). Saltwater was put in three bowls and one cup (the sample saltwater), and motor oil was put in the three bowls (but not the cup). The first bowl was cleaned with Styrofoam, the second with hay, and the third was left alone as the control. Then the water purity in the three bowls and one cup was measured with the Intellitec WPTrooo Digital Water Purity Tester and was recorded. The results show that Styrofoam cleaned oil out of saltwater (symbolizing the Gulf of Mexico) better than hay.

4911
Effects on Growth of Radishes By Plant Fertilizers
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This study examined which plant fertilizer has the largest effect on the growth of red globe radishes. Five seeds were put in each pot with a type of plant fertilizer: Osmocote, Miracle-Gro or Lilly-Miller. All were put in the same place and watered the same amount. They were recorded by the three tallest in each pot and tested three times. Miracle-Gro (Plant A) had the smallest effect on the growth of the radishes. The results suggest that Osmocote (Plant B) was the plant fertilizer that had the largest effect on the growth of radishes.

4912
Will a Population of Collembola Decrease If They Are Given Dawn Dish Soap in Water As Their Source of Water?
Holmes International Middle School
9351 Paso Robles Ave.
Northridge, CA 91325

The purpose of the experiment was to see whether Dawn dish soap in water would harm a population of collembola, Onychiuridae encarpatus. As a hypothesis it is believed that the population of collembola will decrease if they are given Dawn dish soap in water as their source of water. Collembola, or springtails, live in a variety of soil habitats and eat mold. One part charcoal to nine parts plaster of Paris and water were stirred together in a dish. It was then poured into petri dishes and allowed to dry for a couple of days. Half of the petri dishes were labeled as the control with blue tape and half of the petri dishes were labeled as the experiment with tan tape. The control was watered with water and the experiment was watered with Dawn dish soap and water. Yeast was sprinkled in each petri dish for the collembola to eat. In each new environment 10 to 13 collembola were placed. The collembola were observed and counted using magnifying glasses and stereomicroscopes. At the end of 42 days, 55.46% of the collembola were found in the experiment and 44.53% of the collembola were found in the control. The hypothesis was incorrect. The collembola were not harmed by the Dawn dish soap because more collembola were found in the experiment than in the control.

4913
Will a Population of Collembola Decrease If They Are Given Ajax Dish Soap in Water As Their Source of Water?
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The purpose of this experiment was to see if grey water would affect a population of collembola, Onychiuridae encarpatus. The hypothesis was that a population of collembola would decrease if they were watered with Ajax dish soap in their water. Collembola are miniscule arthropods that eat mold and are often called springtails. Nine parts plaster of Paris, one part charcoal and water were mixed and placed in 18 petri dishes. These new environments were allowed to dry completely. Half of the petri dishes were labeled control and half of the petri dishes were labeled experiment. The experiment was given water with Ajax dish soap and the control was given regular water from the tap. Yeast was placed in all of the environments for the collembola to eat. Ten to 12 collembola were placed in each petri dish until the number of collembola in the control was the same as the number of collembola in the experiment. Lastly, over the next 42 days the number of live collembola was recorded and graphed. The total percent of surviving collembola in the experiment was 47.7% and in the control 51.2%. The hypothesis was incorrect. The collembola were not affected by the Ajax dish soap. So people should be able to water their plants with this kind of grey water and not harm collembola.

4914
Will a Population of Collembola Decrease If They Are Given Palmolive Dish Soap in Water As Their Source Water?
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The purpose of this experiment was to find out if Palmolive dish soap would affect a population of the collembola Onychiuridae encarpatus. If the dish soap doesn’t harm a population of collembola, it should be safe for gardeners to water their plants with used water and not harm collembola. The hypothesis was that a population of collembola would decrease if they were watered with Palmolive dish soap in water. Environments for the collembola were made by putting nine parts plaster of Paris, one part charcoal and...
water into a dish and stirring it until it was thoroughly mixed. The liquid, about the consistency of yogurt, was poured into 18 petri dishes. The petri dishes were allowed to dry for a couple of days. Half of the petri dishes were labeled experiment and were watered with Palmolive dish soap water. The other half of the petri dishes were labeled control and watered with regular water from the faucet. Ten to 15 collembola were placed in each petri dish, with the same number of collembola placed in the experiment and control. The number of collembola were observed and recorded as data. The end results were 677 collembola, or 68% of the total collembola, in the control and 31%, or 32%, in the experiment. The Palmolive dish soap affected the collembola negatively. The hypothesis was correct.

4915
How to Determine the Speed of Light Through Gelatin
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My science project was on finding the speed of light when it goes through gelatin. This project helps one learn how to calculate the speed of light. We are able to calculate the speed of light through an object due to Snell's law. I bought a packet of KNOX Unflavored Gelatine and mixed in one cup of cold water. After stirring for 1 minute, I mixed in another 3 cups of hot water and stirred for another 5 minutes. Then I put it in the refrigerator for 4 hours. After I took it out of the container and put it on graph paper, I put the light at an angle and measured the angle. Then I measured the angle in the gelatin. Then I took Snell's law and found out the speed of light in gelatin is about 2.17×10^4 meters/sec. This method could also be used to find the speed of light through other objects.

4916
What Is the Effect of Acidic Liquids?
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The purpose of this study was to see how various semi-acidic liquids that humans drink affect teeth. In this case, the chicken bones used represented the enamel of human teeth. The meat and most of the remaining connective tissues, and tendons were cut off with a knife. The 15 bones were each put in jars containing liquid. The liquids used were water for the control, and Coca-Cola, 7UP, orange juice and coffee were experimental. The tested pH for water was 7, for Coca-Cola was 3, for orange juice and 7UP was 4 and for coffee was 5. The bones were left in their jars for 50 days. The hypothesis formed was that the chicken bones in the more acidic liquids would dissolve the fastest. However, this experiment proved the hypothesis somewhat false. In fact, the bones in orange juice dissolved the fastest, then Coca-Cola, 7UP, water and, last of all, coffee. The expected order for the bones to dissolve in was based on the pH of each liquid. However, the coloration of the Coca-Cola and coffee bones was much changed. This study was based on if one drank one of the semi-acidic liquids used, and then never brushed his/her teeth again. This experiment shows exactly why people should brush their teeth.

4917
Alzheimer's Disease and Its Effect on the Brain
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The purpose of this study was to become more educated about Alzheimer's disease and its effects on the brain. By doing so, I could see what effects it has on the brain and how to decrease the chances of getting the disease. To learn more about the disease I had to use my resources. I looked through many books and many online databases. I read about the interplay of neurotransmitters in the disease. I also read about the causes, risk factors, symptoms, genetic factors, and the disease's effects on the brain and body. After doing all my research I finally received my results. Alzheimer's disease is a degenerative brain disorder that develops in mid- to late adulthood. Acetylcholine is a neurotransmitter that plays a big role in processing memory. When people get Alzheimer's, the acetylcholine is decreased, therefore resulting in memory loss. When people get Alzheimer's, their cerebral cortex, the outer layer of the cerebellum, shrinks. This part of the brain is where you get your intellectual functioning. The number of brain substances in the folds of the brain decreases and the spaces in the folds of the brain are enlarged. This causes more memory loss. This process continues and over time the brain slowly shrinks. After a few years death will occur. Most people who get the disease have a genetic background of Alzheimer's. Others may have increased the risk while they were younger. You could help yourself decrease the chance of getting Alzheimer's by leading a stress-free life and doing activities that will stimulate your brain and not hurt it. In conclusion, Alzheimer's is an unfortunate disease with no cure. It is very hard to slow down and almost impossible to prevent. But, educating yourself about the disease can help save you in the future.
4921
Are Fingerprint Patterns Inherited?
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This study examined the question: Are fingerprint patterns inherited? Each relative rolled his or her thumb on a blank sheet of white paper and was recorded. Each experiment was repeated if the fingerprint pattern did not come out properly. The percentage of relatives who were matched was 75%. The percentage of relatives who did not match the fingerprint of a parent or child was 25%. The results suggested that fingerprint patterns are most likely influenced by genetics.

4922
Weight Held By the Wing
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This experiment was run to find how much lift a wing could create. The wing was tied down in front of a fan and weights were attached to it. It was tested at different angles and weights were added until the wing fell. Wing #1 has been tested and has created the most lift. It was the most aerodynamic. The other wings either created too much drag or were not aerodynamic.

4923
Effects of Beet Juice on Fish Color
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This study examined the possible connection of the water color in a fish tank and the beta fish in the tank. There were 24 oz. of water in the tanks and the tanks were kept at room temperature. The experiment was repeated three times. The first fish made little improvement compared to its original color. The second fish made some improvement from the original color of the fish. The third fish had significant changes as to be completely changed. The results suggest that it is possible to change the fish color with beet juice, but it is not permanent.

4924
What Combinations of Colors Work Best for Anaglyphic 3D?
Kyle Harrington and G. Zem (teacher)
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Anaglyphic 3D is the use of special glasses, each of a different color, to produce a stereoscopic effect. The two benefits of anaglyphic 3D are that it can be used for either printed or projected 3D, and it is fairly inexpensive to produce. The drawbacks are that the glasses can cause discomfort, particularly for people who already wear glasses to correct their vision; certain colors cannot be produced with strong fidelity since the eyes are looking through two fixed color combinations; and there is sometimes a "ghosting" effect where one color doesn't completely mask the light, and some of the image from the other color shows through as a "ghost" image. The purpose of this experiment was to see what combinations of colors worked best for anaglyphic 3D. My hypothesis was that red/cyan would work the best, because it is the most widely used. The different color combinations were judged weighing the factors of color fidelity, ghosting, depth and eye comfort. To prepare for the experiment, an optimized YouTube video was chosen that offered the option to select the anaglyph color combinations. Then, glasses for each color combination were obtained. For the experiment, each subject watched the video three times: once with red/cyan, once with green/magenta and once with blue/yellow. After watching the video with each color combination, the subjects rated each of the factors. The factor scores were averaged and the data was compared. Green/magenta had the best color fidelity, the lowest amount of ghosting and the best depth effect, and came in second place in eye comfort. Red/cyan was the most comfortable and came in second in all of the other factors. The blue/yellow combination rated last in all factors. My hypothesis was wrong because green/magenta was in first place in all but one category, making it the best. The data supports why people use red/cyan more often: When audiences sit down to watch a two-hour 3D film, they prefer an effect that their eyes can adjust to easily and won't make them feel dizzy or give them a headache. Statistically green/magenta is better, but audiences prefer the red/cyan.

4925
What Colors Do Dogs See Best?
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My science project is based on what color(s) dogs see the best or are attracted to the most. For this project I am using different colors of paper, dog treats, my dog and other dogs from the neighborhood. I will put the colors of paper on the wall and place a little treat in the center, and see which one the dog goes to most often, moving the papers around each time. My question is what colors dogs can see; most people think that dogs are color-blind, but dogs can see colors. On a color spectrum, dogs can see shades of blue, grey, yellow and brown. But the colors they see are less vivid and less rich than the colors humans see. This might be because dogs have fewer cones (light-catching cells) than humans, which are needed to respond to color. Dogs and humans also both have rods in their eyes, but in this case these dogs have more rods; this gives them better vision in the dark. Based on the information that I have found, I would hypothesize that, on a graph, the color most visited would be yellow or grey.

4926
How Different Fluids Affect How Long a Paper Boat Can Float
Mohammad Raeiyan and G. Zem (teacher)
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In this project I tested whether or not different fluids will affect the amount of time a paper boat floats on them. The purpose of the experiment was seeing if different fluids do affect the paper boats’ floating time. My hypothesis was that yes they do, and all of the results were positive. The procedure was quite simple. First, you take a bowl and fill it with fresh water. Second, you put the paper boat on the water, time it and record the results. You then add salt to make it saltwater (I added 10 spoons’ worth) and place the paper boat and time it. Finally, you clean the bowl fully and add soda, and then place the paper boat and time it. I used two solutions of water, which were salt and fresh, and I also used Pepsi. During the experiments I found an experimental error. One of the times for saltwater came out to 21 minutes, when the average was 9:31:2 minutes. I later found after testing that the experimental error was the density of the salt. Overall my hypothesis was right and different fluids did affect the boats’ floating time.
4927 How Do Different Soils Affect Plant Growth?
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This experiment was conducted to observe how different soils affect the growth of *Phasolus lunatus*, more commonly known as lima beans. First, seven different cups were filled with soils from various locations. They were the control, rocks, soil from Limekiln Canyon, soil from Chatsworth Park North, soil from Holleigh Bernson Memorial Park, soil from Zuma Beach and commercially bought potting soil. The control was from the backyard of my house. Each cup was filled with 3 *P. lunatus* beans. The hypothesis was that the soils would grow from shortest to largest in this order: rocks, Zuma Beach, control, Holleigh Bernson Memorial Park, potting soil, Chatsworth Park North and Limekiln Canyon. Every day for 17 days the plants were watered and data was recorded. The final results were from smallest to tallest in this general order: Chatsworth Park North, Limekiln Canyon, Holleigh Bernson Memorial Park, control, potting soil, Zuma Beach and rocks.

4928 Eco-Friendly Plant Growth
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This experiment tested whether plants can survive when watered with saltwater, acidic water or grey water. Eight marigold flowers were watered four to five times per week. Two flowers were watered with 1/4-1/3 cup of freshwater each; two flowers were watered with 1/4-1/3 cup of saltwater each; two flowers were watered with 1/4-1/3 cup of vinegar water each; and two flowers were watered with 1/4-1/3 cup samples of grey water each. The flowers watered with freshwater grew an average of 1.75 centimeters in the 26-day experiment, and had little to no browning. The flowers watered with saltwater grew an average of 1.5 centimeters in 26 days, and showed moderate to severe browning throughout the experiment. The flowers watered with acidic (vinegar) water grew 1.5 centimeters each, and showed little browning until the conclusion of the experiment, at which time both of the flowers wilted and died. The flowers watered with grey water grew 1.5 centimeters each, and showed moderate browning throughout the experiment. These results show that flowers live the longest and grow the tallest when watered with clean freshwater.

4929 Number of Popcorn Kernels That Did Not Pop From Different Popcorn Brands
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This experiment was to show which popcorn brands did not pop the fewest and highest number of kernels. Orville Redenbacher, Act II, Pop Weaver and Jolly Time were the popcorn brands that were used. All of the popcorn brands were in the microwave on high level. Each popcorn brand was first in the microwave for 3 minutes. All of the kernels that did not pop were counted and placed in sandwich bags. Then each popcorn brand was placed in the microwave for the number of minutes stated on its label. All of them stated 2 minutes and 30 seconds. The kernels that did not pop were stored in sandwich bags again. In 3 minutes, Orville Redenbacher had the fewest kernels, 19. Jolly Time had 94 kernels that were not able to pop in 3 minutes. Orville Redenbacher did not pop 37 kernels in 2 minutes and 30 seconds. That was the fewest. Jolly Time did not pop 86 kernels, which was the most in 2 minutes and 30 seconds. As a result, out of the four different popcorn brands, Orville Redenbacher had the fewest and Jolly Time had the most kernels that could not pop. This was a very interesting experiment that taught a lot about comparison and patience.

4930 Will Acid Rain Harm the Species of Collembola, Onychiuridae tullbergia?
Nataly Gonzalez, Alyssa Jackson and T. Miller (teacher)
Holmes International Middle School
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Northridge, CA 91325

The purpose of this experiment was to see if *Onychiuridae tullbergia* would be harmed by acid rain. The hypothesis is that acid rain would have a negative impact on *Onychiuridae tullbergia* because we believe acid could harm a tiny arthropod. To test the hypothesis, four environments for the collembola were made. Nine parts plaster of Paris, one part charcoal and tap water were mixed together and poured into four petri dishes. Two petri dishes were labeled control and the other two experiment. The petri dishes were allowed to dry for a few days. When the petri dishes were dry, the controls were moistened, using tap water. Acid rain was created by using baking soda and vinegar. Baking soda was continuously added to raise the pH. Every time baking soda was added the pH was checked, using Hydron paper strips, to make sure that the pH ranged from 4.5 to 5.5. Once the desired pH was reached, the experiment petri dishes were moistened and fed yeast. The collembola in each petri dish were counted twice a week, for a month, and fed and watered with their designated liquid. In the first trial, 95% of the collembola were found in the control. Only 5% of the collembola were in the experiment. In the second trial following the same steps we used in the first trial was conducted. In the second trial, 94% of the collembola were found in the control and 6% of the collembola in the experiment. Both of our trials had similar results. This evidence suggests that acid rain could harm and kill *Onychiuridae tullbergia*.

