CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
John M. Azizian

Project Number
J1801

Project Title
Solutions and Medications: Analysis of Pill Coatings for Dissolving Purposes

Abstract

Objectives/Goals
Determine if coatings of pills containing the same main ingredients (such as Advil/Ibuprofen) affect the time it takes to dissolve the medication in the human body.

Methods/Materials
Mixed carbonated water, water, carbonated sweet water, and white wine with simulated stomach acid. Tested solutions# pH with pH Microprocessor Tester. Timed it took to dissolve gelatin, colorless, sugar, no coating, and keratin coated Advil/Ibuprofen in these solutions (using magnetic stirrer).

Results
Keratin coated pills took the longest to dissolve in all solutions. Gelatin pills took the second longest to dissolve, but sugar and not coated Advil took the least amount of time to dissolve in all solutions. Colorless coated pills took average time to dissolve. In addition, all coated Advil dissolved in least amount of time in the water solution, which had the lowest pH (acidity) levels and most amount of time in carbonated sweet water, which had the highest pH (alkaline) levels. Also, water mixed with simulated stomach acid increased the pH level the least compared to the other solutions.

Conclusions/Discussion
The pill coatings affect the time it takes for pills to dissolve in a body. Solutions with lower pH levels help dissolve the pills in the human body most efficiently. Therefore, doctors advise to take medication with water.

Summary Statement
Determine the rates at which medicine with the same ingredients (Ibuprofen) covered with different coating dissolves in the human body.

Help Received
I received help from my mother and father who proofread the report, bought materials, and helped me with Excel Software.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Samuel D. Birns

Project Number
J1802

Project Title
How Clean ARE Your Hands?

Abstract

Objectives/Goals
My objective was to determine which of five hand cleaning agents (water, bar soap, antibacterial soap, hand sanitizer, or isopropyl alcohol) would be the most effective at removing bacteria from human hands via washing.

Methods/Materials
First, a control group was established: the subject washed his hands with each of the five cleansers; after each washing, the subject touched the agar in a specifically labeled Petri dish. Within the control group, there was a control dish in which the subject touched the agar without washing his hands. Four other groups were created in which common environmental bacteria was introduced; after each washing, but before touching the agar, the subject would, in turn, touch someone else#s hand, his eyes, a cell phone or a sandwich. Again, each group had a control dish in which the subject did not wash hands but handled the object then touched the Petri dish. After 7 days, the percentage of each Petri dish filled with bacteria was determined based on the equation Area of a circle = Pi x r2. Then, the average percentage of the Petri dishes covered by bacteria, grouped according to each hand cleanser, was calculated and compared.

Results
Antibacterial soap was the most effective in removing bacteria, with an average of 20.21% of its Petri dishes covered in bacteria. The least effective cleaner, hand sanitizer, had 23.97% coverage, 3.78% less than antibacterial soap. The control group, in which hands were NOT washed, had less bacterial coverage than the water and hand sanitizer groups.

Conclusions/Discussion
The data suggests that, when it comes to removing bacteria from hands, there is not a significant difference between one cleanser and another, or even between washing or not washing hands. The former conclusion indicates that the consumer needs to be aware of advertising hype. For example, as the hand sanitizer seems to add rather than remove bacteria from one's hands, the consumer using this product will have a false, even dangerous, sense of security. The latter conclusion, that washing or not washing one#s hands makes little significant difference, seems counter-intuitive; more experimentation needs to be done on this matter. Perhaps a study could be conducted with five families, who are each assigned a different hand cleaner, and one 'control' family, who doesn't wash at all; these families could be tracked over a period of two months to see how often they get sick.

Summary Statement
My project is about the bacteria-removing capabilities of water, bar soap, antibacterial soap, hand sanitizer and isopropyl alcohol.

Help Received
Father helped to convert hand-drawn graphs to computerized graphs and helped with formatting report.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Bryar W. Brandvold

Project Number
J1803

Project Title
Should Soccer Players Wear Protective Headgear?

Abstract

Objectives/Goals
To determine whether soccer protective headgear prevents impact injury and if its underutilization is due to poor performance, comfort or coaching bias.

Methods/Materials
Three types of commercial protective headgear and an unprotected control were tested repeatedly for side and front impacts. A cranial model was struck by a reproducible impact and the compression and deformity to an applied clay slab was measured with a digital caliper. Competitive soccer players compared each product to their unprotected head for comfort and playability. Coaches were surveyed to assess their knowledge and biases.

Results
Protective headgear decreased the measured impact compression and deformity of the clay. The Full 90 Select had the best overall impact results and scored better than the unprotected head on the player survey. The coaches admitted little knowledge of headgear utility and one coach reported a negative bias.

Conclusions/Discussion
Soccer protective headgear consistently reduced the impact to the head and did not adversely affect reported player comfort and playability. Since athletes participating in football, skateboarding and cycling wear protective headgear, one has to question why not soccer players.

Summary Statement
Soccer protective headgear reduces impact injuries and does not affect playability.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Grace Chen; Carissa Lee

Project Number
J1804

Project Title
Fat Fries?

Abstract

Objectives/Goals
To find out which fast food chain store's French fries contains the greatest amount of calories.

Methods/Materials
Methods: First, we constructed our calorimeter. Then we weighed each of the French fries in grams and recorded its weight. After, we filled the glass beaker half full with distilled water (approximately 100 mL), and measured the temperature of the water. We then impaled a French fry on the needle and lighted it on fire. Immediately after it caught on fire, we quickly placed the clay base with the impaled French fry under the beaker. We allowed the food item to burn itself out before using the pliers to push the French fry onto a plate. Then we stirred the water and measured the final temperature. Then we measured the remains of the burned French fry in grams on the scale. We repeated these steps for all of the French fries that had come from different fast food chain stores, and recorded detailed measurements. We performed these steps on three French fries from each fast food chain store, to ensure our precision.

Materials: For our materials, we used a homemade calorimeter, which required one glass beaker, clay base, a needle, and pliers. Our experiment also required French fries from the following fast food chain stores: McDonald's, Jack-in-the-Box, Wendy's, In-N-Out Burger, Carl's Jr., and Burger King. Other materials that our experiment required were: a graduated cylinder, distilled water, a Celsius thermometer (with a 20-100 range or greater), safety glasses, a lighter, and a scale (to measure in grams).

Results
Based on our calculations, Jack-in-the-Box's French fries contained the greatest amount of calories. Carl's Jr.#s French fries had the least amount of calories. However, our results differed slightly compared to the results of the manufacturing companies because of a few uncontrollable circumstances such as wind and heating of the beaker from the lighter.

Conclusions/Discussion
According to the data that we collected from our experiment, our results agreed with our hypothesis that Jack-in-the-Box's French fries contained the most calories. Unfortunately, we had some uncontrollable circumstances that affected the outcome of our results and how accurate our results were. Overall, our experiment concluded that out of selected fast food chain stores, Jack-in-the-Box's fries contained the greatest amount of calories.

Summary Statement
To find out which fast food chain store's French fries contains the greatest amount of calories.

Help Received
Father supervised experimental procedures. Parents purchased fries.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Cayley A. Cruickshank

Project Number
J1805

Project Title
A Comparison of Swim Times with Speedo Fastskin and Standard Lycra Swimsuits

Abstract

Objectives/Goals
The primary objectives of this study are to determine if Fastskin suits have superior water resistance properties compared to standard Lycra, and to determine the degree of difference (if any) between the two swimsuit materials. Improved knowledge of the degree of faster swim times will permit more informed purchasing decisions between Fastskin and Lycra swim suits.

Methods/Materials
Procedures:
1. Randomly assign swimmers into one of two equally sized groups. Swimmers assigned to Sequence 1 will test the Fastskin swimsuit in the first period followed by the Lycra swimsuit in the second period. Swimmers assigned to Sequence 2 will test the swimsuits in reverse order (i.e., Lycra in the first period followed by Fastskin in the second period).
2. Measure body weight and height of each swimmer. Calculate body mass index (BMI) of each subject as kg/m2.
3. For Period 1, record the 50-meter freestyle swim time of each swimmer wearing swimsuit assigned in step 1.
4. For Period 1, swimmer will repeat step 3 three times. The swim time for each test will be recorded on a datasheet. Note: The swimmer will rest for approximately 5 minutes between tests to ensure recovery.
5. Upon completion of Period 1, swimmer will switch suits and rest for 15 minutes before start of Period 2.
6. For Period 2, repeat steps 3 and 4.