4931 The Fantastic Frequency Fight
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This project was done to determine which kind of speakers reproduce sound the best and with the best quality. Five different kinds of speakers were used, along with an iPad and an iPhone. The iPhone was connected to a speaker, and the app on the iPhone called SignalScope played pink noise through the speaker. The microphone on the iPad picked up the sound and used the app Audio Toolbox to convert into data using its RTA (Real Time Analyzer). This was repeated with all five speakers. The data was then put into numbers on the computer and and graphed. The results were that the studio speakers reproduced the sound the best. The stereo speakers were second best, the large loudspeakers were third, and the iPod and multimedia speakers were very, very similar. This shows that the studio speakers reproduce sound the clearest and best of all the speakers, probably because of their purpose in the studio for work and the large amount of equipment inside of them.

4932 Effects of Gender on Short-Term Memory Loss
Kevin Hafen and G. Zem (teacher)
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The experiment examined the effects of gender on short-term memory loss when age plays a role. One at a time, 55 human test subjects of mixed ages and genders were brought into a silent room. There, they were given 15 seconds to remember as many images as they could. (The images consisted of 12 stereotypical objects about males and females.) In kindergarten, the
4933

Which Rusts More?
Daniel Tarmi Moatamadi and G. Zem (teacher)
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This project showed how different metallic compounds can change in different types of liquids depending on the types of metals and the acidity levels of the different liquids. In my project, there were three different types of liquids and four different types of coins. The coins were just simple American coins such as quarters, dimes, nickels and pennies. I put them in Dixie cups and then poured the liquids in each cup. I left them for precisely two hours (which I had timed) and poured them into a sink through a drainer. I checked my results from before and after and realized that milk had barely done anything to any of the coins, while water and Coca-Cola had a great effect on them. This is because according to the pH scale, they have a higher acidity than milk. Also, another variable is the types of metals that make the coin. The quarter was the most affected and I believe this is because of its high copper content. It has more copper than anything else. So the quarter that was in the Dixie cup with Coca-Cola was the most affected and the dimes in the milk were the least affected. This project can help people learn about the acidity levels of water and soda so they realize what they are putting into their bodies. It also helps people learn what types of metallic compounds are in coins.

4934

Which Nail Polish Dries the Fastest?
Ashli Han and G. Zem (teacher)
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This study examined which nail polish would dry the fastest. For this experiment you should paint each nail and time yourself. Then you should write down your results. The results for this experiment were that Sally Hansen: Diamond Strength, Maybelline New York, Anise, Revlon and Sally Hansen: Hard as Nails. For you to conduct this experiment you should paint each nail and time yourself. Then you should write down your results. The conclusion is that different nail polish brands have different rates and times to dry. The reason is because nail polishes are all differently designed with different chemicals.

4935

Which Type of “Homemade” Batteries Gave the Most Power Over Time?
Abbie Murthy and G. Zem (teacher)
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In this experiment, we used different types of “homemade” batteries and a solar cell to see which was the most efficient and most reliable over a period of 300 minutes at 30-minute intervals. The components were a voltaic pile, a lemon battery, a saltwater battery and a solar cell. After taking the averages of the numbers and voltage readings, it came to about 3.322 volts for the solar cell, about 6.324 volts for the lemon battery, 6.519 volts for the saltwater battery and, lastly, 5.7836 volts for the voltaic pile. So the solar panel had the highest average of voltage over a period of time. The saltwater battery came in second with the lemon battery third and the voltaic pile the last. My hypothesis was that the saltwater battery would be the most efficient of the four test subjects. But the hypothesis was wrong and the solar panel was the most efficient.

4936

How Permanent Are Permanent Markers?
Arna Bauirjan and G. Zem (teacher)
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My experiment was how permanent are permanent markers and which solvents will remove the ink stain the best when using baking soda, water, rubbing alcohol, laundry detergent, soapy water and nail polish remover on fabric, skin, plastic and wood. In three cups pour 1/2 cup of water in each. In one cup mix some hand soap (until bubbly), in another add 1 teaspoon of baking soda, and in the last one leave it as it is. Mix the baking soda with a spoon. In three small containers add some hydrogen peroxide in one, in the second one add some liquid laundry detergent, and in the last one add some nail polish remover. Use a permanent marker to make a stain on all the surfaces in six places. Start with the wood and try to remove the marker stain with soap water, baking soda, rubbing alcohol, water and laundry detergent by scrubbing with a toothbrush for 30 seconds. Do this over again until you have finished with all of the items (fabric, skin, plastic and wood). The results show that plastic was the easiest to remove most of the stains from, but fabric was the hardest. Hydrogen peroxide and baking soda in general had the most effect on the permanent marker stain.

4937

How Does Air Resistance Affect Gravity?
Amanda Jette and G. Zem (teacher)
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This experiment was to see how air resistance affected gravity’s effect on an object. I had four balls made of Play-Doh – and I dropped them off the roof and timed them. Then I flattened out the balls, dropped them off the roof and timed them. I looked at the difference in the times to see if air resistance affected gravity’s effect on the Play-Doh. The results were that air resistance does affect gravity’s effect on objects. The times when the ball was flattened out were much slower. So air resistance does not affect gravity, but it affects gravity’s effect on an object.

4938

Fuel Efficiency of Air Conditioning vs. Open Windows While Freeway Driving
L.M. Rudnick and G. Zem (teacher)
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This study examined the question of whether turning on air conditioning is more fuel-efficient than rolling down windows while driving. A 2007 Honda Pilot was driven over an 11.9-mile route at 55 mph using cruise control. The vehicle was driven with the air conditioning temperature turned down as low as possible and the blast power turned up to full. The test was repeated with all four windows all the way down. The control was air conditioning off and the windows rolled up. Each test was repeated three times. The vehicle was fueled, driven and then refueled at the same service stations. The amount of fuel necessary to fill up the tank was measured to determine the mileage. The average mpg for the control test was 27.99 mpg. For the air conditioning test the average was 27.05 mpg, and for the windows test the average was 25.54 mpg. The results show minimal difference between air conditioning and the control, but the windows being down caused the vehicle to be less fuel-efficient.
Abstracts

4939
To Glow or Not to Glow
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This study observed the issue of what helps extend glow stick life. This
was done by obtaining four glow sticks and putting them in four different
environments. The control didn’t have anything extra done to it. One glow
stick was put under light. One glow stick was put in the refrigerator.
The last glow stick was put in the freezer. The control was the first glow stick
to die. It happened on the second day. Next, the glow stick under the light
died on the second day after the control. The glow stick in the refrigerator
died on the fifth day of the experiment. This meant that the glow stick in
the freezer lasted the longest. This glow stick wasn’t as bright as the others
but the chemical reaction was slower than the rest, which meant it took a
longer time to die. These results suggest that for a longer glow life, put the
glow stick in the freezer.

4940
Chewing Gum
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This experiment is about the duration of certain brands of chewing gum.
The products used in this experiment were Trident Strawberry Twist,
Trident Layers: Wild Strawberry and Tangy Citrus, Stride: Uber Bubble,
Wrigley’s 5 Cobalt Cooling Peppermint, Orbit Wintermint, and Extra
Spearmint. My assistant and I both tried out all of the gum brands and
recorded our times. My hypothesis was that there is no real solution for
which chewing gum lasts longer, and that it all depends on an individual’s
taste buds. My hypothesis was proven correct in this experiment. The
longest-lasting gum varied from person to person. My assistant had differ­
ent results than mine. The longest-lasting gum for her was Trident Layers:
Wild Strawberry and Tangy Citrus. It lasted 5 minutes and 16 seconds for
my assistant. The longest-lasting gum for me was Wrigley’s 5 Cobalt Cool­
ing Peppermint. It lasted 4 minutes and 26 seconds for me.

4941
Effects of Light Color on Plant Growth
Hoang Ngo and G. Zem (teacher)
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This study examined whether growing plants under colored light bulbs
would affect their growth in any way. Beans were planted in plastic cups
inside closed boxes to keep out ambient light. The four groups were the
control group (the regular fluorescent light bulb) the green light bulb, the
blue light bulb and the red light bulb. Each cup had three beans in it and
the height and number of leaves were recorded for 30 days while making
observations. The control group was the shortest, but had the most and
biggest leaves. The green group grew taller, but didn’t have many leaves and
lacked color. The blue group grew taller than the control but shorter than
the green and had fewer leaves. The red grew the tallest, but had the fewest
leaves. The results show that the light color does affect plant growth and
that a mixture of light spectrums is best.

4942
How Eye Color and Distance From the Lens Affect the Appearance of Red Eye in Photographs
I.R. Pessah and G. Zem (teacher)
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The purpose of this experiment was to see how the subject’s eye color and
distance from the lens affect the appearance of red eye in photographs.
The settings used for the experiment were the living room, dining room
and family room of a house. An X was made on the floor with masking tape
and a ruler was used to measure the other three marks at five, 10 and 15 feet
away. Then the lights were turned off and the experiment began. One at a
time each subject stood on each mark and then came up for a close-up.
The close-ups had no red eye effect at all. The farther away you got, the stron­
ger the effect. However, as you got farther away, the red eye turned more
yellow. As for the differences among eye colors, brown and hazel had simi­lar
effects, with some red eye. Green eyes had a much stronger effect, with
nearly fluorescent eyes. Dark brown eyes had more of a “blue eye shine”
as it’s called) at five feet. But at 10 and 15 feet it became more yellow. The
conclusive results are that the farther from the lens you are, the stronger
the red eye effect. People with green eyes have a much stronger effect than
people with brown and hazel eyes; however, people with dark brown eyes
have different effects aside from red eye.

4943
Up, Up and Away
H.L. Gittins and G. Zem (teacher)
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This experiment showed which liquid evaporated the fastest in one week.
One cup of Powerade Orange, Ocean Spray Light Cranberry, water and
Caffeine-Free Diet Dr Pepper were each placed in their own cups. Over a
one week period, measurements were taken of the liquids to see how much
each liquid had dropped. Each experiment was repeated three times. In
each experiment, the Caffeine-Free Diet Dr Pepper’s results showed that it
was the liquid that evaporated the fastest in the given time period. There­
fore the results were in favor of the hypothesis, in which the Caffeine-Free
Diet Dr Pepper would evaporate the fastest because of carbonation.

4944
Which Genres of Music Affect Heart Rate the Most? The Least?
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This study tested which genres of music affect the heart rates of adolescent
boys and girls between the ages of 11 and 14 the most and the least. During
this experiment five boys and seven girls were used. Each adolescent (sepa­rately)
had his or her heart rate at rest recorded and his or her heart rate
recorded while listening through earphones to one song separately from
each of these genres: rock, pop, R&B, hip hop and rap. The results prove
that for girls, hip hop affected heart rate the most, by having the highest
beats per minute. For boys, rap affected heart rate the most, by having the
highest beats per minute. For both boys and girls, rock affected heart rate
the least, by having the lowest beats per minute. Studies have shown that
the genre of music does not have as much effect on the heartbeat as the
tempo and pace of the music.
4945
Pain Tolerance of Girls and Boys of the Ages of 13 and 14
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This study was an experiment to see who has a higher pain tolerance: 13- and 14-year-old boys or girls. Ten subjects were tested, five boys and five girls. Each had to put their hand in a 30°F bucket of ice for however long they could withstand, with the exception that after three minutes their hand would go completely numb and therefore they would have to take it out. First they put in their dominant hand and then, after a few minutes, they came back and put in their non-dominant hand. They were timed to see how long they could leave their hand in and once their hand came out the time was recorded. The results came out so that on average boys left their dominant hand in for 105.95 seconds and their non-dominant hand in for 123.43 seconds. The girls, on average, left their dominant hand in for 91.83 seconds and their non-dominant hand in for 67.06 seconds. These results suggest that 13- and 14-year-old boys have a higher pain tolerance than girls of the same age.

Editors’ Note: The school and teacher should approve experiments that deal with humans or vertebrate animals, especially those that deal with possible pain or injury.

4946
Radar: What’s Around the Corner?
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This experiment was carried out to determine whether radar can see around obstacles using mirrors, and to determine whether (and, if so, how) mirror size affects radar return strength and beam width. It was hypothesized that radar can see around obstacles using mirrors, and that a larger mirror gives a larger return strength and beam width. A Furuno X-Band Radar was used, along with a 2 x 4 foot sheet of metal used as a mirror, a support system, a video camera, a tape measure, chalk and a level. The mirror stood on the support system with the 4-foot side horizontal. A target stood on a 10-foot section of the tape measure, at the point that was marked "o." The target then stepped to each 2-foot interval of the section and the experiment was repeated again. Results show that mirrors can allow radar to see around obstacles, and that a larger mirror gives a larger return strength and beam width.

4947
Effects of Different Additives Added to Bubble Solution
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This study was done to test which additive added to a bubble solution would make the bubbles last longer. The additives were glucose, sugar, lemon and corn syrup. A cup was filled with 100 ml of water, then with 20 ml of bubble solution. After mixing, 10 ml of one of the additives was added to the mixture. A bubble was then blown with the newly made mixture. The time the bubble lasted before bursting was recorded. The results of this experiment showed that glucose made the bubbles last longer. Coming second after glucose was lemon, then corn syrup and then sugar.

4948
How Good Is Your Toothpaste?
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This study tested how well three different kinds of toothpaste (Crest, Colgate and Arm & Hammer) and baking soda with water would remove coffee stains from tooth enamel. Four eggs were placed in bowls, each with a different letter assigned to them. (I used eggshells in this experiment because both tooth enamel and eggshells contain crystalline calcium carbonate, which makes them hard and white.) Brewed and cooled coffee was poured evenly into the bowls and was set for 30 minutes to stain the eggs. When the coffee was drained from the bowls and the eggs were dry, different toothpastes and the baking soda and water were assigned to each bowl. Each egg was brushed with the toothpaste for a minute and 30 seconds. The results were that toothpaste C, which was Arm & Hammer, and toothpaste D, which was just baking soda and water, cleaned 100% of the stain where the area was brushed.

4949
Gullibility or Unfamiliarity?
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Reseda, CA 91335

This study examined the degree of gullibility amongst people from a variety of different backgrounds. In this experiment, I used a simple question to test how gullible people really are. I tested 20 people, all from different age groups. They were asked if they would eliminate dihydrogen monoxide. Furthermore, its consequences were also presented: 1. Major component in acid rain; 2. Found in fatal tumors of cancer patients; 3. Deadly if inhaled in its gaseous state; and 4. May cause severe burns. With such a question posed, many did not give a definite answer of yes or no. It was quite the opposite of what I had suspected. Many asked if there were any good things about it (dihydrogen monoxide), or said that if it existed, then it existed for a reason, and thus answered no, they would not eliminate it. But in the end, the results proved my previous beliefs. Ultimately, 75% of the examinees in this experiment gave the final answer of yes: Yes, they would eliminate dihydrogen monoxide. Dihydrogen monoxide is in fact just another term for water. With this experiment, the question can be posed: Is it really gullibility, or just unfamiliarity? Or both? Do we have the power of making others believe what we want, or are others just powerless when it comes to believing?

4950
Factors That Affect a Fruit Battery’s Voltage Output
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This experiment aimed to find out whether or not a fruit’s acidity translates to generating electrical power, as well as to figure out other factors that could possibly affect a fruit battery’s voltage output. The pH, or acidity, levels of different citrus fruits were first determined. A battery was made out of each fruit by inserting a copper nail and a zinc nail across the middle of the fruit. Then a volt meter was used to measure each fruit’s voltage output. Factors were changed in the experiments, including the placement and distance of the nails, fruit temperature and elapsed time.

The fruit’s acidity by itself does not translate into generating more electrical power. It is the chemical reaction triggered between the juice and the nail electrodes that determines voltage output. A regular citrus fruit such as a lemon can produce about one and a half volts of electrical power, approximately equivalent to a common household battery. The farther
apart the nails are placed from each other, the more voltage the fruit produces, while the closer the nails, the lesser the voltage the fruit produces. Time elapsed over several hours caused the fruit battery’s output to decrease steadily. The fruit produced more voltage at room temperature than when cold.