Results
The mean swim time for the Fastskin swimsuit was statistically significantly faster compared to Lycra ($p=0.01$). For a 50-meter freestyle event, the Fastskin suit decreased the time by a mean of 1.1 seconds (95% confidence interval 0.6 to 1.6 seconds). The faster swim times can be attributed to its unique water repellant coating properties that decrease water absorption and remains lightweight when wet.

Conclusions/Discussion
Swimmers who learn about the outcome of this study will be able to know how a suit can affect their swim times, and which materials will be the most beneficial to them while competing.
The next step in my research is to test the swimsuit materials on a larger test group to confirm the study#s findings and to see if the results vary for different swim strokes and event distances.

Summary Statement
The goal of my project is to determine if swim times are faster when wearing a swimsuit made of Fastskin material compared to standard lycra material.

Help Received
My father helped me set up the study and with the data analysis.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Kathryn R. Dern

Project Number
J1806

Project Title
Calories: Do They Add Up?

Abstract

Objectives/Goals
Through this experiment, this researcher hopes to discover if the #Nutrition Facts# section of pre-packaged, frozen meals give consumers accurate calorie counts. The problem this researcher hopes to solve is whether or not the amount of calories in certain foods that is stated on the package is incorrect, and if it is, by how many calories.

Methods/Materials
1. 1 glass test tube
2. 7 mL water
3. 1 C thermometer
4. 1 balance
5. 1 pack of matches
6. 1 food dehydrator
7. 1 small metal cup
8. 3 snack food items:
 -1 Hostess Twinkies
 -1 Hostess Donettes: Crumb
 -1 Hostess Dunkin# Stix
9. 0.8 g catalyst (stand oil, turpentine, and bees wax solution)

Results
The calorific value was found in calories per gram, and then multiplied to get the amount in an entire snack item. The hypothesis was that the final calorie counts from the test would be 5% higher than the count given on the package. The tested amounts were really an average of 52% higher than the amounts given on the package.

Conclusions/Discussion
The Hostess Twinkies had 24% more calories, the Hostess Donettes: Crumb had 63% more calories, and the Hostess Dunkin# Stix had 69% more calories than the packages said. In the average of all three products, there were 52% more calories in the product than were marked on the package. Through this experimentation, it is concluded that the amount of calories written on snack food items is under marked.

Summary Statement
This experiment tested the accuracy of calorie counts on the Nutrition Facts section of food packages.

Help Received
Parents supervised the testing of the food and helped collect materials needed for experimentation.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Luka C. Douridas

Project Number
J1807

Project Title
Soapy Dilemma

Abstract

Objectives/Goals
The question to be answered is, "How will changing the main oil used in creating a bar of soap effect how well the soap will clean a dirty piece of fabric?" It is hypothesized that a bar of soap with the main oil being coconut oil will clean a dirty piece of fabric better than one with olive oil, canola oil, avocado oil or lard. This is hypothesized because most recipes for soap use coconut oil, so it was suggested that the variation would be relatively efficient.

Methods/Materials
The procedure is as follows. First, five different types of soap, as stated in hypothesis, were formed and each poured into separate molds. Then a large piece of cloth was kneaded evenly with a mixture of vegetable oil, water, orange juice, dirt and ketchup, and left to soak overnight. Afterwards the cloth was equally cut into 25 pieces. Then an equal amount of each soap was shaved into five different containers of equal amounts of water. Five pieces of dirty cloth were dropped into each, and then shaken periodically during a 25 minute time period. The cloth was then rinsed and data was collected according to a color scale.

Results
The results did not support the hypothesis; canola oil worked the best. The soap that worked the worst was in fact the hypothesized variation: coconut oil soap.

Summary Statement
The project is about making soaps and finding out what oil used in making a bar of soap would clean a dirty piece of fabric the best.

Help Received
Mother helped drive to stores and take pictures

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Wylie H. Drummond, IV

Project Number
J1808

Project Title
Sticky Fingers: Getting More Bond for the Buck

Abstract

Objectives/Goals
What white glue will give you the most bond for the buck? I believe my experiment is important to others because it will help them save money when purchasing white glue.

Methods/Materials
Two wooden pieces were glued and clamped together using six different brands of white glue. The glued was allowed to harden for 24 hours and then a hook was screwed into each side of the glued wooden piece. The top hook of the glued wooden piece was then hung from a beam which was suspended between two chairs. The bottom hook was attached to a bucket which was filled with 70-95 pounds of bar-bell weights. Water was then added to bucket until the glued bond between the two pieces of wood broke. The bucket was weighed on a digital bathroom scale and the weight needed to break the glued bond was entered into a spread sheet and averaged.

Results
The more expensive glues did not produce bonding strengths in proportion to their cost. However, my experiment may have some errors in it because some of the glue seeped under the masking tape used to keep part of the wooden piece glue free. This "seepage" allowed some pieces to have more surface area "glued" than others which may explain why some of my results have some unexplained "spikes" in the weight needed to break the glued bond.

Conclusions/Discussion
The next time you want to use "white glue" to hold something together, do not reach for the expensive name brand. Reach for the white glue that is the least expensive for what you want to glue so you can get "More Bond for the Buck."

Summary Statement
To find out which brand of "white glue" gives you more bond for the buck.

Help Received
My dad helped me cut the wood because of my broken wrist from snow boarding.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Jessica M. DuBose

Project Number
J1809

Project Title
Dirty Mouth? Clean It Up!

Abstract

Objectives/Goals
I hypothesized that the cinnamon gum would reduce the most microbes. My problem was which flavor of gum reduced the most bacteria, though both flavors have an even chance to reduce the most bacteria. The peppermint gum has peppermint oil in it that has a numbing affect, and the cinnamon gum has cinnamon oil in it that helps prevent bad breath. I planned to solve this by having people chew two different flavors of gum and measure how much bacteria it reduces. I will also need to get a control so I can figure out which flavor reduces the most bacteria.

Methods/Materials
I tested my question by taking samples of bacteria. My independent variable was the sample before they chewed the gum. My dependent variable was the samples from the cinnamon and peppermint gum. My method for testing was to swab their mouth before and after they chewed the gum. Then I put the sample on the agar plates and looped them, taped them shut, and put them in the incubator for the bacteria to grow. The next day I would count the bacteria.

Results
My findings proved my hypothesis wrong. Peppermint gum reduced the most bacteria. The average bacterium reduced by cinnamon gum was 79.1. The average bacterium reduced by peppermint gum was 86.5. 549.4 was the average control people had. As you can see both flavors of gum reduced about the same amount of bacteria. Also neither one reduced much of the bacteria, but they reduced some bacteria.

Conclusions/Discussion
I have learned many things from this project. For example, I learned a lot about bacteria and how to grow them. I had to grow them to see if my hypothesis, which was cinnamon would reduce the most, was correct or incorrect. My problem was which flavor of gum would reduce the most bacteria. My independent variable was the type of gum I had and my dependant variables was the amount of bacteria each type grew.
In the end I proved my hypothesis incorrect. The average bacterium reduced by cinnamon gum was 79.1. The average bacterium reduced by peppermint gum was 86.5. As you can see peppermint gum reduced 7.4 more bacteria than cinnamon gum.

Summary Statement
My project is about finding out which flavor of gum, peppermint or cinnamon, can reduce the most bacteria in your mouth.

Help Received
Mother helped type up report and decorate board, Mrs. Marcarelli helped get materials I needed and supervised my project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Helena Epps; Joe Raimondi

Project Number
J1810

Project Title
Efficiency Deficiency

Abstract

Objectives/Goals
Estimates of the degree of fuel that is not combusted in a typical 4-stroke engine ranges from 5-20 percent. With gas prices rising and oil supplies dwindling, the need for fuel efficiency rises. Our purpose is to determine whether any gas saving treatments actually have beneficial effects on fuel efficiency. Specifically, we asked how different types of gas saving treatments affect the mileage of a 4-stroke engine? We predict that compared to regular gasoline, additives will perform the best, a modified spark plug next, followed by heated gasoline, and then fuel line magnets, which will perform the same as regular gasoline (the control).

Methods/Materials
To test our predictions, we built an apparatus consisting of a 6.5hp engine coupled to a wheel and odometer. We used 87 octane gasoline. We tested 5 gas saving treatments: fuel additive, fuel line magnet, modified spark plug, fuel line heating pack, and control. For each trial, we used 50 milliliters of gasoline and one of the five gas saving treatments. We ran five trials of each treatment in a series of the five treatments in a row.

Results
Some of the treatments improved fuel efficiency. Heated fuel was the most efficient (5% greater than the control), followed by the modified spark plug (+4%), the gasoline additive (+1%), the control, and finally the magnet (5% decrease).

Conclusions/Discussion
Our results did not support our hypothesis in the order of effectiveness, however they do suggest that there are ways to increase fuel economy. Next time we would like to try combining the treatments to see if we could get a better result. We would also try to find a way to use the heat from the engine to heat the gas in the fuel line.

Summary Statement
We investigated the effects of different gas saving treatments on the fuel effficiency of a 4-stroke engine.

Help Received
Parent helped with spread sheet and graphs, science teacher edited and made comments on the report.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Brian Fiser; Joshua Polich

Project Number
J1811

Project Title
Look Cool or Be Cool: Which Sports Material Cools Your Body Temperature Down the Fastest?

Abstract

Objectives/Goals
We both play sports and spend a lot of money on sports apparel. We came up with this project to see what sports material allows a body to cool down the fastest.

Methods/Materials
We manufactured a silicon block. Then we heated the silicon block to 110°F in a convection oven. The ambient temperature was controlled at 74°F. We measured the temperature of the silicon block with a digital thermometer. Then we monitored the temperature of the silicon every ten seconds from 105°F down to 97.5°F, while it was covered alternately with five different sports materials. We chose this temperature range based on a marathon runner#s body temperature of 103.8°F, and a weight lifter#s body temperature of 101°F and a normal body temperature of 98.6°F.

Results
Our results showed that the more synthetic materials there are in the active wear, the faster you will cool down. It also shows that the most expensive shirts don#t always perform the best.

Conclusions/Discussion
The polyester material of the Champion shirt performed the best because it cooled down the fastest. The Under Armour shirt was ranked better in manufacturer reviews because of its 82% Cationic Polyester and 18% Elastane, but in our study it was beat by both Champion (100% Polyester) and Nike (56% Nylon, 32% Polyester, 12% Spandex). The Speedo (100% Cotton) material took the longest to cool down, as the natural material did not allow our test block to cool as rapid as synthetic materials. All the synthetic sports material, were the top performers in our experiment.

Summary Statement
Our project is about the cooling rate of body temperature with sports materials covering them.

Help Received
We would like to thank our parents for helping us put our board together and creating graphs on the computer. Allflex USA provided us with the highly accurate GLA thermometer.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Claire E. Gorder

Project Number
J1812

Project Title
Your Fries Give Me Gas! The Viscosity of Various Bio-diesel Blends in Cold Temperatures

Abstract

Objectives/Goals
The purpose of my project is to find out whether or not temperature affects the viscosity of bio-diesel fuel blended with different bio-fuel/diesel fuel ratios.

Methods/Materials
Eleven samples were prepared using pure B100 bio-diesel fuel and pure Diesel #2 fuel. A graduated cylinder was used to prepare various blends with the ratio of bio-diesel to diesel varied in ten percent increments. The blended samples were poured into test tubes and placed in a temperature-controlled chamber. Viscosity of each blend was measured at various temperatures ranging from +25 to -20 degrees Celsius using a viscosimeter with a 2.0 millimeter orifice and a stopwatch. Temperatures were measured with a thermocouple.

Results
The results show that temperature affects the viscosity of the mixtures, depending on the blend ratios. Pure bio-diesel (B100) gelled at -4 degrees Celsius, while pure Diesel #2 gelled at -19 degrees Celsius. Significantly, the viscosity of all blends remained relatively constant until the gel-point was reached. *Note: Gel point is the temperature at which the fuels did not flow.

Conclusions/Discussion
All of the bio-diesel blends tested would be suitable for the Southern California marketplace. However, higher bio-diesel ratios could be problematic in colder climates such as in the Upper Midwest during the winter season. Bio-diesel appears to be a very viable alternative fuel to reduce dependence on imported oil and air pollution.

Summary Statement
I wanted to find out if temperature had an affect on the viscosity of bio-fuel blended with different bio-fuel/diesel fuel ratios.

Help Received
My mom helped me use the paper cutter and with the spray adhesive for my display. My dad proofread my report and drove me to his lab to use the equipment there. Mr. Ronald Tirado let me interview him, and Mrs. Kelly Silva lent me test tube equipment.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Jaena Han

Project Number
J1813

Project Title
Natural vs. Pharmaceutical Antibiotics

Abstract

Objectives/Goals
I conducted this experiment to determine whether natural or pharmaceutical antibiotics would be better at preventing antibiotic resistance from occurring within E. coli strain ATCC25922.

Methods/Materials
A turbidity measurement was performed to guarantee that each antibiotic had an initial antimicrobial effect against E. coli strain ATCC25922. Then, the E. coli was exposed to the two pharmaceutical antibiotics (Ampicillin and Cyprofloxacin Hydrochloride) and two natural antibiotics (garlic and honey) that had been tested, for increasing lengths of time, beginning at 2 hours of exposure and concluding after 12 hours of exposure. After each exposure, a susceptibility test was performed to determine how sensitive the bacteria were to the effects of each antibiotic. The point at which the E. coli developed an antibiotic resistance was determined when the diameter of the inhibition zone decreased below its standards for susceptibility.

Results
The turbidity measurement indicated every antibiotic tested had some degree of growth inhibition. By the end of the susceptibility tests, garlic had no inhibition zone, and the inhibition zone of Ampicillin had decreased about 3.3 mm from 17 mm to 13.7 mm, which is below its zone diameter standards for antibiotic susceptibility. The inhibition zone of honey, however, decreased by only 1mm from 13 mm to 12 mm, the least significant decrease among all the antibiotics, and the inhibition zone of Cipro decreased 3 mm from 35 mm to 32 mm: not enough for it to be considered ineffective. Therefore, the E. coli developed resistance to garlic and Ampicillin but not to Honey or Cipro.

Conclusions/Discussion
The results were inconclusive, as the E. coli developed resistance to one natural and one pharmaceutical antibiotic and failed to develop resistance to one natural and one pharmaceutical antibiotic: an even split. Perhaps there is no correlation between whether an antibiotic is natural or pharmaceutical and its ability to prevent bacteria from developing resistances. However, it should be taken into consideration that this experiment encompassed a very limited number of antibiotics which may not accurately represent most antibiotics, both natural and pharmaceutical. Moreover, there is a high possibility that Cipro, garlic and honey did not have correct concentrations or were inadequately dosed, potentially skewing the results.

Summary Statement
The purpose of this expiriment was to determine whether natural antibiotics would be more effective in preventing antibiotic resistance from occuring in E. coli bacteria over longer durations than pharmaceutical antibiotics.

Help Received
Used lab equipment at The Scripps Research Institute under the supervision of Angela Baik; Lindsey A.Miles allowed me to use lab equipment; Neill Gingles provided E. coli strain; Hongdong Bai gave technical advice on methods of culturing E. coli.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Leah A. Hatayama

Project Number
J1814

Project Title
The Effects of Honey on Longevity of Fruits and Vegetables: Year 2

Abstract

Objectives/Goals
To determine the effects of a 1% honey solution on extending the shelf life and preserving fruits and vegetables.

Methods/Materials
Last year I tested 3 different dilutions of honey (1%, 5%, and 10%) on strawberries and tomatoes, and found out that my 1% honey solution kept fruits and vegetables fresh longer at room temperature. I investigated further this year using my 1% honey solution. I purchased strawberries, tomatoes,and grapes and raw honey. I made my 1% solution using honey and sterile water. I labeled each fruit and separated them into 3 groups of 10 plus 3 control groups. I sprayed 30 of each berry, grape, and tomato with my 1% honey solution and made my 3 control groups that I didn't do anything to. I let everything dry overnight and stacked them in bowls. This year I took my groups of 10 and placed one outside, one at room temperature, and one in the refrigerator at 40 degrees. I also put a control group with each. The next day I checked for signs of soft or dark spots, or mold. I observed all my groups until they showed signs of decay.