4951
Do Gummy Bears Expand in Water and Soda?
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The purpose of this experiment was to see if gummy bears expand in water and soda. Gummy bears were placed in two different cups. One was filled with water and the other one was filled with orange soda. I examined them for a week. The experiment was done twice. The gummy bears in the water sucked in 1/4th of the liquid and the estimated size of the gummy bears was 2 1/4 inches. The gummy bears in the orange soda sucked in 1/6th of the liquid and the size of the gummy bears was 1 5/6 inches. The results of the experiment showed the gummy bears grew. The gummy bears were larger in the control group.

4952
Types of Bridges and Their Strength
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This study examined what type of bridge is the strongest and can withstand the most weight (psi) put upon it. A bridge is a strip of any material over a body of water, valley, ditch, or over an obstacle. The three main types of bridges are the truss bridge, arch bridge and suspension bridge. These bridges were built as scale models and exactly how these bridges look. This test would have been inconclusive if it found out how much weight it can take scale model, so it was tested as what design type of bridge is stronger. The scale model bridges were too inaccurate and could not be related to a real bridge. Fortunately, the design of the scale model was accurate to real-life bridges, so this experiment tested which design out of the truss, arch and suspension was stronger and could stand the most weight put upon. For this experiment there was some drilling into steel pipes in order to screw in a pressure gauge. The pressure gauge recorded how much pressure was put on the scale model bridges. The steel cylinder was attached to an eight-gallon air compressor that blew small increments of air into the cylinder. A tile was added to distribute the weight. The results of the experiment showed whether sand grains would show up in the experimental group. This experiment was repeated three times. Two factors I found that affected the evaporation process were the weather temperatures and the amount of water added to the control group. The results of the experiments show that sand deposits do form from the weathering of sediment in the ground from the leftover rainwater.

4954
Using Objects to Measure Drag Force
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This study examined the correlation between drag forces of different objects. A total of five experimental objects were tested. They were a barbecue grill top, barbecue stove top, hot pot mat, pan and a pan lid. Each object was tied to a rope, which was tied to a spring scale measure. Then it was put into a pool. This way when the object was pulled, it would measure the drag it had on the water. Each object had five trials and then an average trial. I hypothesized that the object with the heaviest weight would have the most drag on the water. Results showed that the barbecue stove top and the barbecue grill top had the most drag, while the pan and its lid had the least drag. So overall, my hypothesis was correct and the object with the heaviest weight had the highest drag force, and the object with the least weight had the lowest drag force.

4955
Which Acidic Liquid Has the Most Effect on Tarnished Pennies?
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In this experiment different acidic liquids of different pH levels were tested to see which would have the greatest effect on tarnished pennies. There were three liquids tested: 7UP, lemon juice and vinegar. The liquids were each kept for three different timings of one hour, three hours and 24 hours. Then a tarnished penny was dropped into each liquid. The liquids were removed after the different timings were completed. The results were then recorded. After completing the experiment the results were that lemon juice cleaned the tarnished penny the best. After 24 hours the tarnished pennies were almost restored to the original shine. Lemon juice had the strongest pH level of 2. Vinegar cleaned the tarnished penny second best, with a pH level of 2.6. After 24 hours vinegar restored one penny back to its original shine and one penny was half-cleaned. And cleaning the penny third best was the 7UP, with a pH level of 4. After 24 hours, 7UP cleaned half of one penny and partially restored one penny back to its original shine. This shows that the acidity in lemon juice cleans the tarnish of pennies best. These results also show that the stronger the pH level was, the better the liquid cleaned the tarnish of the pennies.

4956
Crystallization of Different Solutions
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This experiment analyzed the different structures of salt and various sugar crystals and the crystallization of salt and sugar solutions. Four different solutions — granulated sugar, brown sugar, powdered sugar and table salt — were poured into four clear jars each. For each jar, a string was tied to the center of a pencil and the pencil placed at the mouth of the jar, letting the string dangle into the solution for crystals to form. For two weeks the solutions were observed and the growth recorded. The results proved that salt crystal growth is faster than any of the sugar solutions’ crystal growth, as the sugar solutions had not crystallized within the two weeks.
**4957**

**Light in the Dark**  
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This experiment was to see the results of a photograph after a setting, called the ISO, had been tinkered with. ISO stands for International Organization for Standardization. It is a standardized industry scale for measuring sensitivity to light. What ISO denotes is how sensitive the image sensor is to the light present. The higher the ISO, the more sensitive the image sensor, and therefore the possibility of taking pictures in low-light situations is better. To make sure the effect came out to compare only the ISO, the shutter speed was set to 1/10 seconds for all pictures and the flash was turned off. Pictures were taken with the lowest ISO, 100, and the highest, 3,200. They were taken at different times of the day, indoors and outdoors to see if any variables might have changed the outcome. The results for all pictures suggested that pictures taken with a lower ISO have less sensitivity to light and that pictures taken with a higher ISO capture more light.

**4958**

**Paper Airplane Model Efficiency**  
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This study determined which airplane model can fly the farthest under the same conditions. Five planes were created out of five standard white pieces of printer paper (8.5" x 11"). Each plane was flown outdoors on the same day and the distance traveled was recorded in inches. This step was repeated two other times for each plane and the distances were averaged. The power was similar because the height of the hand throwing the plane was the same and the distance the hand went back was the same. The Floater flew an average of 215, the Edmonton Shadow flew an average of 236, the Classic Dart flew an average of 299, and the Dragon Plane flew an average of 300. The results show that the Dragon Plane flew the farthest compared to the four other planes. The Dragon Plane turns out to fly the farthest because of its stiff wings and symmetry.

**4959**

**Do People's Reaction Times Change With Age?**  
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The experiment was conducted to figure out if your nervous system is faster as you get older. Various aged people were gathered and told to catch a ruler three different times: 1) while looking at it the time it drops, 2) when hearing the word “go” when it is dropped, and 3) while being distracted. This whole process was repeated a total of three times, making it nine catches per person. The different age groups consisted of toddlers, children, preteens, teens, adults and senior citizens. The results showed that adults did the best in the first category. The second category was pretty consistent throughout. The third category was dominated by the preteens. Children did second best in every single category. Teens, toddlers and seniors citizens did not do as well.

**4960**

**Which Nail Rusts the Fastest When Sprayed or Soaked in Liquid?**  
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The purpose of this experiment is to test which liquid rusts an uncoated nail faster when the nail is sprayed or soaked in different liquids. The hypothesis stated that lime juice would rust the nail the fastest, followed by saltwater, water, vinegar and then air. The hypothesis stated that the nails would rust at the same pace when sprayed and when soaked in liquid. This was stated as such because acidic liquids (lime juice) rust nails more quickly than water, but with salt added, the nails may or may not rust faster. Vinegar is a hardware cleaner and would leave the nail clean. Air rusts nails because of its exposure to oxygen. To perform this experiment you need five spray bottles, 10 eight-ounce juice bottles (plastic), tap water, lime juice, vinegar, saltwater, uncoated nails, twine and a hot glue gun. Using the materials, pour one liquid into each bottle and spray bottle, and hang a nail into the liquid of each plastic bottle. Make sure to leave a nail hanging in the air bottle (control). Check each nail three times a week for a month and spray the spray group’s nails each time the hanging nails are checked. Then document their descriptions. This experiment proved the hypothesis to be false. With spraying, vinegar does the most damage, then lime juice, saltwater, water and air. With soaking, the results show that saltwater does the most damage, followed by water, lime juice, air and then vinegar. This experiment proves that the acidic value of a liquid does not considerably play into the development of rust of the nail.

**4961**

**The Stroop Effect**  
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This study focused on what happens when someone tries to name the color of the color word if the color ink that the word is printed in differs from the color word (e.g. GREEN in red ink). First color words were printed in the same color ink as the color word (e.g. GREEN in green ink, RED in red ink, etc.) and then color words were printed in a different color ink (e.g. RED in green ink). Then volunteers were tested and the time difference to name the color of the ink that was printed in was recorded. It took an average of 3.85 seconds longer for five volunteers to name the color of the ink that was different from the color word. The results show that it takes a longer time to name the color of the ink when the color word is different from the ink it is printed in.

**4962**

**Which Is the Best Propellant?**  
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In this experiment, seven liquid propellants were tested in water rockets. Each rocket was tested three times with each propellant. The rocket that flew the highest and farthest had the best propellant. The hypothesis stated that the rocket containing water would be the best because it was the thinnest and probably the cleanest out of all the propellants. The following descending order is also part of what was hypothesized: water, Windex, Gatorade, milk, soda, vinegar and then olive oil. Final results were not at all expected; milk had done the best by far in each test. Each time, every rocket was airborne and achieved great height and distance. Vinegar had the lowest of them all. This happened in each test. The real descending order was milk, Windex, Gatorade, water, olive oil,
soda and then vinegar. In the first test there were some interesting things that happened; vinegar backfired and Windex took angle while being launched, even though it was held straight.

Setup for this project was fairly simple, but just a bit messy. The setup required the seven liquids, and a clean bucket of water to clean everything for reuse and more accuracy. The amount of liquid in each rocket was measured equally and the number of pumps was also the same.

As a whole, milk was the best propellant of all. This rocket had the most height and the most distance. It was also in the air the longest. To further extend the project, more propellants could have been used and tested. Then it could have been determined how to find and test real rocket propellants.

4963
Will a Population of Collembola Increase If Given Diet 7UP Instead of Water As Their Source of Water?
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The purpose of this experiment was to see if Diet 7UP would affect a population of collembola, *Onychiuridae: encarpatus*. The hypothesis was that a population of collembola would decrease if given Diet 7UP instead of water as their liquid. Collembola are miniscule arthropods that eat mold and are often called springtails. Nine parts plaster of Paris, one part charcoal and water were mixed and placed in two petri dishes. These new environments were allowed to dry completely. One petri dish was labeled control and the other one was labeled experiment. The experiment was given Diet 7UP and the control was given regular water from the tap. Yeast was placed in both of the environments for collembola to eat. Thirteen collembola were placed in each petri dish. Over the next four months the number of live collembola was recorded and graphed. The total percent surviving in the experiment was 60.25%, and in the control 39.75%. The hypothesis was incorrect; collembola can survive with 7UP as their source of liquid.

4964
Will a Population of Collembola Decrease If Trash Is Placed Into Their Environment?
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The purpose of the experiment was to see if pieces of trash (Doritos chip bag) placed in the environment would harm a population of collembola. The hypothesis was that the collembola population would increase if pieces of trash were placed in the petri dish, because extra mold would grow due to the trash. Collembola eat mold as their food. One part charcoal to nine parts plaster of Paris and water were stirred together in a plastic cup. It was then poured into petri dishes and left to dry for a couple of days. Ten collembola were placed into the control petri dish labeled with white tape. Ten collembola were placed into the experiment petri dish labeled with white tape. The control and the experiment were watered and fed with yeast, but pieces of a Doritos chip bag were placed into the experiment petri dish. The collembola were observed and counted with the use of stereomicroscopes for a month. This experiment suggests that collembola are not affected by trash. The hypothesis was correct. The experiment petri dish had 33.31% of the collembola and the control petri dish had 46.69%.

4965
Does the Wing Size of a Whirligig Affect Its Flight Time?
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The purpose of doing this experiment was to see if the wing size affects the time it takes for a whirligig to fall. My hypothesis was that the biggest whirligig would fall the slowest because the wings are larger and would have more air pushing up against them. A whirligig is an object that spins or whirls when it is thrown or dropped and is made out of paper. When you throw or drop a whirligig, the air pushes up against the wings. This bends the wings up slightly. When air pushes up on the slanted wings, some of the thrust turns into a sideways push. My experiment was to make three whirligigs: one big, one medium and one small. The big whirligig’s wings were 2.5 by 8 centimeters, the medium whirligig’s wings were 1.25 by 4 centimeters, and the small whirligig’s wings were .625 by 2 centimeters. I dropped each one 10 times from a height of 1.8288 meters. I timed how long it took for them to fall with a timer and recorded the results. Afterward, I found the average flight time of each whirligig. The big whirligig fell at an average of 2.928 seconds, the medium whirligig fell at an average of 2.363 seconds, and the small whirligig fell at an average of 2.146 seconds. This shows that my hypothesis was correct, and the largest whirligig took the longest to fall.

4966
If Oranges Were Added to Their Diet, Would the Collembola Population and Reproduction Rate Increase?
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The purpose of this experiment was to find out if oranges would help the collembola population and reproduction rate. My hypothesis was that the oranges would help the population and reproduction rate of the collembola. First, I gathered all of the materials I needed for the experiment. Then, I mixed active charcoal, plaster of Paris and water in a container with a spoon. The mixture was mixed until it had the consistency of yogurt. Two petri dishes were labeled control and experiment. The mixture was poured into the two petri dishes equally. The petri dishes were tapped against the table so that the level of the mixture was equal. After that, the petri dishes were left by the windowsill to dry for two days. After the dishes were dry, 10 collembola, yeast and water were put into both petri dishes. A piece of an orange was put into one petri dish and it was labeled experiment. The collembola were observed, watered and fed for 73 days. The observations were recorded in a log book. There were 17% collembola in the control and 83% collembola in the experiment. There were 34% collembola eggs in the control and 66% collembola eggs in the experiment. There was a significant difference and my hypothesis was correct. The orange affected the collembola positively.

4967
Does the Number of Coils Around an Electromagnet Affect the Number of Half-Inch Nails an Electromagnet Picks Up?
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This study helped prove whether or not the number of metal coils around an electromagnet will affect the number of half-inch nails an electromagnet picks up. Different numbers of coils were placed around the same brand of nails. To prove that the metal coils can only affect an electromagnet made...
4968 Which Commercial Plant Fertilizer Grows the Best Plants?
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The purpose of this experiment was to compare the efficiency of commercial plant fertilizers. The four that I used were Osmocote Plant Food, Miracle-Gro Liquid Fertilizer, Miracle-Gro Soil and Jobe's Organic Fertilizer. My hypothesis was that Miracle-Gro Liquid Fertilizer would grow the best plant, because on the back of the can it says that it will "double the size of flowers." I used five-six inch yellow pansies for the experiment, and applied each respective fertilizer to its plant. I left one plant alone to observe the effects on the others. The experiment ran for a total of five weeks. Though all fertilizers were markedly superior to the control plant, it was Osmocote that proved most efficient. Osmocote plant food claims to take care of a plant's nutritional needs for six months. Both Miracle-Gro products outstripped the others in the first two weeks, but fell behind Osmocote by the third. The organic fertilizer, though efficient compared to the control, never came close to Osmocote or either of the Miracle-Gros. My findings concluded the superiority of Osmocote vs. three other commercial brands of fertilizer for the growth of pansies.

4969 Stain Go Away
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This experiment showed which stain is the hardest to remove from a white piece of cloth. The four stains - grass, chocolate, permanent Sharpie marker and cherry juice - were placed on an 8-inch white towel, resembling a white shirt. Then all four variables were sent to the Whirlpool Duet washer and dryer for 28 minutes. I used Gain Original as the detergent. My hypothesis was that the permanent marker would be the toughest to remove since the ink is dark and it penetrates deep down in the cloth. I also said that the chocolate spread would be the easiest to remove. This is because the chocolate stain is sitting on the cloth and the stain hasn't sunk in. The results showed that the permanent marker was the hardest to get rid of, followed by the cherry juice. The grass stain was the second easiest and the chocolate stain was completely removed. In conclusion, my hypothesis was right and I learned which stain was hardest to remove from a white piece of cloth.

4970 Magic Egg
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This study investigated how raw and boiled eggs would behave in a solution of the sea and iodized salt at different concentrations. One cup of water was placed in each of the four glasses containing one egg each (two raw and two boiled eggs). One teaspoon of the sea salt was added, one at a time, to separate containers with raw and boiled eggs until the time both eggs floated. The same procedure was done using iodized salt instead of sea salt. The experiment showed that the raw egg floats faster compared to the boiled egg because the raw egg is more buoyant and less dense than the boiled egg. On the other hand, more sea salt is needed to make the eggs float compared to the iodized salt, because sea salt is coarser than iodized salt. A lesser amount of the iodized salt will make the solution more concentrated.