Results
The 1% honey coated strawberries and grapes were preserved 50% more or twice as long as the control groups both at room temperature and in the refrigerator. My strawberries and grapes outside decayed at about the same rate as my control groups. My 1% coated tomatoes did better in the refrigerator, none had decayed by day 10 and in fact did not show any signs of decay for weeks after that. For my tomatoes outside on day 10, 30% were decayed compared to 50% of the control and my room temperature tomatoes actually decayed faster than my control.

Conclusions/Discussion
After completing my investigation in more depth, I found that my hypothesis was correct and the 1% honey solution sprayed on strawberries, tomatoes, and grapes that are refrigerated will stay fresh much longer. It will also keep fruit longer at room temperature which I found again this year like last year. This is a great thing for farmers and fruit packers who store the fruits and vegetables before they send them off to the grocery stores to know and try. The fruit was much better looking too, the strawberries were bright red in color and people who are allergic to or affected by chemicals would not have to worry.

Summary Statement
Investigating whether or not a 1% honey solution could be used to preserve and extend the shelf life of fruits and vegetables.

Help Received
My teacher read over my project and my mother helped type it and helped me with my board.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Julia Hennrikus; Christina McKoane

Project Number
J1815

Project Title
Which Mouthwash and Ingredients Are Most Effective at Inhibiting Oral Bacteria?

Abstract

Objectives/Goals
Determine which mouthwash/ingredients and concentrations are the most effective at inhibiting oral bacteria.

Methods/Materials
We melted Nutrient Agar,collected our saliva and injected 0.25ml of saliva into each tube.The mixed agar/saliva was poured into sterile Petri dishs. Color-coded discs were dipped into 1 of 6 mouthwashes and placed on the surface of the agar plus a water control.The plates were observed at 24,48,72 hrs.At72 hours the clear zone around each disc was measured.We performed 3 trials with newly bought mouthwashes,a total of 30 experiments,and found the average zone of bacterial clearance for each mouthwash.

Results
Peroxyl is the most effective mouthwash at inhibiting oral bacteria,19.5 mm average zone of bacterial clearance.Scope and Listerine tied for 2nd place with an average zone of 12.6mm and 12.8 mm.Crest was 3rd with an average zone of 9.4mm.Act performed poorly with an average zone of 7.8mm and AntiPlaque performed the worst with an average zone4.2mm.Bacteria grew over the water disc 100% of the time.

Conclusions/Discussion
Peroxyl,the only mouthwash with H2O2 did not perform well in the 1st trial, zone of inhibition 6.9mm,similar to antiplaque with a similar alcohol concentration but performed exceedingly well in the 2nd and 3rd trials,28.3mm inhibition zone,when the expiration dates were 1½ yrs,rather than ½ yr.We conclude that our 1st bottle of Peroxyl was old and spontaneously converted to H2O and only its alcohol 6% was effective in the first trial.(H2O2)+light/heat-2H2O + O2.Scope and Listerine have the highest alcohol content,15% and 21.6%,Anti-Plaque 8.7%,so it appears that for alcohol to be effective,it must be 15% or higher.Crest performed fair with only cetylpyridinium 0.07%.Scope and ACT also had cetylpyridinium,but no conc.listed,so at a lower concentration than Crest. Cetylpyridinium0.07% is fair at inhibiting growth,but at higher concentrations it stains the teeth brown. The performance of Listerine is due to the high alcohol content and possibly a minor contribution from Thymol.Sodium benzoate and benzoic acid are major components in ACT and AntiPlaque which performed poorly. They do not appear to be major contributors to bacterial inhibition, perhaps because they need very acidic conditions,pH 3.6to be effective,whereas our mouths'pH is 6.2-7.0.Sodium lauryl sulfate, found only in AntiPlaque also does not appear to be a very strong bacterial inhibitor.

Summary Statement
We measured the diameters of bacterial clearance on nutrient agar around discs soaked in different mouthwashes to determine which mouthwash and its ingredient is most effective at inhibiting oral bacteria.

Help Received
mother helped type report and order nutrient agar supplies

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Jotthe Kannappan

Project Number
J1816

Project Title
Paper Chromatography

Abstract

Objectives/Goals
My objective is to determine which marker possesses the strongest bonding ink, a characteristic measured by paper chromatography (strength indicated by the retention factor). In this process of experimentation, I wanted to learn the basic principles of paper chromatography.

Methods/Materials
Materials:
Water, vinegar, 15 strips of paper towel, ruler, pencil, sharpie permanent marker, crayola thin washable marker, crayola block washable marker, tape and a wide mouth jar were used in this experiment.
Method:
A ruler was used to draw a horizontal line 2 cm, above the bottom edge of the already cut paper strips. After pouring a small amount of water into a glass, a dot of each marker was placed at center along the line on the paper. Each strip was labeled and the strips were taped to pencil and then hung across the glass jar so that the bottom of the strip was barely touching the water surface. After letting the water raise for 10 minutes, the distance the solvent rose was measured and compared to the distance the dot (sample of ink) traveled. The test was repeated 5 times in water and then the solvent was changed to Vinegar and hot water.

Results
Retention factor (R.F) is the distant traveled by the sample (dot) over the distance traveled by the solvent. Average retention factors for Sharpie Permanent Marker were 0.022 in Water, 0.035 in Vinegar and 0.059 in Hot Water. Average retention factors for Crayola Block Marker were 0.67 in Water, 0.737 in Vinegar and 0.743 in Hot Water. Average retention factors for Crayola Thin Marker were 0.625 in Water, 0.67 in Vinegar and 0.713 in Hot Water.
Basically, the block marker showed the highest retention factor.

Conclusions/Discussion
I thought that the crayola block marker in water would have the highest retention value. Experiment results showed the retention factor value of the block marker the highest (0.67 # 0.743) irrespective of the solvents used. The sharpie permanent marker had a very low (0.022 # 0.059) retention factor indicating strong adhesion of ink components which is needed for permanent marking. The thin marker had a R.F of 0.625 to 0.713 which has a similar washable ink but because of its thin spread it showed slightly lower R.F. I was correct about my hypothesis

Summary Statement
My project is to identify the material composition (type of ink) using the principles of paper chromatography. .

Help Received
Dad, sister and grandpa helped me put together the display board.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Kevin R. Kaufmann

Project Number
J1817

Project Title
Antibacterial Soap vs. Antibacterial Gel: Cause for Concern?

Abstract

Objectives/Goals
The objective is to determine if antibacterial gel inhibits germ growth as effectively as antibacterial soap, even when the variables surrounding the growth of germs change.

Methods/Materials
Nutrient agars were prepared. A basketball containing bacteria from the hands of school children, (no children were used in experiments), was the source of germs. Germs were grown in the presence of antibacterial gel, soap and a neutral environment for bacteria. All environments include an incubated area.

Results
Antibacterial soap exhibited a minimal amount of growth. The antibacterial gel consistently grew bacteria in large amounts of colonies. The fluid friction applied method had no change of results in the bacterial growth in the antibacterial gel experiments. The control was not as heavy a growth of bacteria as the antibacterial gel.

Conclusions/Discussion
Antibacterial soap is more effective than antibacterial gel, even when friction is applied. Antibacterial gel and friction may have killed some bacteria picked up by the original swabbing, but growth of some type of bacteria can not be killed by gel alone. From these results, it is recommended to use an antibacterial soap.

Summary Statement
This project is to observe if antibacterial gel is as effective as antibacterial soap, or creating an antibacterial resistence in the bacteria domain.

Help Received
Used lab facilites at Center for Advanced Research and Technology (CART), Under the supervision of Constance Zeeb, Instructor; Forensic Research &Biotechnology, Photographs taken by mother, Diane M. Kaufmann

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Kelly M. Kosmo

Project Number
J1818

Project Title
Does a Fastskin II Swimsuit Really Make a Swimmer Faster?

Abstract

Objectives/Goals
The objective of my experimnet was to determine whether or not the friction-reducing design of the Speedo Fastskin II full body suit is truly able to increase the speed in which a swimmer travels through the water, or if this is just a marketing gimmick. I tested the speed of four different swimsuits; the Speedo Fastskin II, a standard lycra swimsuit, a bikini, and board shorts and a t-shirt. In order for my results to be accurate, I conducted an experiment which was able to eliminate all other variables besides friction; the main variable being propulsion.