4971 Which Color Absorbs the Most Heat?
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This experiment was done to determine which color will absorb the most heat in six hours with direct sunlight. In the procedure, five jars are filled up with water of the same temperature. Then, five cloths in the colors of purple, black, white, yellow and red are put on top of the jars and secured with rubber bands. Five pool thermometers are also put in the jars and a regular thermometer is put next to them. The area where the experiment takes place has direct sunlight. The temperature in the jars and outside is measured in degrees Fahrenheit. After six hours it is found that the temperature in the jar with the black cloth is 65° F, the jar with purple cloth is 59.7° F, the jar with red cloth is 59° F, the jar with yellow cloth is 58.5° F and the jar with white cloth is 57° F. The temperature outside is 63.5° F. In conclusion, the results show that out of all the colors black absorbs the most heat, followed by purple, red, yellow and then white.

4972 The Price of Purity
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This study examined whether price has anything to do with purity of drinking water, or if people pay a lot of money for brand-name water that may not be the safest to drink. Eight different types of drinking water (Aquafina, Kona Deep, Fiji Water, Evian, Roxane, Glacier Water, filtered tap water, and water taken from a school drinking fountain) were tested first by taste, then using test strips (for pH, total alkalinity, total hardness, free chlorine, total chlorine, nitrate nitrogen, nitrite nitrogen, copper and iron). The waters' price-per-liter is: Kona Deep ($2.60), Fiji Water ($1.99), Evian ($1.53), Aquafina ($1.39), Roxane ($0.35), Glacier Water ($0.08), filtered tap water ($0.00) and school drinking fountain water (free to the public). The results for the taste test were as follows (in order of best taste to worst taste): Kona Deep, Aquafina, Evian, Roxane, filtered tap water, Fiji Water, Glacier Water and school drinking fountain water. The results for the waters' purity (based on the test strip results) were, from best to worst: Aquafina/Glacier Water (tied for purest water), Kona Deep, Roxane, filtered tap water, Fiji Water, Evian and school drinking fountain water. These results suggest that price has very little to do with how pure the water is, as the fourth most expensive water and the sixth most expensive water are the purest, and the third most expensive and the eighth most expensive are the least pure.
4973
Does Talking to Plants Help Them Grow?
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This experiment focuses on the effects of talking to plants. There are two groups using cranberry beans as the seeds, a control and the experiment, with the latter being talked to. Each group contains four cups with three plants in each. The experiment is to talk to each of the four cups every day for exactly one minute. The phrase was the same every time to prevent more variables. This experiment was done two times. The first was over a 70-day period and the second was over 55-day period. The result was that the experiment group matured slower than the control group. This caused the experiment group to last longer and grow larger leaves, as it had more time to. Examples of the control group maturing faster were seen in their sprouting, growing leaves, budding and flowering. The experiment group’s leaves seemed to have grown better, as at a point the group had 11- to 12-inch leaf widths, while the control group had only 9- to 10-inch leaf widths and had more yellow leaves than the experiment group. The conclusion is that talking to plants slows down their maturity rate, but allows the plants to grow larger and healthier leaves.

4974
How Does Weight Affect a Helicopter’s Speed and Direction?
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The purpose of this experiment was to find out how weight affects a helicopter’s speed and direction. The hypothesis was that heavier weights would make the helicopter slow down. An Interceptor R/C Outdoor Helicopter was used for this research project. Coins were used to put different weights on the helicopter. For each test the helicopter was flown up to 201 cm and the time was recorded for each flight. For each weight, the flight was repeated five times and the average time was calculated. The helicopter was also recharged for each flight. The same procedure was repeated for the other weights. The results showed that with no weight it took 1.08 sec., with 4.53 grams it took 1.22 sec., with 15 grams it took 1.69 sec., with 16.1 grams it took 1.79 sec. and with 24.3 grams it took 1.79 sec. It was also observed that the helicopter moved forward with more weight added onto it. The hypothesis proved correct. The heavier the weight, the more time is required to reach a specific height, and that weight also affects the direction of the helicopter.

4975
Different Liquids for Plants
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This project studied if different liquids, other than water, can grow plants efficiently. It also compared how well the other liquids grow the plant compared to how well the water grows the plant. It was done by taking cups and filling one with water, one with Gatorade, one with SunnyD and one with coffee. A piece of cotton was spread over the cups and two pinto beans were put on each piece of cotton. The cotton became moist with the liquid in the cup and grew the plant. The plants were observed for 20 days. At the end of the experiment, the plant growing with water grew to 42 cm. The other plants did not grow at all. Therefore the experiment suggests you grow plants with mainly water.

4976
Aerodynamic Forces Around a Helicopter
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This science project showed what aerodynamic forces make a helicopter fly. A remote control helicopter was suspended in a frame and allowed to move fairly freely. The helicopter was flown in a cloud of dry ice smoke. As the helicopter flew, the dry ice smoke shifted into patterns of air. These air patterns were recorded on video from multiple different angles. The recorded video showed that air around the helicopter gets pulled into the rotary system and deflected downward by the blades. The experiment, being done just above a floor, showed that the air bounced back to the top of the helicopter after being forced down. The air then repeated this pattern by going through the cycle again.

4977
Does Temperature Affect a Solar Panel’s Output?
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This experiment was conducted to prove if temperature affects a solar panel’s output. Every day at 4 p.m. the solar panel was placed outside in the same location. The temperature was recorded from three reliable sources: The Internet and two thermometers. The average temperature was taken from these three sources by adding them and dividing by three. The solar output was then taken three times as well. The average was taken of the three solar outputs. This was repeated every day for one week. Once the data was collected, the average solar outputs were compared and the temperatures were compared. When the data was compared, it was surprising to learn that temperature does not, in fact, affect a solar panel’s output.

4978
Development of a High Throughput Real-Time PCR Assay for Rapid Detection of Helicobacter Bacteria
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Introduction: Helicobacter bacteria can be found in humans and various animals. Some members of this genus are associated with gastric diseases and cancer formation. The diagnosis or screening of Helicobacter infection by culture method is difficult because of low sensitivity. In this report, a genus-specific high throughput real-time PCR (polymerase chain reaction) procedure is developed to rapidly screen for subjects potentially colonized with Helicobacter bacteria.

Methods/Materials: Consensus PCR primers designed over the 16S rRNA gene of Helicobacter bacteria were used in a real-time PCR reaction that incorporated a proprietary DNA binding fluorescent dye. Quantified H. pylori DNA was used to determine the lowest detection limit, and the intra-assay and inter-assay variations of the assay. The specificity of the assay was checked against 29 bacterial DNAs.

Results: By titrating against four different concentrations of Mg²⁺ at three different primer annealing temperatures, the optimal condition for the real-time PCR assay was determined to be at 2.0 mM Mg²⁺ with 60° C primer annealing temperature. The specificity of the assay was checked against 10 different Helicobacter species and 19 different common bacterial pathogens, and only Helicobacter bacteria were detected. The lowest detection limit of the assay was determined to be one copy of Helicobacter genomic DNA per reaction, with intra-assay and inter-assay variations below 5%. The assay had a linear quantification range from 10 to 10⁵ copies of Helicobacter bacterial genome.
Conclusion: A genus-specific real-time PCR using DNA binding dye technology is developed for the detection of Helicobacter bacteria. Real-time monitoring of amplification signal eliminates further processing of resultant PCR products before detection, increases the throughput of the assay and minimizes cross-contamination.

4979

Aerodynamics Testing in Wind Tunnels

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In the experiment four potential nose cones—one parabolic, one conical, one hemispherical and one flat—were tested for aerodynamics. The wind tunnel had non-pressurized air at 220 miles per hour. The test was repeated three times for each and a mean and highest reading in grams of force were taken each time. Then a mean of the shape in every test was constructed. The most aerodynamic was the cone, for its edges were the steepest and did not change the angle. Then the hemispherical came next, for the angle changed at the same angle. Then the parabola came; it was steep but changed steepness in the sides. The flat came last, but it was a control. The experiment proves that the steeper and longer the nose cone is the better, but the less it changes the shape the less turbulent and therefore more aerodynamic.

4980

Illusions to the Brain

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The purpose of my experiment is to see if optical illusions have different effects on people. Also, the experiment is to see if illusions trick the brain. I first searched for illusions and then I searched up facts about the brain’s response to illusions. The research said that people face reality so when it comes to illusions, it’s the opposite. It is said that to pass illusions, we need to see things in different perspectives. I was able to experiment by taking examples of illusions of various kinds and going to different people. I asked them if they could guess what the picture was or if they could explain what was happening. I went to adults, teens and kids. I dated the data and examined my results. Most people saw through the illusions. It became clear that children are better than adults when it comes to figuring out optical illusions. I found out that illusions trick the brain because we believe what we see. The experiment proved that children were able to get better answers than adults, and my hypothesis was correct. Not only did adults receive more incorrect answers, they had to take more time to figure it out. From this I was able to conclude that the illusions have different effects on people. Also, from the results, children are able to find what lies in illusions better than adults. Figuring out illusions requires all senses, focus and intellect. Illusions trick the brain; I tested myself with a circle that looked like it was moving but it wasn’t. My eyes were telling me that it was moving; in the end I was wrong. I was able to learn that what we see is not always what we should believe in. In the end, my hypothesis came out true.

4981

How and Why a Guitar Fretboard Works

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This project is to show how and why a guitar fretboard works the way it does. The strings were measured in thickness, total length, and length from each fret to the base. Results showed that the thinner and shorter amount of string there is, the higher pitched the string plays. This shows that the string vibrates and the vibrations reverberate throughout the string. The thicker the string, the lower the sound is because the vibrations have to put that much more energy into making the string vibrate. The shorter the available amount of string there is (via placing a finger on a fret), the higher pitched the string will sound, because there is less string for the vibrations to reverberate along.

This entire experiment was an in-depth analysis of sound waves and how they’re related to a guitar fretboard. A sound wave is a vibration in the air caused by the vibration of anything that can vibrate (guitar string, vocal cords, drumheads, etc.). Sound waves are measured by how many peaks (that part that’s higher than the rest of the wave) there are in a given amount of time. The notes in a standard music scale are known already, and that saved me a lot of time in this experiment. When I compared the ratio between each fret and the ratio between each sound frequency, I noticed that they were either at or near 1.06 despite being two different things (distance and frequency). The only difference between the two was that the frequency’s ratios were constant, while my ratios might have had some error. This is probably because the frequencies have been tested and measured for error, while I had measured the distance between the frets, thereby leaving room for error (I’m only human). It might be possible to improve the measurements, but I would need to use a more accurate measuring device (I used a carpenter’s measuring tape). The guitar’s pictures on the frequencies from Audacity don’t look like perfect sound waves, and that is probably because string vibration isn’t a single frequency, but multiple frequencies reverberating from end to end of the guitar. This can make the sound waves distorted by comparison to a generated tone. In conclusion, a guitar fretboard is all about sound waves. When you place your finger on a fret, you pinch the string between your finger and the fret, blocking all vibrations from getting past it. This action causes shorter vibrations along the strings, making the pitch go up in tone. If two strings are wound the same and have the same playable length, but one is thinner, the thinner string will play a higher pitch. This is because there isn’t as much energy put into making the string vibrate as compared to the thicker string. From this experiment I gained a better depth of understanding about vibrations and sound waves, and how they’re related to a guitar.

4982

Do Different Types/Brands of Soda Spew Different Amounts of Soda After Being Shaken?

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This experiment was to test whether different types/brands of soda spew the same amount of soda when shaken for 5 seconds and then opened. My hypothesis was that each type/brand of soda would spew a different amount of soda because each has different carbonation levels. To do this experiment I first placed a large bowl on the floor to collect the soda that came out. Then I got a soda can and set a timer for 5 seconds. I then clicked start and then shook the can until the timer rang. I then quickly popped open the tab and let the dispensing soda fall into the large bowl. I did this four times with the same type of soda. Then I poured all of the soda in the bowl into a measuring cup and recorded how much soda was in there. Then I divided the number I got by four to get an average of how much soda was dispensed per can and recorded my results. I repeated these steps until I had used all of the different types of soda I had. I am not very surprised by my findings. I predicted the sodas for the most part would spew around the same amount of soda, with one soda not spewing a lot more soda than the other ones. Out of the five sodas that I tested, which included Sprite, Coca-Cola Zero, Shasta Orange, Shasta Cola and Shasta Tiki Punch, the type of soda that spewed the most after being shaken for 5 seconds and then opened was Shasta Tiki Punch. The order of the most spewed then followed with Coca-Cola Zero and Shasta Orange tied because they both spewed the same amount. The type of soda that spewed the least amount of soda was Sprite.
4983 Chromatography of Plant Pigments
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The purpose of this study was to determine whether plant extracts contain more than one color of plant pigments. Crushed plant extracts from a leaf and rubbing alcohol were left to soak for a couple of hours. A coffee filter strip an inch wide was wrapped around a pencil and secured with tape. The bottom of the strip was cut so that the bottom was 1/4 inch above the bottom of the container when placed on top of a glass container. A horizontal line was drawn an inch from the bottom of the strip. The soaked extracts were applied to the line in one spot. A hair dryer was used to dry the extracts until they were 1/4 inch in diameter. The glass container was then filled with 1/4 inch of nail polish remover. The pencil was then placed on top of the glass container, letting the paper fall above the polish remover, and then left to sit for a couple of minutes. Strips of color appeared above the line. The strips appeared in this order from the line: light yellow, yellow, light green, green and brown green. The results suggest that there is more than one color of plant pigments in plant extracts, which were different hues of yellow and green.

4984 Air Speed and Asthma
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Introduction: An asthma trigger is when the immune system overreacts. The airways become inflamed and swollen. Because of the swelling, the space where air goes gets smaller, making it so hard to breathe it makes a wheezing sound. An asthma attack can last up to a week, and it can be life-threatening.

Hypothesis: As the airway gets smaller, the air travels slower. The air can’t come in and out as fast.

Materials:
- anemometer
- straws of different thickness, cut the same length
- ruler

Methods: Measure the diameter of each straw. Exhale through straws really hard and find out the speed of air traveling through with an anemometer. Blow into each of the straws 10 times. Take the average air speed.

Results:

<table>
<thead>
<tr>
<th>DIAMETER OF STRAWS</th>
<th>AIR TRAVEL THROUGH DIFFERENT-SIZED STRAWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>6.9</td>
</tr>
<tr>
<td>5 mm</td>
<td>12.9</td>
</tr>
<tr>
<td>8 mm</td>
<td>12.6</td>
</tr>
<tr>
<td>13 mm</td>
<td>9.1</td>
</tr>
</tbody>
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Conclusion: I was thinking that the air would go faster in the bigger straws. The air speed inside the smallest straw was about half the speed of air in the second straw. The air in the third straw was a tad slower than in the second. Then, the air was even slower in the fourth straw. The straw with the smallest diameter was not so easy to blow through. Blowing was pretty easy in the second straw, and it was very easy in both the third and fourth straws. Why did the air go slower and why was it hard to blow in the smallest straw? Well, it’s because the air has less space and it’s pushing and shoving its way out of the straw. For people who have asthma, this is why they can’t breathe very well – the air inside their lungs is traveling slower and they can’t get oxygen as fast. So why do I think the air went slower in the fourth straw? Maybe I wasn’t blowing hard enough since it was so easy. I don’t know yet.

4985 Grocery Store Chickens
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I did my experiment (eggsperiment?) on whether or not you can hatch eggs bought at the supermarket. I incubated more than 100 eggs of many different types and brands. I tried Organic Cage-Free Eggs (both white and brown), “Fertile” Cage-Free Eggs (both white and brown) and normal AAA Grade Eggs (White White) from Trader Joe’s, Whole Foods Market and Ralphs. The incubator could hold 42 eggs at a time and it took 21 days to hatch each batch. My incubator had an automatic turner and a thermostat to aid in good hatch percentages. The chicks that hatched were sold to the local poultry store or given to people who already had chickens. I ended up keeping the first chick I hatched; her name is Apple. She was from a brown Whole Foods Organic Cage-Free Egg. Out of all the different types of eggs I tried, the Organic Cage-Free Eggs (both white and brown) from Whole Foods seem to hatch the best, with the Trader Joe’s fertile whites in second place. None of the normal non-organic AAA Grade Eggs were fertile. Due to refrigeration, sterilization, transport, male-to-female ratio, and malnutrition of the broodstock, the fertility rate was very low in general. About 15% of the eggs were fertile and about 5% hatched. The hatch rate seems astonishingly low compared to a batch of “real” fertile eggs (easy 90%-100% hatch rate), but with all of these factors and the fact that the developing embryo had a small and not very nutritious yolk (due to the malnutritional diet of the hen), it is actually pretty good.