Methods/Materials
1) 50 meter pool; 2) Swimmer; 3) Three timers & someone to hold and release the swimmer; 4) Speedo Fastskin II full body swimsuit; 5) Standard lycra competition swimsuit; 6) Bikini; 7) Shorts and t-shirt; 8) Snorkel, goggles, pull buoy, swim cap; 9) Aqua scooter; 10) 3 stopwatches; 11) Rope.
I did not want a swimmer's effort to affect my results. Instead I used an Aqua Scooter(a single-speed water propulsion device used by scuba divers). Prior to the start, the swimmer was held horizontally in the water with her feet on the wall and the Aqua Scooter running. By doing this I was able to eliminate any variance in the start which may have otherwise been caused by pushing off the wall with different amounts of force. I am a Junior Olympic level swimmer and have good strength and balance in the water. I practiced before-hand to be sure to keep the aqua scooter at the same depth and straight for each timing run. The pool was closed to all other users and there was no wind, so there were no currents or wakes. For each suit type I made five timing runs, each run with three stop watches.

Results
The Speedo Fastskin II full body swimsuit does indeed increase the speed in which a swimmer is able to move through the water. My results showed that the Speedo Fastskin II is 3.1% faster than the standard lycra swimsuit, 4.1% faster than the bikini, and 4.6% faster than the shorts and t-shirt.

Conclusions/Discussion
Overall, the Speedo Fastskin II full body swimsuit was the fastest out of all the suits that I tested. This was due to its design, which is made to control the flow of water over a swimmer by reducing frictional drag. My hypothesis that the Fastskin II would reduce friction and increase the speed of the swimmer was supported by these results. However, the percentage by which this occured was greater than I had expected.

Summary Statement
A swim-suit made of specialized material and a design resembling shark#s skin is measurably more efficient (less drag) than a regular competitive swim-suit or human skin.

Help Received
My dad helped find and purchase the Aqua Scooter, he also held the swimmer at the start of each test. There were three helpers timing with stop watches. I received a generous donation of a Speedo FastSkin II from Competitive Aquatics Supplies and was given time to use the pool thatks to the City of Santa

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Nicole Kowtko

Project Number
J1819

Project Title
Fast Food Fuel Frenzy: How Effective Is Biofuel?

Abstract

Objectives/Goals
I wanted to determine if biodiesel made from waste vegetable oil (WVO) is a comparable replacement for diesel #2. I hypothesize that they both will burn approximately the same amount of fuel in approximately the same amount of time because they both burn at high temperatures.

Methods/Materials
A homemade calorimeter composed of a 6 oz tin can containing 5 ml of the test fuel was clamped into a tea kettle holding 1 pound of water. A digital thermometer was placed in the spout. After the wick in the fuel was lit, a timer was started, and there was continual stirring of the water (so the heat was evenly distributed). When the water was raised 1 degree Fahrenheit (meaning the fuel generated 1 British Thermal Unit or BTU), the wick was blown out, and the timer stopped. The amount of fuel burned off and the elapsed time were recorded. This was repeated 10 times per fuel.

Results
The amount of fuel burned off during each test is the same as the amount of fuel needed to generate 1 BTU. The biodiesel used an average of .25 ml to generate 1 BTU, while diesel #2 only needed .225 ml of fuel to produce the same energy. The amount of time needed to generate 1 BTU is another factor that was used to evaluate the efficiency of the test fuels. Biodiesel used an average of 99.375 seconds to generate 1 BTU, while diesel only needed an average of 67.875 seconds. Interestingly enough, biodiesel required about 50% more time than diesel, so diesel was clearly faster.

Conclusions/Discussion
The evidence indicates that the diesel burned less fuel and burned quicker than the biodiesel, proving the hypothesis wrong. However, from observations based on the smell and byproduct of the fuels, biodiesel seems to be the overall better choice.

Summary Statement
This project tests if biodiesel made from waste vegetable oil is a comparable replacement for diesel #2 by examining the fuel efficiency.

Help Received
Two neighbors informed me about calorimeters and a way to test the fuels, which I later refined thru trial and error. My science teacher reviewed my ideas. My mother was my test assistant (dealing with the matches and safety measures), taught me how to use Excel graphs, and helped review my work.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Andrew R. Kurzweil

Project Number
J1820

Project Title
Cereal Critters: A Study of Contaminants in Mass-Marketed and Organic Breakfast Cereals

Abstract

Objectives/Goals
I hypothesize that mass-marketed cereals contain fewer contaminants and microorganisms than organic cereals because pesticides are used in the growth of their key ingredients and chemical preservatives are used in their processing.

Methods/Materials
I purchased 10 mass-marketed and 10 organic cereals, noting preservatives, country of origin and packaging materials for each. I then measured ½ ounce of each sample and conducted a visual contaminant study vs. a pre-determined rating scale. I crushed the sample with a pestle, made a slide, and observed it under a microscope at a 4x magnification level, charting any observations. I added water to the specimen slide and observed it at a 40x magnification level, again noting any activity/findings. I repeated the process for each sample, comparing and drawing conclusions from my findings.

Results
There was no difference in the amount of visible contaminants and debris between the mass-marketed and organic cereal samples in a visual inspection. Contaminant levels observed at the 4x magnification level were also similar, with all debris in the minimal range. Organic cereals yielded contaminants in a greater magnitude and severity than did mass-marketed cereal at the 40x magnification level, 70% vs. 20% of samples. Most mass-marketed cereals studied used the chemical BHT as a preservative, while all organic cereals sampled used a natural preservative. Cereals containing fruit and those manufactured outside of the U.S. correlated to a higher level of contamination.

Conclusions/Discussion
Mass-marketed cereals contain fewer contaminants than organic cereals. While neither showed easily-visible debris, organic cereals showed markedly heavier and more contamination under microscopic magnification, a 50 percentage point difference. The use of pesticides and chemical preservatives in mass-marketed cereals appear to be effective in limiting contamination. Cereals containing fruit and those manufactured outside the U.S. have a greater likelihood of containing unwanted matter.

Summary Statement
My project compared various mass-marketed and organic cereals under different levels of magnification in order to determine if one type had a greater presence of contaminants and microorganisms than the other.

Help Received
Mother drove me to the grocery stores & Father oversaw microscope viewing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Alexandra A. Lamoureux

Project Number
J1821

Project Title
What's Best for Washing People's Hands?

Abstract

Objectives/Goals
This experiment determined which type of substance was most effective at sanitizing people's hands after handling raw hamburger meat. The researcher hypothesized that if less bacteria grew after washing hands with anti-bacterial soap, then anti-bacterial soap kills the most bacteria.

Methods/Materials
The procedure involved a volunteer washing his hands with various substances after handling hamburger meat that was placed out for two days (allowing it to spoil). The following substances for washing were used to perform each of four trials: not washing (control group), water, regular soap, hand sanitizer, and anti-bacterial soap. After washing, the researcher swabbed the palm of the volunteer's hand with a Q-tip and smeared the Q-tip on the agar inside a petri dish. The bacterial growth in each petri dish was measured over a nine-day experimentation period.

Results
The researcher found that a small amount of bacteria grew slowly after hands were washed with anti-bacterial soap. When washing with water, hand-sanitizer, and regular soap larger amounts of bacteria grew quicker. When hands weren't washed, large amounts of bacteria grew the quickest.

Conclusions/Discussion
The results show that anti-bacterial soap grew the least bacteria, which supports the researcher's hypothesis.

Summary Statement
This experiment determined which type of substance was most effective at sanitizing people's hands after handling raw hamburger meat.

Help Received
My father smeared hamburger meat on his hands and washed them in various substances in order for the researcher to swab them. My mother purchased the petri dishes and agar.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Joshua B. Larky

Project Number
J1822

Project Title
The NBA Takes a Bad Bounce: Evaluating Leather vs. Synthetic Basketballs

Abstract

Objectives/Goals
My objective was to test leather and synthetic basketballs in an effort to evaluate grip and bounce consistency. My interest was ignited by the recent controversy in the National Basketball Association (NBA) over the introduction of the new synthetic ball, in place of the traditional leather basketball. I hypothesized that since the players perspire during play, the balls might show greater differences when wet versus when dry. I further hypothesized the dry leather basketball would bounce higher when dry, and not roll as far as a synthetic basketball. I expected the wet synthetic basketball would bounce higher than the leather ball.