4986 Which Paper Towel Is the Most Absorbent?
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This experiment is to find out which paper towel is the most absorbent. Using three different towel brands, Soft Touch, Sparkle and Bounty Basic, fill a pot with about seven cups of water and dip the paper towel in for 15 seconds. Then, take out the paper towel and squeeze the water out into a cup. Record and measure the water in milliliters. Do the same step four more times and do the same procedure for the other two paper towel brands. On average, Bounty Basic absorbed the least amount of water, 9 milliliters. Soft Touch absorbed an average of 9.4 milliliters of water. The most absorbent paper towel was Sparkle, with an average of absorbing 9.6 milliliters of water.

4987 Orange Ripening and Vitamin C
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This science project was about how much Vitamin C each fruit contains. This study was done using apple juice, orange juice and lemon juice. Iodine starch determined how much Vitamin C each fruit had by seeing how many drops it would take to make the liquid blue. The more drops it needed, the less Vitamin C it had. For the apple juice, it took 60 drops to make the liquid blue. This proved that the apple juice was very low in Vitamin C. The lemon juice needed 12 drops to make its liquid blue. Lemons are not very low in
How Do Different Types of Music Affect Someone's Heartbeat?
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The purpose of this experiment was to find out which style of music would change a person's heart rate. Our hypothesis was that rock music would affect someone's heart rate more than techno, pop or classical music. We researched what the normal heart rate for each age range is and then we proceeded with the experiment. We let our testing subjects rest for 2 minutes and recorded their heart rates. We then played one type of music, repeated relaxation and then played another type of music until we tested all types of music. Our results were as expected. The rock music affects a person's heart rate the most (95.4 beats per minute), then pop (91.9 beats per minute), then techno (86.1 beats per minute), and finally classical (78.7 beats per minute). This shows that for relaxation we should listen to classical music, and for exercising where we want to be more active, we should listen to rock.

Effects of Changing Key Physical Attributes and How It Affects a Paper Propeller's Descent
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This experiment was based on testing whether changing key physical attributes of a paper propeller will affect how it descends. This experiment focused on finding the slowest descending paper propeller by dropping the different types from 5 feet in the air. The three categories tested were size, weight and material. For each of these categories, there were three paper propellers tested. In each of these experiments, the control was one of the paper propellers. The control paper propellers were 22 x 5 cm and they were made using standard white blank paper. In the size category, the three sizes were 11 x 2.5 cm, 22 x 5 cm and 33 x 7.5 cm. The 33 x 7.5 cm propeller descended the slowest. In the weight category, a single propeller was used, but during each of the descents a penny, a large paper clip or a piece of foil was attached onto the propeller. The propeller with the foil descended the slowest. In the material category, the paper propellers were the same size as the control propeller, but they were constructed using construction paper, foil or standard white blank paper. The paper propeller made out of foil descended the slowest in the material category, as well as the weight and size categories. This experiment proves that by changing the key physical attributes of a paper propeller, you can alter how fast or slow it descends.

Reaction of Vinegar vs. Reaction of Bleach
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This experiment tested the reaction of different metals in an acid and in a base. This experiment required me to fill one beaker with 300 ml of vinegar and fill another beaker with 300 ml of bleach. Then brass pieces, white screws, black screws and quarters were placed inside the vinegar and bleach and covered with foil. After five days of the experiment the results suggested that the bleach had corroded the brass pieces and all of the screws. The vinegar had also corroded the brass pieces, corroded the quarters and corroded the white screws.

Analysis for Population Dynamics of the Sardinops sagax caerulea in Relation to the Engraulis mordax
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The purpose of this study is to investigate the population dynamics of the Pacific sardine and the Northern anchovy. The hypothesis investigated stated, "If the population of the Pacific sardine increases, then the population size of the Northern anchovy will drop." Sea surface temperature anomalies were analyzed to find any effects on the abundance of the two fishes. The study area of this project was California fishing grounds from 1950 to 2009. Commercial landings data was provided by the National Marine Fisheries Service. Different methods were used to catch the two fish. The Pacific sardine was mostly caught using the purse seine. The Northern anchovy was caught mainly with the round haul gear. Area graphs of commercial annual landings were created for both the Pacific sardine and Northern anchovy. The column graphs "Monthly Landings of Sardine" and "Monthly Landings of Anchovy" both show the monthly landings of the fish in each month over the span of the study. The graph "Landings and Temperature Anomalies in July for Pacific Sardine" shows the landings of the fish for the month of July from 1997-2008; this is a graph on two-axis that has a line for temperature anomalies overlaid on columns for landings data. The highest landings observed for the Pacific sardine were in the month of July, and May for Northern anchovy. The line graph "Population Dynamics of Pacific Sardine and Northern Anchovy" shows the dynamic relationship in the population sizes of the two fish so, when the rate for Pacific sardines is high, the rate for the Northern anchovy is low and vice versa. The scatterplot graphs "Log of Sardine Landings by Temperature Anomalies" and "Log of Anchovy Landings by Temperature Anomalies" both prove that sea surface temperature anomalies do not affect the abundance of the two fish, with $R^2$ values of 0.409 and 0.1126 showing that the data does not fit the trend line for the fish. A scatterplot graphing the sum of the differences in landings had a trend line added to show an inverse correlation between the two populations with the $R^2$ value of greater than 0.8. The hypothesis was accepted because the results show that when the population size of the sardine is high, the population of the anchovy is low and vice versa.
4993

Collembola With Herbs
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Will a population of collembola increase or decrease if rosemary is added to their usual diet of yeast and water? The purpose of this experiment was to see if a plant that is a seasoning would affect a population of collembola. I believe a population of Lepidocyrtus northridge collembola will increase if rosemary is added to their daily diet of yeast and water. Collembola, sometimes referred to as springtails, are tiny, clay-walled arthropods that are known to eat mold. By mixing nine parts plaster of Paris, one part charcoal, and water, I created the collembola’s environment. I added the mixture to two petri dishes and tapped them on a table to flatten out the mixture. The dishes were set to dry for two days. Next, I added water until the petri dishes were dark grey, and added to collembola into each dish. I labeled the dishes: one experiment and one control. The experiment received water, rosemary and yeast for 45 days. The control received yeast and water for 45 days. I counted and observed the collembola every few days and recorded the information. At the end of 45 days, the experiment had 82% of the collembola and the control had 88% of the collembola. This data suggests that the collembola’s population increased with the extra green vegetable. They also might have liked the habitat with new things to climb on. In conclusion, my information suggests that rosemary increased the collembola’s population.

4994

Will a Population of Lepidocyrtus northridge Decrease When Lemon Thyme Is Added to Their Diet?
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The purpose of this experiment was to see if an herb would affect a population of collembola. My hypothesis was that the lemon thyme would not affect the collembola. Collembola are tiny arthropods that eat mold; they are often called springtails. Lemon thyme, an herb, is used for cooking (it is a seasoning), and it can be used for medicinal purposes as well. Nine parts plaster of Paris, one part activated charcoal, and water were mixed together and placed in two petri dishes. These new environments were allowed to dry thoroughly. One of the petri dishes was labeled control, and the other experiment. Both were given yeast and water (from the tap), but the experiment was given three leaves of the fresh lemon thyme. Eight collembola were put in each petri dish, with me counting several times to make sure. Over the next 42 days, the number of live collembola was recorded and graphed at random intervals. The total percentage of surviving collembola in the experiment was 62.8%, and in the control it was 73.8%. There were more eggs, about two times more, in the experiment than in the control. My hypothesis was not only correct – a population of collembola will not be affected by lemon thyme – but the collembola in the experiment also seemed to have a higher population than the collembola in the control.

4995

Which Will Fly the Farthest? Putting Weight on the Front, Middle and Back of a Paper Airplane
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The purpose of this experiment was to see if a paper airplane’s flight distance would change if weight was placed on the front, middle and/or back of the fuselage. The hypothesis was that the paper airplane would fly farthest with weight on the back. Only one paper airplane was made so the results would be consistent. The weight was held by a thread, then cut and taped to a section of the fuselage. A knot was tied around a medium-sized paper clip so that the paper clip was hanging from the thread. A tape measure was used to measure the distance of each flight in meters. The airplane was flown with weight on each position on the fuselage and with no weight as the control. This step was repeated 10 times for each weight placement. The plane that was the control (no weight) had the farthest average flight, at 4.952 meters. The plane that flew the farthest with weight had weight on the front of the fuselage. Its average was 3.0911 meters. The average with weight on the back of the fuselage was 2.45 meters, and with weight in the middle was 2.5251 meters. The hypothesis was incorrect because the paper airplane flight average with weight was the farthest with the weight on the front of the fuselage.

4996

Effects of Acid Rain on Pinto Bean Plants
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The purpose of this experiment is to determine how acid rain affects nature. Acid rain can harm plants, animals, humans, buildings, statues and bodies of water. In this experiment, my question is what will happen to the growth (height) of pinto bean plants if they are given acid rain as their source of water? My hypothesis is that the more acidic mixture a plant has, the less it will be able to grow. To create this experiment, 40 pinto beans were placed in four plastic bags, watered and left to germinate for a week. Meanwhile, the acidic mixtures were made with vinegar and water. The controls in this experiment were the plants with pure water, and the experiments were the plants with acidic mixtures (pH 6, 5 and 4). After a week, I planted 10 germinating seeds in each of my four rectangular pots full of nutritious soil. The acidic mixtures were then watered into the correct rectangular pots. The plants were measured every two days and the experiment continued for 14 days. In the end, the control (plants with pure water) grew the highest, with an average of 16.3 cm tall. The experiments (plants with acidic mixtures) did not grow as tall. The plants watered with pH 6 acids averaged 14.6 cm tall, the plants watered with pH 5 acids averaged 11.6 cm tall, and the plants watered with pH 4 acids averaged 9.9 cm tall. My hypothesis was correct, because the plants watered with acidic mixtures did not grow as tall as the plants watered with pure water.

4997

Which Brand of Bottled Water Has the Highest Amount of Acidity?
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This experiment was to determine what kind of bottled water has the highest amount of acidity. I was interested to know if the different types of drinking water would be more acidic or basic, and tested the pH to determine this. More acidic water would have a pH below 7 and basic water would have a pH above 7. I tested this to determine if Dasani, Aquafina, Arrowhead, Fiji Water or Smartwater would have the lowest pH level. My hypothesis was that the Dasani brand would be the most acidic. I made a chemical indicator using cabbage juice to determine the pH of each brand of water. I boiled water and later let the red cabbage sit in the hot water until it was room temperature. Using the indicator, I measured 15 grams of water for every 15 grams of cabbage juice. Once the purple liquid was mixed into the water, it began to change color. I used a pH indicator chart to discover the amount of acidity in each sample. My control was distilled water, because it is neutral with a pH of 7. After I tested all of the waters three times, Aquafina was the most acidic. The Aquafina had a pH of 5, Smartwater had 6, Dasani had 6, Fiji Water had 8 and Arrowhead had a pH of 9. When I lined them up from the lowest to highest pH, the order was Aquafina, Dasani, Smartwater, Fiji Water and then Arrowhead. This is
really helpful because it tells me what brands of bottled water to avoid and not drink. Since the best pH for people is about 6, a person is not supposed to have water that is too acidic. My hypothesis was incorrect; the type of bottled water that had the most acidity was Aquafina.

The main idea of this experiment was to see if a population of collembola, Onychiuidae encarpatus, would decrease if three chips of white paint were placed in their environment. The hypothesis was that the population would decrease. Collembola are miniscule arthropods that eat yeast and are sometimes called springtails. Nine parts plaster of Paris, one part charcoal, and water were mixed and placed in two petri dishes. This new environment was allowed to dry fully over the weekend. One container was labeled experiment and the other was labeled control. Yeast, which is collembola food, was placed in each petri dish for the collembola to eat. I also gave them drops of water every other day. Ten collembola were placed in each container. For 38 days the collembola were observed and numbers were recorded. The population of collembola in the experiment stayed the same.

The population of collembola increased 420% in the control. The experiment increase was 0%. The chips of paint didn’t affect the population of adult collembola, although the population of the collembola didn’t increase in the experiment.

The purpose of this project is to see whether solar energy can be used to heat up water. Melissa Ibarra and T. Miller (teacher)

Northridge, CA 91325

The purpose of this project was to see if all roots grow downward (gravitropism). My hypothesis was that roots always grow downward. I bought five glass jars, placed wet cotton balls in them and placed eight red kidney bean seeds at the side of each jar. This way I could easily observe the growth of the roots. The jars were placed on a sunny window. Water was poured inside them every two days. During the eight days, the seeds were observed and graphed; 95% of the seed roots grew downward. Five percent of them grew upward out of the seed but then again the roots of the seeds grew downward. Thus 100% of the roots of the seeds grew downward. My hypothesis was correct.

The purpose of this project is to see if any roots grow downward. Andrea Escobar and T. Miller (teacher)

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The purpose of this project was to see if the Lepidocyrtus northridge are capable of surviving in a rough terrain as their environment. My hypothesis was that the collembola would decrease if I put them in an altered (rough) landscape. I placed plaster of Paris, charcoal and water into a cup, then stirred them together. I then poured this liquid into two petri dishes. For the experiment I used a serrated knife, and with the rough side lightly scraped it over the plaster of Paris while it was wet to make a rough terrain. Then I let it dry for a few days. Water was dropped in the petri dishes with an eyedropper, so there would be moisture for the collembola. I placed some yeast inside and then placed 13 collembola in my control and 10 collembola in my experiment. I observed and counted the collembola through a stereomicroscope, or a magnifying glass. After 28 days my results were 54.09% collembola in my experiment and 45.9% collembola in my control. My hypothesis was incorrect. Collembola can live in a rough terrain.

The purpose of this project is to see whether solar energy can be used to heat up water. Lucy Huynh and T. Miller (teacher)

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The purpose of this project is to see if all roots grow downward (gravitropism). My hypothesis was that roots always grow downward. I bought five glass jars, placed wet cotton balls in them and placed eight red kidney bean seeds at the side of each jar. This way I could easily observe the growth of the roots. The jars were placed on a sunny window. Water was poured inside them every two days. During the eight days, the seeds were observed and graphed; 95% of the seed roots grew downward. Five percent of them grew upward out of the seed but then again the roots of the seeds grew downward. Thus 100% of the roots of the seeds grew downward. My hypothesis was correct.

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bigger airplanes was that they were affected more by air resistance and their weight, resulting in a shorter flight period. We have learned that smaller paper airplanes fly straighter and for a longer period of time than bigger airplanes.

5004
Which Sport Affects Pulse the Most?
Luis Lora and A. Antoniou (teacher)
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The purpose of my experiment was to find out which sport affects pulse the most. I picked this topic because of my love for sports and my interest in which one would make me work out the most. I tested basketball, football and soccer. I measured the pulses of the players of the different sports after they played each sport for 15 minutes. I recorded the results. According to my data, soccer was the sport that affected the players’ pulses the most. Basketball was the next one and football was last. This shows that soccer makes players work out the most, followed by basketball, which was very close. Soccer involves more running and applying a lot of force when kicking the ball hard across the field. The results of my experiment supported my hypothesis.