Methods/Materials
I measured how high each basketball bounced and calculated the standard deviation to assess the variability of the basketballs# performance. I bounced the basketballs from heights of 100cm (1 meter) and 200cm (2 meters). I set up a roll test to investigate the basketballs# ability to grip to the ground and the friction associated with each basketball#s particular surface. This test was accomplished by rolling the basketballs down a ramp and measuring the distance rolled. I performed all of these tests with both wet and dry basketballs, for a total of 480 tests. Bounce tests comprised 320 of the total, and roll tests accounted for 160 tests.

Results
When bounced from 200cm, both wet and dry, the synthetic basketballs had much higher standard deviations than the leather balls. Results at 100cm, both wet and dry, showed similar standard deviations for leather and synthetic basketballs. Bounce heights were similar in all cases, wet and dry. When rolled, both wet and dry, the synthetic basketballs had much higher standard deviations and also rolled farther than the leather basketballs.

Conclusions/Discussion
The greater standard deviations of the rolled synthetic basketballs may indicate a less consistent grip, and the farther roll implies they are more slippery than leather balls. My test results seem to confirm the NBA players# complaints that synthetic basketballs are harder to grip and more inconsistent when compared to leather basketballs. The NBA acknowledged its mistake in switching to the new synthetic ball, and the leather basketball was put back in play.

Summary Statement
I tested leather and synthetic basketballs by bouncing and rolling them, under both wet (to simulate sweat) and dry conditions, and found that the synthetic were more inconsistent, slippery, and unpredictable than the leather basketballs.

Help Received
Thanks to my father for helping me set up my tests and teaching me how to work the video camera. Thanks to my parents for help with editing my report.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Marie R. Laube

Project Number
J1823

Project Title
Do Different Household Substances Kill Whitefly on Hibiscus Plants?

Abstract

Objectives/Goals
My objective was to determine if different household substances would kill whitefly on hibiscus plants. I thought that the canola oil, dish soap, and whitefly insecticide would work the best.

Methods/Materials
The household substances I tested were water, whitefly insecticide, dish soap, canola oil, rubbing alcohol, 409, and bleach. I found two hibiscus plants with whitefly and used these for the experiments. At the beginning of each experiment I first counted the white eggs on the leaves. Then for each of the seven household substances I sprayed two leaves with each substance and counted the white eggs every three days for a total of nine days and recorded the results.

Results
There were three experiments conducted on two different hibiscus bushes. In the best experiment, number three, when the leaves on hibiscus bush number two were treated with water, 409, bleach, and rubbing alcohol, the number of whitefly eggs was reduced. However, the leaves treated with dish soap, canola oil, and whitefly insecticide had no live whitefly eggs on them after day three.

Conclusions/Discussion
There was some confusion on which eggs to count in the first experiment. Both white eggs and yellow larvae were counted, but in the next two experiments only the white eggs were counted. Also it took two experiments to determine the right concentration of dish soap to use. Although some of the household substances (409, bleach, rubbing alcohol, and water) had just a small effect on the number of whitefly eggs killed, the only substances that completely killed all the whitefly eggs on both tested leaves in at least one experiment were canola oil, dish soap, and whitefly insecticide. The reasons that these substances killed whitefly eggs are different. The dish soap disrupts the cell membrane which causes the contents of the cell to leak out and the eggs die. The canola oil suffocates the eggs. The whitefly insecticide, which was used as a positive control, contains canola oil and pyrethrins. Pytrethrins kill adult insects by disrupting the nervous system and causes paralysis. Therefore the hypothesis that dish soap, canola oil, and whitefly insecticide will kill the most whitefly eggs on hibiscus plants is correct.

Summary Statement
Different household substances were tested to determine if they could kill whitefly on hibiscus plants.

Help Received
Mother helped me choose project and gather data,brother helped me with the graphs, my teacher Mr. Pashkow helped me with editing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Joshua R. Lewicki

Project Number
J1824

Project Title
Sweet Relief?

Abstract

Objectives/Goals
My objective was to determine whether or not certain candies could neutralize a strong acid. I hypothesized that candies with magnesium present as an ingredient would work towards neutralizing the acid.

Methods/Materials
Seven different brand-name candies (Mentos, Wrigley's Doublemint Mints, Tic Tacs Freshmints, Peppermint Life Savers, Strawberry Pop-Rocks, Bubble Gum Pop-Rocks, and one generic antacid as the control group) were crushed and dropped into 10 mL of cola, after which the mixture was tested with litmus paper (in Phase 1). The number of candies was increased by threes (1, 3, 6...). In Phase 2, the procedure was the same, but the mixtures were tested with a digital pH meter. The materials were: pencil, computer, SOLO plastic cups, paper towels, Diet Go2 Cola, notebook, the six aforementioned candies and the aforementioned antacid, and red and blue litmus paper.

Results
Tic Tacs (which contained a form of magnesium, magnesium stearate) and the antacids were the only candies that reached a neutral pH or higher, the Tic Tacs after 27, the antacids after 2. My hypothesis was therefore correct.

Conclusions/Discussion
My hypothesis was correct in that magnesium neutralizes acid. I discovered that Tic Tacs can act as an antacid, because they contain magnesium. However, the anti-health factors of eating 27 Tic Tacs overrules their benefits.

Summary Statement
My project is about whether candies can provide a useful function by acitng as an antacid.

Help Received
My mother drove me to the store to buy candies and other materials; she also helped with the typing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Timothy J. Okita

Project Number
J1825

Project Title
The Efficiency of the Fluorescent Light Bulb vs. the Incandescent Light Bulb

Abstract

Objectives/Goals
The objective is to see how much more efficient the fluorescent light bulb is compared to the incandescent light bulb.

Methods/Materials
Three fluorescent light bulbs (10, 13 and 20 watts) and three equivalent incandescent light bulbs (40, 60 and 75 watts) were tested. The heat given off by each bulb was measured by the rise in air temperature in a closed Styrofoam container. Each bulb was tested at one-minute intervals for 15 minutes and a total of six tests on each bulb were conducted. In addition, light and wattage were measured. The light given off by each bulb was measured at four different distances using a light meter. The wattage of each bulb was measured using a watt meter.

Results
The fluorescent light bulbs are 75% more efficient than the equivalent incandescent light bulbs. Since the wattage measurements were consistent with the rated watts and the light output was approximately the same for each equivalent bulb, incandescent light bulbs waste energy in the form of heating the air in the room.

Conclusions/Discussion
The fluorescent light bulbs are more efficient than predicted. The wattage and light output was approximately the same for the two types of bulb as expected. This experiment demonstrates that there could be significant energy savings if people used fluorescent rather than incandescent light bulbs in their homes and businesses.

Summary Statement
In this experiment, I am testing how much more efficient the fluorescent light bulb is than the incandescent light bulb.

Help Received
My dad helped me record the results.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Joseph L. Pagano

Project Number
J1826

Project Title
Swing Batter Batter!

Abstract

Objectives/Goals
The purpose of this project was to determine which of the four baseball bats hit a baseball the farthest. The four baseball bats were made of different materials that included: wood, aluminum, alloy and graphite.

Methods/Materials
The experiment involved measuring the distance the ball traveled altogether. This was done by using a spring loaded batting device, a batting tee and a baseball. The bats retracted 180 degrees and released to strike the baseball. I recorded measured distances in a journal. I compared distances that the ball traveled when hit by the different types of bats. The in-flight travel of the baseball was not very different among the four bats. The aluminum alloy bat hit the baseball the farthest because of the reflex effect that occurs when the aluminum alloy strikes the ball. This effect propels the baseball farther than other bats.

Results
After conducting the experiment I realized the graphite bat generated the same bat speed from the batting device as the other bats. Because of this controlled speed, the graphite bat did not hit the farthest. I believe that a graphite bat would perform better with a real batter because he/she would be able to benefit from the lightweight feature that the graphite bat offers allowing the batter to swing faster and as a result hit the ball farther.

Conclusions/Discussion
Based on my research I predicted that the graphite bat would hit the baseball farthest because of the special type of metal that it is made from. Graphite metal is lightweight and is used in different types of sporting equipment such as golf clubs, tennis racquets and baseball bats.

Summary Statement
Using baseball bats made of four different materials, which bat will hit the baseball the farthest.

Help Received
Father and a friend helped design and build the batting device. Mother helped with the display board. Interviewed a pitching coach for the Detroit Tigers, Chuck Hernandez.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Alaina R. Petlewski

Project Number
J1827

Project Title
"And the Reading Is...." The Effects of Antacids on Lemonade and Orange Juice

Abstract

Objectives/Goals
My project was to determine which antacid, of six tested, would reduce the acidity of lemonade and orange juice the most. I believed that Tums would be the most effective.

Methods/Materials
Initial pH readings of six beakers of 250 ml of room temperature lemonade were taken with a pH meter. The minimum recommended dose of six different antacids, in tablet form, were crushed and added to the beakers. The pH of the juice/antacid solution was measured at timed intervals up to one hour. An additional dose, if allowed and needed, was added at 30 minutes. The process was repeated with orange juice.

Results
In both the lemonade and the orange juice, Alka Seltzer Gold worked the most quickly to reduce the acid, but stabilized at a lower pH. The Mylanta Ultra worked a little more slowly, but continued to reduce the acidity the most over the hour period and came closer to reaching neutral than the other antacids. Tums came in second over the hour period.

Conclusions/Discussion
My conclusion is that Alka-Seltzer Gold works the most quickly to reduce the acidity of lemonade and orange juice, but Mylanta Ultra reduces the acidity the most over the hour long period. My hypothesis was disproved as Tums was the second most effective antacid over the hour long period.

Summary Statement
My project determined which, of six antacids tested, would reduce the acidity of lemonade and orange juice the most over an hour long period.

Help Received
Mom helped with testing, typing Procedure and Bibliography, dictation. Teacher- format questions.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Kayleen D. Ports

Project Number
J1828

Project Title
Help! My Data's All Wet

Abstract

Objectives/Goals
To find out out how different liquids affect the functionality of a flash drive.

Methods/Materials
Six different flash drives, Diet Coke, Tide Laundry detergent, water, plastic cups. Soaked flash drives in different liquids to see at various intervals how they would function.

Results
All flash drives worked after soaking for five minutes, one hour and for ten hours.

Conclusions/Discussion
By Testing, I found out that flash drives can withstand soaking in Diet Coke, water and laundry detergent for a long period of time.

Summary Statement
How do different liquids affect the functionality of a flash drive.

Help Received
None

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Zachary C. Radovich

Project Number
J1829

Project Title
Germs

Abstract

Objectives/Goals
The objective of this experiment was to find which household cleaning products were most effective in killing germs. Vinegar will be the most effective household cleaning product in killing germs. Water will be the least effective.

Methods/Materials
Raw hamburger was rubbed on nutrient agar in ten labeled petri dishes. 10 labeled disks were soaked in each cleaning product and water, which was the constant. One of each disk was placed at equal intervals in each petri dish. Petri dishes were incubated for several days in a dark, warm closet. The zone of inhibition was measured and recorded. The values were added together to determine the average zone of inhibition for each product.

Results
Clorox Clean Up was the most effective household cleaning product in killing germ, with an average zone of inhibition of 13.5mm. Water was the least effective, with an average zone of inhibition of 0.7 mm.

Conclusions/Discussion
The results from this experiment did not support my hypothesis. The household cleaning products used were not as effective at killing germs as the had claimed.

Summary Statement
To determine which household cleaners are the most effective in killing germs.

Help Received
Mrs. Parker supplied the nutrient agar. Bridget helped me keep organized and helped with the typing. My mom for picking me up late after school when I stayed late to work on my project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Lior I. Schenk

Project Number
J1830

Project Title
Teeth Whitening with Natural Products

Abstract

Objectives/Goals
The purpose was to determine what foods can be used to effectively whiten teeth. What foods can be used to effectively whiten teeth. It is hypothesized that certain foods can be effective, or even superior, in teeth whitening.

Methods/Materials
Groups of eggs (representing teeth) were put into jars filed with stainers (tea, coffee, Coca-Cola, red wine, and a mix of the four). After ten days of being soaked, the eggs were taken out of the jars to dry. The variable would be sliced or crushed to get the juices flowing, and then it would be rubbed on a spot on the egg continuously for sixty seconds. (The variables were Lime, Apple, Orange, Strawberry, Carrot, Cauliflower, Celery, Jicama, Pear, Whitening Strips, 3% Peroxide, Baking Soda, and Whitening Toothpaste.)
The colors and whiteness of the new spot were recorded and compared.

Results
From least to greatest effect, the resulting order of variables was: carrot, cauliflower, whitening strips, orange, celery, jicama, pear, baking soda, peroxide, apple, whitening toothpaste, strawberry, peroxide + baking soda, peroxide + lime, and finally, lime. All in all, lime, pear, apple, and strawberry would be the best foods to eat as substitutes for actual bleaching; they are just as effective, and in some cases, even better. When the testing was repeated, the resulting order of variables was: baking soda, carrot, cauliflower, whitening strip, orange, celery, jicama, pear, peroxide, apple, whitening toothpaste, strawberry, baking soda + peroxide, peroxide + lime, and lime.

Conclusions/Discussion
What foods can be used to effectively whiten teeth? All of the variables managed to whiten teeth by some degree, except for cauliflower and orange, which were worse than the control. The best foods were lime, followed by pear, apple, and strawberry. My hypothesis was that certain foods can be effective, or even superior, in teeth whitening. I was correct in stating that certain foods will be superior; however, not all of the variables were better than the leading products such as whitening toothpaste and whitening strips. All in all, lime, pear, apple, and strawberry would be the best foods to eat as substitutes for actual bleaching. They are just as good, and in some cases, even more effective.

Summary Statement
Instead of using risky commercial teeth whiteners, people can use natural products for a whole cleaner feel.

Help Received
Mother helped buy supplies and research; Dr. C (orthodontist) helped get tooth chart.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Katelyn R. Serrano, II

Project Number
J1831

Project Title
The Hidden Strength of Paper Towels

Abstract

Objectives/Goals
My objetive for doing this project is to find out which paper towel brand has the strongest paper towels.

Methods/Materials
To test a paper towel brand, I place a paper towel over two layers of bricks (there were four bricks in each layer)and then I place a third layer of bricks over the sheet to weigh down the paper towel. Then I poured a 10 milliliter baby medicine spoon full of water into the center of the paper towel using a contraption made of tinker toys. Twenty seconds after the water is poured half ounce fishing weights would be rolled down a ramp into the paper towel every five seconds until the sheet breaks. The weight that breaks the sheet is not included in the number of weights it held. Twenty-nine paper towel brands were tested three times each.

Results
The strongest paper towel was Bounty with Brawny coming in second. Third strongest was CVS Big Quilts and fourth was Thirsty. The two least strongest, which held zero weights in all three tests, were Earthfirst and Mardi Gras.

Conclusions/Discussion
My hypothesis was partially true. The more expensive paper towels, Brawny and Bounty, did test stronger overall. Although, the third strongest, CVS Big Quilts, wasn't very expensive and tested qite strong. However it has less sheets. CVS Big Quilts has 60 sheets, while Brawny and bounty have 80. In conclusion, I think the consumer needs to not only look at the price of the paper towels, but also at the information on the packaging.

Summary Statement
My project's main purpose was to examine the many aspects the consumer should look at when buying a paper towel.

Help Received
Dad helped in building the contraption made out of tinker toys; Mom helped in finding ways to control the variables of my project; My sisters contributed ideas; My aunt Sherry came up with the idea of using the bricks.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Shalin N. Shah

Project Number
J1832

Project Title
Regular - Super - Supreme

Abstract

Objectives/Goals
My goal was to find out: Does higher octane rating of unleaded gasoline provide better milage for a car, and is it worth spending more money on it if you're seking better milage?

Methods/Materials
The materials needed for my project were fuel from two different gas stations, two cars (suv, sedan); paper, pencil and a calculator. Fill up the tank of the 1st car at gas station A with 87 octane gasoline and record odometer reading as the begining odometer. next time fill up the tank and record odometer reading as ending odometer. Find the difference between the begining and ending odometer and record it as the miles. Also, record how many gallons you fill up, the price per gallon and the total price you pay. Next, divide the miles by the gallons filled to get the mileage and record it as the average miles per gallon. Follow these steps two more times using the same octane rating to conform the data. Repeat the same steps for 89 and 91 octane rating at the same gas station. Then, repeat all of the previous steps at gas station B with the same car. Follow the entire procedure again, but this time using the second car, remebering to do all three octanes three times at both gas stations.