5005
Which Toilet Bowl Cleaner Works More Effectively?
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The purpose of my experiment was to find out which of the three toilet bowl cleaners I selected to test would be more effective in removing the stain. I tested Clorox Blue Liquid Gel, Bowl Fresh Blue Tablets and Coca-Cola. My hypothesis was that the Coca-Cola would not do that well. One of the active ingredients in the Clorox Gel is sodium hypochlorite. This is the cleaning agent that kills 99.9% of germs, bacteria, rust and a few types of mold. While testing this cleaner, overall, it did an excellent job and made the surface of the bowl whiter than before. One of the key ingredients in the tablets is sodium tetraborate, also known as sodium borate. This helps adhere to the surface of the toilet tank, so the tablet stays in place. It also helps dissolve into the water, so in every flush, the tablet dissolves in the water and stays in the bowl soaking the stain. The tablets did not have an immediate effect but, over time, they worked well as they soaked the stain. In Coca-Cola, the phosphoric, citric and carbonic acids are scientifically proven to break down stains. According to my results, the Coca-Cola left a big ring in the bowl even after a tough scrubbing. The Clorox Blue Liquid Gel and the Bowl Fresh Blue Tablets worked the best, while Coca-Cola caused permanent damage to the porcelain by leaving a ring. My hypothesis was correct, but I never predicted that the Coca-Cola would damage the toilet.

5006
Which Juice Contains the Most Vitamin C?
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The purpose of my experiment was to test different fruit and vegetable juices for Vitamin C. In my research, I read that Vitamin C is essential to fight harmful diseases and it’s required for the growth and development of tissues in all parts of the body. For adults, 75-90 mg of Vitamin C is needed in the daily diet. My hypothesis was that the mixed vegetable juice would have the most Vitamin C. I made a cornstarch solution that was used as a Vitamin C indicator together with iodine, and began my experiment. I put 10 drops of the solution into 4 ounces of juice and then added iodine drop by drop until it had a distinct color change. The way the iodine works is that the fewest number of drops used to change the color, the least amount of Vitamin C content that is present. The juice with the least amount of Vitamin C was the CapriSun, with only one drop. The lemonade had the second least amount of Vitamin C, with 36 drops. The grapefruit, apple, orange and pineapple juices were all at the average of 52 drops. The juices with the most were the tomato, with 61 drops, and the vegetable mix, with 64 drops of iodine. My hypothesis was correct that the vegetable juice had the most Vitamin C. As a conclusion, we must eat vegetables because they are a great source of Vitamin C, which is essential for our health.

5007
How Effective Are Home Stain Removers?
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Trying to remove stains from surfaces, fabrics, carpeting and other household items is a big problem. Most commercial stain removers contain non-biodegradable chemicals that harm the environment and often produce unhealthy fumes hazardous to human health, but they do a good job in removing stains. According to my research, stains on porous materials are the most difficult to remove. Some examples are 100% cotton materials, porous tiles and grout. The stain molecules contain pigments that remain within the pores and are very difficult to remove. The most difficult stains to remove from porous surfaces are made by acidic drinks with dark pigmented molecules, like red wine, berry juices and coffee. My hypothesis was that the porous material would stain the most because it would absorb more, and that the baking soda solution would clean the best. For my experiment I used three types of porous materials: 100% cotton carpet, 100% cotton fabric and porous unglazed ceramic tile. I used three staining agents: fresh blueberry/blackberry juice, dark red wine and coffee. I conducted 12 trials of cleaning agents using water as my control group, and 12 different household cleaning agents. According to my results, for the 100% cotton carpet stained with berry juice, 3% hydrogen peroxide solution worked the best. The red wine was removed the best with a vinegar and water solution. The coffee was removed the best with a solution of lemon juice and water. With the 100% cotton fabric for all stains, 70% isopropyl rubbing alcohol was most successful. With the unglazed ceramic tile for all stains, 3% hydrogen peroxide solution proved the most successful. My conclusion is that although commercial cleaners and bleaches might be the most effective stain removers, I found that many acidic, dark-pigmented stains could be removed from porous materials with the use of household agents that are less harmful to the environment and human health. The biggest surprise was how effective lemon juice proved to be on the carpeting, and also how vinegar and water, when steam-ironed with clean white towels, seemed to transfer the pigment by osmosis to the towel. Overall, the best cleaning agent for fabric was 70% isopropyl rubbing alcohol, and for unglazed ceramic tile it was 3% hydrogen peroxide solution, which did not support my hypothesis.

5008
Which Cleans Dirty Pennies Better: Coca-Cola or Lemon Juice?
Natalie Saralou, Brigitte Tovmassian and A. Antoniou (teacher)
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The purpose of our experiment was to clean dirty pennies with Coca-Cola and lemon juice to see which would clean them better. In our research, we learned that the concentration of citric acid in lemon juice is 0.30 mol/L (molarity). Coca-Cola is a combination of citric acid and orthophosphoric acid. The concentration of citric acid in Coca-Cola is the same as that of orange juice, which is 0.05 mol/L. The concentration of orthophosphoric acid in Coca-Cola is 0.2-0.3 percent of the total Coca-Cola formula. Our hypothesis on which of the two liquids would clean better was Coca-Cola, because it is a combination of the two acids. We placed one penny into a cup of lemon juice, one penny into a cup of Coca-Cola and one penny into a cup of water, as the control of the experiment. After one hour of observing
the pennies in the liquids and timing the whole experiment, we removed the pennies from the cups. Then, we repeated the process with three more pennies. The water had no effect on the pennies at all, but the Coca-Cola and lemon juice both affected the pennies. The lemon juice cleaned the copper oxide layer from the pennies better than the Coca-Cola did, proving that the lemon juice is stronger, and our hypothesis was incorrect. This shows that the higher concentration of citric acid in the lemon juice works best.

5009

Eggsactly Which Soda?
Young Man and G. Zem (teacher)
Ernest Lawrence Gifted/Highly Gifted Magnet
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This project was to see if soda could dissolve the eggshell of an egg. This tested whether Coca-Cola or 7UP would dissolve the eggshell faster. There were two eggs; each egg was put in a clear plastic container. Coca-Cola was put into one container and 7UP was put into another container. The containers were then closed and closely examined for the next 10 days. The looks and texture were recorded in a log. After 10 days the egg that was inside the Coca-Cola container had changed to the color of the Coca-Cola. The egg that was in the container with the 7UP had a very light tint of orange to it. This showed that even though soda could not dissolve an eggshell like vinegar could, it could permeate the eggshell of an egg. This also showed that eggshells are permeable.

5010

What Is the Best Graffiti Remover?
Nick Akino and A. Antoniou (teacher)
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The purpose of this experiment was to find which commercially available graffiti remover works the best and most efficiently. My hypothesis was that the ones with chemicals that are not used as much would work better than the most popular ones. According to my research, most people use pressure washing as a graffiti remover, but that is expensive and takes a lot of time to work properly. On top of that it might damage the wall. Another widely used method is just simply painting over the graffiti. That has a flaw because black spray paint is the most widely used paint and, if painted over, it will take multiple coats of paint to cover it. Sandblasting is also a common way to remove spray paint, but might also damage your wall and strip underneath paint. Chemical removers aren’t as common with residential people but are used by construction workers and painters. The materials I used were pieces of steel, plastic, stucco and Aervoe Rust Prevention Black Spray Paint. The cleaners I tested were paint thinner, Marvel Mystery Oil, Graffiti Buster, Graff-X, All Purpose Household Cleaner, and 100% acetone. My procedure was to paint a line across each of my sample materials and let dry. Once dry, I applied each cleaner and let it sit for exactly 5 minutes. After 5 minutes, I rubbed in each cleaner with a rag for 30 seconds. After that, I moved on to another material and repeated. I examined each sample and found out that Graffiti Buster ended up working best throughout my tests. My hypothesis was correct in the sense that Graffiti Buster is a chemical remover and chemical removers aren’t as widely used as other methods. In conclusion, using a chemical remover that is made and guaranteed to remove graffiti, such as Graffiti Buster, will possibly create less work and provide the best results.

5011

What Movies Do RFMS Students Prefer and How Do They Affect Their Fears?
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The purpose of our experiment was to find out what movie ratings RFMS students prefer and if higher-rated movies desensitize them or make them more afraid. We read about how people suffer from anxiety by watching horror movies. They can also suffer from fainting and insomnia for long periods of time because their brains can’t distinguish the difference between trauma and entertainment. Our hypothesis was that the kids who watched higher-rated movies would have more movie-related phobias than kids who watched lower-rated movies. For our experiment, we asked 100 students, 50 girls and 50 boys of 6th-, 7th- and 8th-grade, what rating they preferred and if they feared ghosts, aliens, spiders, rapists, death, natural disasters, public humiliation, clowns, things jumping out at them, pain and blood. According to our results, 30% of kids liked rated R the best on average; 60% liked PG-13 the best, and they had more fears; and 9.7% liked PG the best, and they had the most fears. Our hypothesis was wrong. Students were getting desensitized rather than getting more sensitive. The more fearful movies they watched, the less afraid they were. We also found that of the students we interviewed, the majority preferred PG-13 movies over R and PG movies.

5012

What Is the Effect of Pressure on Melting?
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The purpose of our experiment was to find out if pressure would raise the rate of ice melting. According to our research, pressure on an ice cube would lower the melting temperature, which would help the ice cube to melt in a shorter period of time than usual. Our hypothesis was that if we put a cooled brick on an ice cube, the rate at which it melts would be faster than of the one without the brick. We tested by setting each piece of ice on a cooking tray and placing a brick on top of one and timing it. During the experiment we observed that every few minutes the brick got lower and lower. The weight of the brick was 1,300N. The length of our ice cubes was 6 cm, while the width was 2 cm. The melting result of the ice without the brick was 12:37 m., while the ice with the brick was 4:50 m. This shows that pressure does affect the melting rate of ice. Our hypothesis was correct.
5014

Does Gravity Affect Tropism?
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The purpose of this experiment was to test if gravity would disrupt the phototropism and geotropism of a plant if its environment was turned upside-down. Phototropism is the growth of a plant's stem toward sunlight and geotropism is the growth of a plant's roots toward the ground. These share the root word tropism, the bending of a plant's organ to an external stimulant. We predicted that after we turned the plants upside-down, phototropism and geotropism would still be in effect. We grew four green bean plants in a cube-shaped jar filled with moistened cotton balls upright for about a week. Then we turned the jar upside-down and watched them for another five days. We observed that the stems continued to grow toward the sunlight, which made the plants change into a U-shape. The roots also continued to grow toward the ground, forming an umbrella-shaped network over the stems. In conclusion, gravity did not affect the plants' tropism, therefore proving our hypothesis correct.

5015

Eco-Friendly Battery
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The purpose of our experiment was to find out which fruit or vegetable would produce more energy to make a good eco-friendly battery. According to our research, fruits and vegetables have electrolytes that work like batteries. In a regular battery, electrons are the energy used to make the sound chip work. In the experiment, we plunged two metal plates (that worked as the anode and the cathode) into the fruit or vegetable (electrolyte). The anode is a positively charged electrode that is the source of electrons entering an electrical device through oxidation, in this case the copper. The cathode is a negatively charged electrode that the electrons pass through from the anode to the device through reduction, in this case the zinc. An electrolyte is the energy source in which its acid breaks down the atomic structure of copper and zinc, causing electrons to be released. An electrode is a conductor in which electric current is passed, like the electrolyte or the metals. We tested different types of organic electrolytes (hot, cold and ice water, oranges, bananas, potatoes and apples) to create a circuit and produce energy for a sound chip. We tested all of the fruits several times so that we could get accurate results. Our hypothesis was that oranges would produce the best energy because they have citric acid and that might be the acid that breaks down in the chemical reaction. We tried each electrolyte separately by connecting wires to the anode and cathode and making a circuit. We recorded our data and observations, and we noticed that the more energy being produced, the higher pitched the sounds came out. We recorded the energy by the pitch, and according to our results, the hot water made the highest-pitch sound and the oranges gave the lowest-pitched sound. Our hypothesis was incorrect, yet we found out that water (hot water) would be the best electrolyte to make an eco-friendly battery!

5016

Which Type of Fertilizer Will Help Plants Grow the Most?
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The purpose of our experiment was to find out which type of fertilizer would help red pepper plants grow best because people waste buying expensive fertilizers for their plants when they could use things found in their homes. We read that eggshells have calcium, which is a great nutrient for plants and which liquid fertilizer and food spikes do not have. Liquid fertilizer contains a lot of chemicals and the food spikes provide various nutrients and minerals as long as the plant is given the proper amount of water. Our hypothesis was that the plant in the soil that was mixed with eggshells would grow the most. We had three pots that each contained four (6-cm) already-grown red pepper plants. One pot had soil mixed with broken eggshells, another had soil with food spikes and the last pot had soil that was given 10-20 drops of the liquid fertilizer every time the plants were watered. As days passed, we noticed that the plants with eggshells had grown remarkably compared to the others. The plants with food spikes were growing at a constant and healthy pace, while the liquid fertilizer had killed the plants. Our results proved that the plants that had grown with the eggshells had grown the most. Our hypothesis was correct.

5017

Who Lies More: Female Teenagers or Male Teenagers?
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The purpose of my experiment was to find out if female teenagers lie more than male teenagers by testing them with a homemade lie detector. I read that lie detectors (also called polygraphs) work by measuring changes in skin resistance and changes of body functions. The lie detector measures changes in blood pressure, pulse rate, perspiration and respiration. It also measures sweat. If somebody starts to sweat, it shows he/she is lying. My hypothesis was that female teenagers lie more than male teenagers. I asked five males and five females the same questions and recorded what my lie detector said. I observed that some females started to sweat and my lie detector said that they were lying. I noticed on the first three questions I asked, nobody lied. Everyone was telling the truth until I asked the fourth question. Then I noticed that there were three males lying and four females lying. On the fifth question, two males were lying and four females were lying. On the sixth and seventh questions, nobody lied. On the final question, two females lied and no males lied. My results were that the ratio of females to males in lying was 10:3. According to my results, females lied more than males. My hypothesis was correct.

5018

Which Type of Metal Will Rust the Most and the Fastest?
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Our experiment was based on metal oxidation. We wanted to find out which metal would rust quickest and the most when exposed to moisture. The materials we used were zinc, steel, copper, a wet paper towel, straws for dividers, and a tray. We put a wet paper towel on a tray and divided it into three sections with straws. Then we placed the three different types of metals on the paper towel. We waited and recorded every six hours. It took two weeks for the three metal pieces (zinc, steel and copper) to rust completely. Our hypothesis was that steel would rust first, but it was wrong. We came up with this hypothesis by using our gathered information before
the experiment. After six hours, copper made some orange stains on the wet paper towel. However, the other metal pieces did not. Steel made small changes on its surface after 23 hours, and zinc changed differently from its original appearance after 17 hours. Copper began to rust in 18 hours, but zinc started to rust after 64 hours and steel began to rust after 44 hours. Copper was completely rusted after 113 hours. Copper was the first metal to rust and the most. Zinc stopped rusting or changing at 94 hours, and steel stopped changing at 107 hours. Overall, copper rusts the fastest and the most over time.

5019 Temptoratures of the Spectrum
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The purpose of our experiment was to find out the temperature of each color of the spectrum and to prove Herschel's infrared light experiment. We researched the concept of infrared light and that it is invisible. Infrared (IR) light is electromagnetic radiation with a wavelength longer than that of visible light, making it invisible. Therefore, this transparent light does produce heat, making Herschel's claim true. Our hypothesis was that the infrared light would indeed be warmer because our research showed that infrared light produces most of the thermal radiation emitted by objects near room temperature, and that is where we would be measuring the temperatures (in a room). For our experiment, we tested the temperatures of each light of the spectrum by using colored water. Our first results came through clear water. We measured the temperatures of yellow, blue and infrared parts of the spectrum. We measured 86° F for the infrared, 87° F for the yellow and 80° F for the blue, thus making Herschel's theory correct of infrared light being the warmest. We also passed the spectrum through green water and then measured the temperatures. We got 76° F for infrared, 73° F for yellow and 70° F for blue. The last test was through red water and we found 79° F for infrared, 76° F for yellow and 73° F for blue. Our total observation was that each light was always a 3° F difference. We also noticed the infrared was the hottest, the yellow was the second hottest and the blue was the coldest. Therefore, we were able to prove Herschel's experiment of infrared light as being the hottest.

5020 Which Type of Glue Works Best Against Gravity?
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The purpose of our experiment was to find out which type of glue works best against gravity. We used four types of glue: tacky, Styro, White Elmer's and hot glue. Tacky glue is super-thick, flexible and can be used for heavy items. It comes out as a white substance and dries clear. Styro glue is nontoxic, water-based and dries clear and fast. White Elmer's is a no-run glue that is washable, nontoxic and easy to clean. It is multipurpose glue. Our hypothesis was that the hot glue gun would work the best. We tested all four types of glue by gluing four equal lengths of string and attaching weights on them. Before we started our experiment we had to let the glue dry first. White Elmer's glue was the last one to dry. Once all four glues dried, we attached the weights and dropped the strings. After 45 minutes into the experiment, Styro glue fell. White Elmer's glue fell after 74 minutes, tacky glue fell after 87 minutes and the hot glue fell 187 minutes after we started. According to our results, hot glue and tacky glue are the types of glue that work best against gravity, while White Elmer's glue and Styro glue don't work as well. Our hypothesis was correct.

5021 How Teenagers at Frost Middle School Spend Their Time
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Ever wonder how teenagers spend their time? Are there certain days that teens will spend more of their time doing specific things? Do teen boys and teen girls differ in how they spend their time? The purpose of our experiment was to see how teens at Robert Frost Middle School spend their time. We researched online how teens spend their time and discovered some interesting facts. One report stated that teens spend the majority of their time sleeping. Another report indicated that teens spend a lot of time on modern media such as TV, texting, video games, etc. Our hypothesis was that overall teens will sleep the most, but the girls will sleep less than boys. Modern media will be used more by boys than girls. Girls will do more homework and studying, whereas boys will do more sports. The time will increase on Saturdays because teens have more free time. We conducted a survey with a total of 100 teen students, 50 boys and 50 girls, at Robert Frost Middle School on how much time they spend on modern media, homework/studying, sports and sleeping on a weekday and Saturday. The data was entered on charts, one for boys and one for girls, and students remained anonymous. According to our data, sleep had the highest average on both days, with an overall average of 8.96 hours. The girls averaged 8.76 hours and the boys averaged 9.21 hours, which proved that teens do spend more of their time sleeping and that boys tend to sleep more than girls. Overall, modern media had the second-highest average at 5.20 hours, with the boys at 2.69 hours and the girls at 2.51 hours on weekdays. The girls did average 2.43 hours of studying compared to the boys at 2.11 hours on weekdays. For sports, on weekdays the boys averaged 0.95 hours and the girls averaged 0.79 hours. The times also showed higher for boys on Saturdays for all these categories. However, there was a decrease in homework/studying for both girls and boys, with girls at 0.79 hours and boys at 0.71 hours on Saturdays, because kids have more free time on that day. The experiment results provided numbers that supported most of our hypothesis. Our survey project also gave us a closer look at how teenagers at our school spend their time on a regular weekday and on a Saturday.

5022 Is Pluto a Planet?
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My question is: Is Pluto a real planet? The purpose of doing this project is to learn about the solar system and how it works. My research shows that Pluto is and isn't a planet. But most of my resources say that Pluto is not a planet. Some people say it is a planet because it is a part of the solar system and it is. But my research shows that Pluto is not a planet because most people say it's just made of rock and that it's an ice-covered world. So Pluto is not a planet and many astronomers have proven this. My hypothesis is that Pluto is a planet. My experiment was to build a solar system. My results are that Pluto is a part of the solar system, but isn't an actual planet. So I conclude that Pluto is not a real planet.
Abstracts

5023
What Soda Is Most Popular Among Seventh- and Eighth-Graders?
Zoriah Eslin, Alex Varghese and A. Antoniou (teacher)
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The purpose of this experiment was to find out what soda was most popular among teenagers, 13-14 years old. We researched to see the most commonly listed sodas and found out that they were Dr Pepper, Coca-Cola, root beer, Sprite, Mountain Dew and Pepsi. Our hypothesis was that Dr Pepper was going to be the most popular soda because it is our favorite soda. We surveyed a total of 50 people and found out that Dr Pepper is the most popular soda among teens. Dr Pepper was first with 30%, root beer was second with 20% and Coca-Cola was in third with 18%. The other sodas we tested were Sprite with 14%, Pepsi with 10% and Mountain Dew with 8%. Our results proved that Dr Pepper is the most preferred and most popular soda among teens and that our hypothesis was correct.

5024
Do Mice Have a Color Preference?
Victor Miranda, Jose Gomez and A. Antoniou (teacher)
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The purpose of this experiment was to find out if mice preferred a certain color in their eating premises. According to our research, mice see limited colors. Like most mammals, mice have only two types of cells in their eyes; they cannot see a variety of colors and they see shades of dark. For our hypothesis we have stated that mice would prefer to eat in the color red because it stands out the most. We tested four mice and five different colors (red, yellow, green, peach and blue). There were a total of 20 tests (five tests for each mouse). Our results were that the mice preferred to eat in the area covered in red 10/20 times, which is 50%. They preferred green 5/20 (25%), orange 3/20 (15%), and yellow and blue 1/20 for each, which is 5%. Our hypothesis was correct.

5025
How Do Different Concentrations of Sugar and Salt Affect the Freezing Time of Water?
Tahs Thukral, Craig Ebersold and A. Antoniou (teacher)
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The purpose of this experiment was to find out if adding salt and sugar to water would affect the freezing time of water. We researched that adding salt to water decreases the freezing point. Our goal was to see how long it would take for the salt and sugar to be able to dissolve and freeze and compare it to regular water. Our hypothesis was that the water with the concentrations of sugar and salt would take a longer time to freeze than the regular water. We tested with 11 cups of water, 4 cups of salt, 4 cups of sugar and 3 cups of regular water. We used different concentrations of salt and sugar: 2.5 ml, 5.0 ml, 7.5 ml and 15 ml. We put them all in the same freezer and checked them every 10 minutes. All of the water samples froze after 130 minutes. Sugar 2.5 ml, 5.0 ml and 7.5 ml all froze around 160 minutes. Sugar 15 ml froze at 170 minutes. Salt 2.5 ml froze at 220 minutes. Salt 5.0 ml froze at 240 minutes. Salt 7.5 ml froze in 360 minutes. The 15 ml of salt never completely froze over the span of two weeks. It never turned solid. According to our results our hypothesis was correct and the water with the concentrations of sugar and salt took a longer time to freeze. The more salt or sugar added, the longer it took for the water to freeze.

5026
Does Magnetism Affect Plant Growth?
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The purpose of our experiment was to find out whether magnetism affects the growth of plants. We have researched that iron does occur in plants, and we know magnets attract iron. Also, almost every aspect of a plant has iron in it, so magnets should affect and help plant growth. Our hypothesis was that if we place magnets over certain plants, they would grow bigger than those without magnets. We first planted six identical plants. Three were left as is, but for the other three we placed magnets over them. We gave all plants identical pots, the same soil, the same surroundings and the same daily water distribution. In the first week, we saw that nothing was growing, but in the second week, both the control and the magnet plants had sprouted leaves. By the third week, the magnet plants appeared larger than the control, and they continued to grow. At seven weeks, it was clearly visible that the magnet plants were much larger. In week 8 we stopped our observations. In the end, the plants with magnets grew 12% taller than the control. The magnet plants grew to be 4.1/2 inches tall, while the control only grew to be 4 inches. This proves that magnetism does affect plant growth, by improving its growth rate. Our hypothesis was correct.

5027
How Does Color Affect the Temperature?
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This experiment was based on figuring out if different colors can affect temperatures. I started off with the same temperature water with clear cups and covered each cup with a different color. Then every minute I took the temperature and saw if it decreased or increased. According to my results, black and green increased the temperature the most. My conclusion was that the darker the colors, the more heat the water absorbs, increasing the temperature and taking less time to heat up and a longer time to cool off. The lighter colors like yellow and white did not increase the temperature much and the water took longer to heat up and less time to cool off. These results can help you select the right colors of clothing for hot or cool days.

5028
Does Size Affect the Velocity of an Object?
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The purpose of this experiment was to determine if size affects the velocity of two objects with the same mass. Research was conducted in the areas of air and surface resistance. The research suggested that the surface resistance of objects of the same mass and texture would be the same despite the fact that the larger object would have a larger area of contact. However, the research suggested that the size of the forward face of an object would impact velocity, as the larger object would have more air molecules to move out of the way. I used two spheres of the same material and mass; one sphere measured to inches in diameter, while the second sphere was half that size, 5 inches in diameter. The spheres were allowed to roll 10 meters down an asphalt slope with an estimated grade of 8%. Four trials were conducted; the time in seconds it took for each sphere to travel the 10 meters was recorded, and then an average time for each sphere was calculated. From this average time (in seconds), velocity for each sphere was calculated. The larger sphere obtained a velocity of 1.51 meters per second, while the smaller, weighted sphere obtained a velocity of 1.63 m/s. The results confirmed the hypothesis that the smaller sphere would obtain a greater velocity than the larger sphere, as the smaller sphere had a smaller
forward face and therefore encountered less air resistance. These results can be applied to sports, such as competitive bobsledding or skiing, and transportation, including automobiles, aircraft and trains.

5029 Does Chilling an Onion Before Cutting It Prevent Crying?  
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The purpose of my experiment was to find out if chilling the onion before cutting it would prevent my eyes from crying. According to my research, the gas released from the onion is less irritable when it’s cold. My hypothesis was that chilling an onion would prevent crying. I cut up onions in room temperature to use as a control and tested onions that were kept in the refrigerator for one hour. The results were that the irritation to the eyes and the crying from the chilled onions were reduced by at least 75%. My conclusion was that if you chill an onion before you cut it up, it will reduce the crying, if not prevent the tearing completely. My hypothesis was correct.

5030 How Can We Isolate the DNA of a Banana?  
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The purpose of our experiment was to find the DNA of a banana. Our hypothesis was that if we used the right ingredients, we could extract the DNA from a banana. We researched the different materials that we would need to break down the lipid, cell walls and separate it from its other cell organs. The materials that we used in the experiment were 1/2 of a banana, 1/4 cup of distilled water, a Ziploc bag, shampoo/soap, plastic cups, salt, chilled 90% isopropyl alcohol, a test tube, a measuring spoon (tsp) and a bamboo skewer. First, we mashed the banana with 1/4 cup of water to make it easier to access the cells. To actually break down the cell walls, we used soap because of its main ingredients, sodium laureth sulfate and EDTA (ethylene-diaminetetracetic acid). This broke down the lipid (fat) walls of the cell. We also added salt to enable the DNA strands to come together. Finally, we poured the solution into isopropyl alcohol, which made the DNA separate from its other cell components and float to the top. DNA is soluble in water, but insoluble in alcohol. We used a bamboo skewer to remove it and store it in a container filled with alcohol to preserve it. Success! We found the DNA of a banana by breaking down the cell step-by-step. This proved that our hypothesis was correct; we can find the DNA of a banana.

5031 Does Eye Color Affect Peripheral Vision? Does It Change in Dim Lighting or Bright Lighting?  
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I tested people with different-colored eyes on their peripheral vision. I looked at the range of the degrees on a protractor to check the blind spot of every person’s eyesight and I tested people in dim light and bright light. The results differed according to the light intensity. In the bright light, peripheral vision was harder to detect because it’s harder to see a moving object with the cone cells of the eyes, according to my research. In dim light, peripheral vision is a lot better because rod cells are better at detecting movement. I tested the left eye of seven people with different-colored eyes. The colors of the eyes were blue, green, brown and hazel. The brown eyes had the best peripheral vision because there was less light reflecting on their irises, which caused more sunlight absorption and increased the peripheral vision. My hypothesis was correct.

5032 What Is a Teenager’s Biggest Insecurity?  
Emily Kim, Sheryl Callu and A. Antoniou (teacher)  
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The purpose of this experiment is to find out what the majority of teenagers are insecure about or what they are worried about. Insecurity means what someone is conscious about. We tested appearance, popularity with friends, and how people look at them. According to our research, appearance was the most common insecurity for teenagers, so our hypothesis was that the majority of teens’ insecurities would be appearance. We interviewed 50 people ages 13-18. We interviewed them through the Internet, by cell phone and in person. After gathering the information needed, we compared it and graphed our data. In conclusion, our hypothesis was proven correct; 28 people said their insecurity was appearance and 12 people’s insecurities were how people look at them, leaving friends as the lowest insecurity with nine people. From doing this experiment we learned that most girls chose appearance and most guys chose how their friends look at them. We also gained new experience and knowledge about teenagers our own age.

5033 What Is the Percentage of States of Matter in My Neighborhood?  
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The purpose of this project was to figure out which states of matter exist in my neighborhood’s environment. I researched the four main states of matter. They are solids, liquids, gases and plasma. In solids, atoms are closely packed; in liquids, atoms are loose and flow; and in gases, they spread away from each other. Plasma is found in lightning and fluorescent light, as well as in fire, although it’s found in abundance on the stars. My hypothesis was that 80% would be solids, 15% liquids, 5% gas and 0% plasma. I went around my neighborhood observing objects and listing their state of matter. I found 60 objects, and of them, 53 were solid, three were liquid, three were gas and one was plasma. The percentages were 88% solid, 5% liquid, 5% gas and 1.66% plasma. In conclusion, my hypothesis was partially correct. I thought I would find more liquids than gases and no plasma.

5034 How Efficient Are Airplanes Constructed From Different Types of Paper?  
Eric Diaz, Eric Forno and A. Antoniou (teacher)  
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My partner, Eric Forno, and I, Eric Diaz, decided to test three readily available types of paper to determine which would make the best paper airplane material. We used 8 1/2- by 11-inch sheets of regular printer paper, construction paper and fine grain sandpaper. We hypothesized that the printer paper airplane would fly the best because it was the lightest. The design of the planes was identical and simple. We immediately noticed that the sandpaper airplane was considerably heavier than the other two. Each airplane was thrown with a similar arm motion and constant force, beginning with the arm bent at a 90-degree angle at the elbow and released as the arm stretched out horizontally. The testing was conducted indoors and outdoors with no measurable wind. Each throw was measured and rounded up to the nearest foot on the measuring tape and recorded. The measurements were graphed and they clearly indicated that our hypothesis was correct. The regular printer paper airplane flew the farthest and stayed the longest in flight compared to the other two airplanes. The material weight and texture were critical to the airplanes’ flight distances. It is understandable why companies and scientists would want to continue researching and experimenting with new materials to make real planes more and more efficient.
5035 How Much Does Carbon Dioxide Affect Global Warming?
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Our experiment was conducted to ascertain the effect of carbon dioxide on global warming. We learned that carbon dioxide is a greenhouse gas and is mostly released in the atmosphere because of the burning of fossil fuels. Our hypothesis was that we could make an accurate model of the Earth being affected by concentrated carbon dioxide levels. To achieve this, we made three different models. We used three glass jars with airtight seals, black gardening soils, three infrared thermometers, a stopwatch and duct tape. The three jars were organized as “air we breathe out,” “regular air” and “car exhaust.” We filled each jar with around 3 inches of black gardening soil and placed a thermometer in each to measure the temperature. We captured the regular air in one container, we breathed out air into another container, and we got the air from a car in the last one. We sealed the jars tightly and afterward we used a blow dryer to make each reach up to 90° F. After each jar reached 90°, we used a stopwatch to consecutively measure the temperature of each jar in the length of one hour. From this experiment, we found that the jar labeled as “car exhaust” took the longest to cool down to room temperature, which was 71° F. The average difference from “car exhaust” to “regular air” was 2° F. The average difference from “car exhaust” to “air we breathe out” was 1° F. Even though there wasn’t a tremendous difference, it was still interesting to see how a change in CO2 concentration could affect the temperature. We learned during our research that regular air has 0.038% of carbon dioxide, car exhaust has 12% of carbon dioxide, and we breathe out has 4% of carbon dioxide. By doing this experiment we were sure that the level of carbon dioxide does have to do with global warming.

5036 Does Cooking Fruit Reduce the Vitamin C Content?
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The purpose of our experiment was to find out if the Vitamin C content of different kinds of fruit gets reduced or altered by cooking the fruit (juice). We decided to do this experiment after hearing that the Vitamin C content does get altered after cooking. According to our research, this is because the cooking heats up the molecules to a certain level that alters the amount of acid-to-pH-level ratio. Our hypothesis was that the Vitamin C content does get altered during the cooking process. We decided to use three different types of fruit, lemon, orange and pineapple, because they are popular with many people and they have high amounts of Vitamin C. We did our experiment by making a homemade cornstarch/iodine solution that would show that after cooking the fruits, the solutions turned darker than when tested before cooking. Our hypothesis was true that the concentration of Vitamin C is reduced after cooking.

5037 Which Fabric Ignites Faster and for How Long?
Gustavo Gonzalez and A. Antoniou (teacher)
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I tested three different types of fabric, cotton, wool and polyester, of equal size and shape. The purpose was to see which type ignited more quickly and when it stopped. I repeated the experiment three times by timing the ignition and burning time in every trial. I calculated the average for each fabric and found out that cotton ignited in 1.33 seconds and burned for 67.4. Wool ignited in 4.56 seconds and burned for 30.9 seconds. Polyester ignited in 1.36 seconds and burned for 48.7 seconds. I concluded that cotton was the fiber that ignites the fastest and burns the longest. This did not agree with my hypothesis. I thought that the wool would ignite the fastest and last the longest. We can use this knowledge to avoid wearing cotton when we sleep in case of a fire.

5038 How Can Different Colors of Light Affect Plant Growth?
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The purpose of this experiment was to find out how different colors of light affect plant growth. I found that light is a key concept in a plant’s life. Plants absorb light during the process of photosynthesis. Photosynthesis is the food-making process in which the plant makes glucose as the main source of energy by using sunlight and water. Sunlight gives off wavelengths. When broken up, these wavelengths separate into bands of yellow, green, red and blue. For my experiment, I chose to grow bean plants and cover them with different colors of cellophane wrap, and then placed them on the window with sunshine. My hypothesis was that the yellow-covered plant would grow to be the tallest and healthiest because yellow light starts the process of photosynthesis, so the plant covered with the yellow light would gain the most nutrients. It took about six days for the plants to sprout. The yellow-, green- and red-covered plants were the first to sprout. Next was the blue-covered plant and last was the uncovered plant, which I used as the control. Each plant grew at a similar pace. I found that the yellow-covered plant grew the tallest and healthiest plant. The green-covered plant was the weakest in a few days after it sprouted. Its stem grew thin and weak. I had to support it with a stick to make it stand straight. Red and green were very close in height: 15 in. and 14.5 in. Green was always 4 inches shorter than the red. In the end, the uncovered plant had grown the most by being the tallest plant, but was wilted and unhealthy. The yellow-covered plant grew as tall as the blue (12 in.) but was the healthiest of all. The uncovered plant grew at a slower pace than the others. Bean plants naturally grow at a slow pace. For this reason, the uncovered plant grew much more slowly than the others but looked very healthy. My hypothesis was proven wrong.

5039 Which Household Cleaner Kills the Most Bacteria?
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Many people use a household cleaner that they see advertised a lot and believe it will kill the most bacteria, so we wondered if that was true. We bought four different cleaners, three of which are popular brands: Lysol, 409 and Fantastik. All three claim to kill 99.9% of bacteria. For our fourth cleaner we bought the Walmart brand “Great Value” with Bleach. Bleach is a very good product to use for killing bacteria and we found that a lot of time consumers buy pure bleach to clean their homes. The three main types of bacteria are Cocc, Spirilla and Bacilli, which are round, spiral and log-shaped. These three types of bacteria are the ones that are most likely
found in a home, along with Cryptosporidium, Seaphylococcus, Salmonella, various E. coli forms and Yersinia. Since bleach is very effective in killing bacteria, we took a chance and believed that if we tested the four cleaners on four different surfaces, then the Walmart Great Value with Bleach would be the most effective and kill the most bacteria. We gathered bacteria from a doorknob, refrigerator handle, toilet seat and a light switch and let it grow on nutrient agar in petri dishes for three weeks. We then sprayed them each with two squirts of our cleaners and watched them for about half an hour to observe which worked best. According to our results, the Walmart Great Value with Bleach was the most effective and killed the most bacteria. The no-name, less-expensive brand killed 99.9% of the bacteria and beat out the top leading brands just as we had predicted. Our hypothesis was correct.

5040 Which Materials Insulate More Effectively Against the Cold?
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The purpose of my experiment was to see which materials were the best insulators against the cold. I have noticed that in cold climate areas people use different materials to build structures than we use in California with moderate temperatures. My hypothesis was that wood would be the best insulator against cold (because of the resin, an organic substance which is flammable and is insoluble in water) compared to plastic, metal, Styrofoam, polyester fiber and rubber. I placed the different materials in the freezer at o° in intervals of 10 minutes for a total of 30 minutes, and I recorded their temperatures. From the beginning the wood had the highest temperature of all the materials. This showed that wood was the best insulator out of all the materials I used in this experiment. My hypothesis was correct that the wood would be the best insulating material against cold.

5041 What Liquid Helps Plants Grow Faster?
Joseph Duran and A. Antoniou (teacher)
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The purpose of my experiment was to see what liquid would make plants grow faster. My family has a flower garden at home and I was wondering if a liquid, other than water, would make a difference in the growth of the flowers. I researched the ingredients that are found in most teas and vinegars, and I found that tea has carbohydrates, proteins, amino acids, organic acids and chlorophyll. These ingredients seem to help the flowers grow much better. One of the ingredients found in vinegar is acetic acid (this is what gives vinegar its sour taste) and this can burn human skin and cause permanent eye damage if a person is exposed to large doses. I predicted the tea would help make the plants grow the fastest. I used three different flowers, three different liquids (water, tea and vinegar) and three cups filled with soil and with holes at the bottom. The control of the experiment was the water. The variables were the other liquids, because the liquids were being used to see if there was a noticeable difference in the plant growth compared to that with water. According to my results, the plant with tea was the healthiest, the plant with water was the second healthiest and the plant with vinegar died almost immediately, within a few days. In conclusion, my hypothesis was correct; the plant with tea did in fact grow to be the largest and healthiest.

5042 Will a Population of Collembola Increase If They Are Given Diet Sunkist Soda Instead of Water?
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The purpose of this experiment was to determine if Diet Sunkist Soda would increase or decrease a population of Lepidocyrtus northridgei collem­bolola. My hypothesis for the experiment was that the population of the collem­bolola would increase if they were given Diet Sunkist Soda instead of regular tap water. The most commonly used name for collem­bolola is springtails; they have the widest distribution of any hexapod group and are mostly found in soil, leaf litter and logs. Nine parts plaster of Paris, one part charcoal and water were mixed and placed into two petri dishes. After the dishes had dried completely, I placed 10 collem­bolola into each petri dish. One petri dish was labeled control and the other petri dish was labeled experiment. The control was given regular tap water and the experiment was given Diet Sunkist Soda. Both petri dishes were given the same amount of yeast for the collem­bolola to eat. The experiment continued for exactly 35 days. I recorded the number of collem­bolola in each petri dish at least twice a week. At the end of the experiment 52% of the total collem­bolola were in the experiment and 48% of the collem­bolola were found in the control. Nineteen eggs were counted in the experiment and in the control. By looking at the results at the end of the experiment, the study suggested Diet Sunkist Soda doesn’t harm the collem­bolola.

5043 Does Cutting Onions Next to a Burning Candle Lessen Eye Irritation?
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The purpose of this experiment was to find out how long it takes for the eyes to get irritated when cutting onions, and if cutting the onions next to a burning candle would make a difference. According to my research, when onions are cut, they release lachrymatory-factor synthase (LFS), an enzyme that irritates the eyes and produces tears. My hypothesis was that if I placed a lit candle next to the onion, it would absorb the gas and prevent the eyes from being irritated and producing tears. I tested three different types of onions: red, white and yellow. I timed how long it took for each type of onion to start irritating my eyes. The results were: The white onion started to irritate in 3.33 minutes, the yellow in 4.38 minutes and the red in 5.00 minutes. Then I lit two candles next to the onion while cutting it. All three different onions let out LFS, but the white one was stronger than the others and almost made me cry, but not completely. The red and yellow onions did not irritate my eyes at all. My hypothesis was correct. The flame of the candles absorbed the gas that the onions released and prevented my eyes from crying. My conclusion is that to prevent crying when cutting up onions, although there are several other ways to avoid crying, a good solution is lighting a candle next to the onion. White onions release the most LFS enzyme and red the least.

5044 How Does Smell Affect Taste?
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The purpose of this experiment was to find out how smell affects taste in identifying soda drinks. According to my research, taste cells let you taste whether the food or drink is bitter, sour, salty, hard or chewy – the primary tastes, as they are called. I also learned that the sensory cells help you perceive taste much more in-depth and that’s what I wanted to prove with
my experiment. My hypothesis was that the sense of smell helps people taste more in-depth and that without the sense of smell, one cannot get the full impact of flavor. I tested 20 people, 10 male and 10 female. My materials were five different flavored sodas (Pepsi, Sierra Mist, Mountain Dew, Orange Fanta and Strawberry Fanta), a blindfold and very small sample cups. There were two trials to see the impact between tasting while being able to smell, and tasting without being able to smell the drink. In the first trial, each person had to taste a small sample of each soda while blindfolded and being able to smell it as well as taste it. I gave them a break in between the two trials and in between tests, I gave them water to drink between soda drinks. In the second trial, just as in the first, each person had to drink a small sample of soda, blindfolded, but this time, they had to plug their noses and try to identify each soda without being able to smell it. I recorded the results for each test. There was a difference between the two trials. For example, the total averages in the first trial while testing with Mountain Dew were 7/10 for the females and 8/10 for the males. The total averages in the second trial while testing with Mountain Dew were 3/10 for the females and 4/10 for the males. They identified a lot more incorrectly in the second trial than in the first. My hypothesis was indeed correct and this shows that your sense of smell immensely impacts the way you perceive taste.

5045 How Many Paper Clips Does It Take to Break the Surface Tension of Different Liquids?
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My experiment was about measuring the surface tension of different liquids. Surface tension is like an elastic sheet that separates the water from any outside forces such as air. The purpose of this experiment was to determine if different liquids had the same surface tension. My hypothesis was that it would take less weight to break the surface tension of water than any other liquid. In order to complete my experiment, I made a balance to test my hypothesis. I taped two shish kabob sticks together so that they were on top of each other, then they were taped in the inside, underneath the top flap of a shoebox. I cut the bottom of a coat hanger, and curved the ends, to a 90-degree angle. To make the hanger balance with the other side of the hanger, I coiled wire on one side of the hanger tightly. The top of the hanger was used as the fulcrum point, and the hangers were placed on the sticks.

Lastly, I hung the palette cup on one side and my piece of aluminum foil, to test the liquids, on the other. I knew the surface tension broke when the aluminum foil rose from the liquid. I tested each liquid four times to get an accurate result. The average number of paper clips it took to break the surface tension of each substance was eight paper clips (22.6 grams) for the vinegar and water, six paper clips (170.1 grams) for the maple syrup and four paper clips (113.4 grams) for the 2% organic reduced fat milk and the Mazola corn oil. My hypothesis was incorrect; the water and vinegar took the most amount of weight to break the surface tension.

5046 Ramping Up the Effects of Adding 'Nano' Particles to the Microbial Lava Lamp (MLL)
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An experiment conducted by our previous Nanotechnology class showed no discernable effects of silver particles and ions on the yeast contained in the yeast/alginateglue beads used in an operational Microbial Lava Lamp (MLL). Silver is known a germicide, yet the MLLs were just as productive when the silver (ions and particles) were added. Two 1-liter bottles were used in this study with 1 liter of 15% sugar water in each bottle. To a third bottle, sodium citrate (an ingredient of energy drinks) was added. CO2 production in this bottle went down so much so as to signify the termina-

tion of the living yeast in the MLL beads. It was speculated the alginate matrix may have protected the yeast from the silver particles and ions. The sodium citrate created higher acid content, perhaps killing the yeast. This year’s Nanotechnology class speculated that not enough silver ions, silver metal or sodium citrate was used to affect CO2 MLL production. We then added 5 grams of each ingredient to three new MLL bottles. In the previous study, 20 mg. of silver powder, 260 mg. of silver nitrate and 1.05 g. of sodium citrate were added, respectively. For silver powder this is an increase by a factor of 2,500. CO2 production fell 67%. Similar results followed with this heavier dose of silver nitrate and sodium citrate. The drop in CO2 production was 36% and 22%, respectively, when compared with an MLL standard bottle we constructed using the same sugar water concentration with no additives. To test the change in acidity, pH paper was used to see if this affected CO2 outcomes as well. Compared to our standard, silver ions or metal did not alter pH significantly. However, acidity declined in the sodium citrate solution, perhaps refuting our earlier conclusion. Overall, we found that the concentration of added ingredients (grams vs. milligrams) had great impacts in terminating yeast-produced CO2 in our MLLs. We speculated that further reducing silver metal size would more closely simulate a ‘Nano’ effect. More study is required.

5047 How Much Starch Is in Different Foods?
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The purpose of this experiment was to measure the amount of starch each food has in order to be aware of how much we consume. Starch is a complex carbohydrate because it can be both good and bad for your health. According to my research, starch is tasteless and commonly found in breads and pastas. My hypothesis was that the most starch would be mostly found in whole grain foods such as bread. The materials I used for this experiment were milk, eggs, flour, bread, cucumber, sugar, a ripe and unripe banana, potato, napkins, cutting board, knife, spoon, iodine, medicine dropper, and paper cups and plates. I put a slice of bread, cucumber, the ripe and unripe banana, and potato in two plates and placed the egg and milk in two separate cups. Then, I used my dropper to drop iodine on the food to find what color it changed to. When iodine is used if the color is reddish-brown, then the item does not contain any starch, but if it turns purple or black, then starch is indicated.

In my results I found that milk, eggs, sugar and the ripe banana did not contain starch, while bread, potato, flour, cucumber and the unripe banana did contain starch. The most starch was found in the bread. My hypothesis was correct.

5048 Do Color and White Candles Melt at the Same Rate?
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The purpose of this experiment was to find out the rate at which candles melt. We tested different colored candles of the same size and brand. The colors we tested were black, blue, red and white. Our hypothesis was that colored candles would melt faster because according to our research, colors have chemicals and because the darker the color, the more heat absorbance. Our results were that colored candles melted faster than white candles. Finding out which candle lasts the longest can be a benefit because, for example, if you need candles in an emergency, colored candles would be a bad choice because they melt quickly. White candles don’t absorb as much heat as colored candles so they last longer. By doing this experiment we learned something new that can help us in life.
5049
How Can the Temperature of Dew Point Be Determined?
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The purpose of this experiment was to determine the dew point temperature of air and to see if the dew point would be higher indoors or outdoors. According to our research, dew point is the temperature to which a given parcel of humid air must be cooled, at constant barometric pressure, for water vapor to condense into water. The condensed water is called dew. The warmer the air temperature, the closest the dew point will be to that temperature. We conducted an experiment inside the house and outside, both in the sun and in the shade. We observed that outside in the shade had the lowest dew point and in the sun was the highest. Dew point is when beads of water form on objects like grass or on cars in the morning, but in this case we stirred ice in a coffee can until beads of water formed on the outside of the can. When that happens it means that we have found the dew point. We proved our hypothesis to be correct when the dew point outside in the shade was the lowest of all.

5050
Which Liquid Will Make a Penny, Nail and a Paper Clip Rust the Fastest?
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The purpose of our experiment was to find out which liquid would make a penny, nail and a paper clip rust the fastest. Our hypothesis was that the vinegar would make them rust the fastest. We used nine cups. Three cups were each filled with 1/2 cup of water. Another three cups were filled with 1/2 cup of vinegar and the last three cups were filled with 1/2 cup of vegetable oil. All three objects were placed in three cups, one in water, one in vegetable oil and another one in vinegar. We observed our experiment for 30 days and found out that the nail rusted in the water on day one, the penny on day two and the paper clip on day 27. The objects rusted in vinegar between days 27 and 30, and in the oil they did not rust at all. Our hypothesis was incorrect. Water rusts metal objects the fastest and oil prevents metal from rusting.
<p>| Lopez, A. | 4914 | Olais, E. | 5029 | Shim, H. | 5046 |
| Lopez, A. | 4975 | Oppenheimer, R. | 4984 | Shim, B. | 4868 |
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