Results
For the SUV at gas station A, I got the average of 13.8 miles per gallon on 87 octane, 13.9 miles per gallon on 89 octane, and 13.9 miles per gallon on 91 octane. At gas station B, I got the average of 14.8 miles per gallon on 87 octane, 14.4 miles per gallon on 89 octane, and 14.8 miles per gallon on 91 octane. For the sedan at gas station A, I got the average of 22.1 miles per gallon on 87 octane, 22.1 miles per gallon on 89 octane, and 22.2 miles per gallon on 91 octane. At gas station B, I got the average of 24.1 miles per gallon on 87 octane, 24.2 miles per gallon on 89 octane, and 24.2 miles per gallon on 91 octane.

Conclusions/Discussion
The first part of my hypothesis was incorrect. Using a higher octane of unleaded gasoline will not provide better milage for a car, and that's because it refers to how much energy it takes to ignite the gas, rather than how much energy the gas puts out. In other words, the octane rating determines the resist to engine knock. Also, because the higher octane does not provide better milage, it wouldn't be worth it if you are seeking better milage. An essential fact I learned from doing this project was that it matters more of where you get your gasoline rather than what octane used.

Summary Statement
My project is mainly about finding if the higher octane of unleaded gasoline gives better mileage to a car.

Help Received
Parents drove car, & took me along to the gas station needed & used octane needed next for the project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Sona N. Shah

Project Number
J1833

Project Title
Sun Specs

Abstract

Objectives/Goals
My goal was to find out whether the tint or shade of sunglasses determines the amount of protection it provides against UV light, and whether it is worth paying higher prices for brand name sunglasses.

Methods/Materials
The materials I needed were twelve brand name sunglasses, nine generic sunglasses, and a UV meter/monitor. First, label the generic sunglasses using the letters A-I. Then, take the equipment outside on a sunny day, and hold the first pair of sunglasses up to the sun. Place the UV monitor in front of it, and then behind it to retreive the UV indexes, and record the readings. Repeat the same steps with both the brand name and generic sunglasses. Confirm the results by repeating the procedure five times on five different days, all at 4:00pm.

Results
For my results, all the brand name sunglasses had a hundred precent protection against ultraviolet light. The generic sunglasses, however, had varied results, one of them having no protection. Also, sunglasses with the same tint didn't have similar protection.

Conclusions/Discussion
In conclusion, the first half of my hypothesis was incorrect. The shade or tint of sunglasses doesn't affect the amount of protection it provides against UV light. Since it doesn't make a difference, the tint is there for personal preference, for different activities, and cosmetic purposes. However, the second part of my hypothesis was correct. It is worth paying more money for brand name sunglasses because they offer better protection against UV light. They contain both UV-A and UV-B protection, which is necessary for your eye. If your eye isn't protected from UV-B light, it can gradulally lead to a variety of eye diseases including arc eye, cataracts, vision loss, and blindness. Sunglasses reduce the risk of these eye diseases, which is why it is vital to purchase better quality sunglasses that fulfill the requirements of protecting your eyes.

Summary Statement
My project is about sunglasses, both brand name and generic, protecting the eye against ultraviolet light.

Help Received
Mom's help in buying materials, taking pictures, cutting science board in half to form board.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Sanjay Siddhanti

Project Number
J1834

Project Title
Brand Name or Generic? Which Antacids Are Better at Neutralizing Acid?

Abstract

Objectives/Goals
The objective of the experiment is to find which antacid, Maalox, generic Maalox, Mylanta, or generic Mylanta works better at neutralizing acid.

Methods/Materials
Materials: The materials included 50 ml and 15 ml tubes, disposable pipettes and droppers, vinegar, antacids (Mylanta and generic Mylanta, Maalox and generic Maalox), pH paper and acid base indicator (red cabbage extract).
Experimental variable: Vinegar and different antacids
Dependent variable: Amount of brand name or generic antacids required to neutralize vinegar.
Methods: 1) Dispense 5 ml of vinegar in separate tubes.
2) Measure the pH of the vinegar using the pH paper strip and the indicator solution.
3) Add one ml of indicator solution to each of the tubes containing vinegar.
4) Add the liquid antacid drop wise to the tube containing vinegar plus indicator solution and observe the change in color of the pH indicator and pH paper.
5) Measure the amount of antacid required to neutralize vinegar.
6) Repeat steps 4 and 5 using the different antacid solutions.

Results
1) A greater volume of the generic antacid was required to neutralize vinegar than the respective brand name antacid.
2) Approximately 8 ml of Maalox, 25 ml of generic Maalox, 5 ml of Mylanta and 20 ml of generic Mylanta was required to change the pH of 5 ml of vinegar to 7.0.
3) All antacids changed the pH of vinegar to 7.0 as measured by the pH strip.
4) The pH change was also observed with color indicator solution. The color changed from pink to blue when vinegar was neutralized with an antacid solution.

Conclusions/Discussion
In this experiment I observed that brand or generic version of antacid were not equal in their ability to neutralize vinegar. A greater volume of the generic antacids was required to neutralize the same amount of vinegar than their respective brand name antacids. This was an experiment done in test tubes; however, I believe that the results could be applicable when people take antacids for relief of heartburn. I also recommend that people should read the label when choosing to use brand or generic antacid.

Summary Statement
My project was designed to evaluate which antacid, Maalox, generic Maalox, Mylanta, or generic Mylanta works better at neutralizing acid.

Help Received
I would like to thank my family for their support.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Sienna M. Silberkleit

Project Number
J1835

Project Title
Should Whitening Toothpastes Be Given the Brush Off?

Abstract

Objectives/Goals
The obejective is to determine if whitening toothpastes are effective and if so, are they equally effective on stains of coffee, tea, and grape juice? My hypothesis is that whitening toothpastes are effective, but not all equally effective on stains.

Methods/Materials
Ceramic tiles were stained in 64 oz. solutions. One group was stained with coffee, one with grape juice, and one with tea. Five whitening toothpastes were tested:Mentadent Advance Whitening, Simply White, Crest Whitening Expressions Cinnamon, Aquafresh Extreme Clean, and Arm and Hammer Advance White. Each toothpaste was tested with a new toothbrush, applying 1/4t. of toothpaste to the brush, and then brushing the tile for 60 seconds, then rinsing and drying. The brushed tiles were then taken to Home Depot for a pigment match. Home Depot's reading told how many ounces or fractions of ounces of pigment would be required to match the brushed tile. The pigment ounces and fractions were added, then converted to decimal form, and then compared to the control sample in each category to determine the percentage of change in pigment.

Results
The whitening toothpastes were effective in reducing pigment. Colgate Simply White reduced tea staining by an average of 64%. Arm and Hammer Advance White and Crest Whitening Expressions reduced coffee stains by 67%, and Mentadent lifted the pigment base to white from a secondary shade on grape juice stains. Colgate Simply White reduced grape juice stain by 71%.

Conclusions/Discussion
My hypothesis was correct. Whitening toothpastes are effective though the user should consider the nature of the staining as not all whitening toothpastes were equally effective on removal of different stains.

Summary Statement
Whitening toothpastes work, but may not all be equally effective on coffee, tea, and grape juice stains.

Help Received
My mother helped type the report and Home Depot helped in the paint center with pigment readings.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Laurel M. Silberman

Project Number
J1836

Project Title
Chlorine vs. Saline Water Systems: Pool Water Quality

Abstract

Objectives/Goals
The purpose of this project is to determine whether new saline pool systems are as effective at eliminating microorganisms as the conventional chlorine systems. I hypothesized that more bacteria would be found in the water treated with salt-chlorination than in the water treated with conventional chlorination because of the difference in the water's chlorine levels.

Methods/Materials
I collected samples from ten different pools, six of which used conventional chlorine and four that used salt-chlorination. Samples were collected in empty purified water bottles and placed in a refrigerator. After intervals of one and two days, I tested the samples for bacteria. I sterilized the work area and materials with alcohol. I labeled twenty Petri dishes in order to test two water samples from each pool. I pipetted approximately three milliliters of the water from each pool into Coliscan Easygel, inverted the mixture once, swirled it around, and then poured it into a Petri dish. The plates were sealed and incubated. I then observed the plates after 24 hours, 48 hours, and finally at 72 hours. I tested each water sample for pH, free available chlorine, total chlorine, total alkalinity, and total hardness stabilizer.

Results
After a 72-hour incubation period, all samples still, to my astonishment, had no visible colonies! In addition, the free chlorine levels were all at or above the recommended one to three parts per million.

Conclusions/Discussion
The results of this experiment indicate that both conventional chlorine and salt-chlorination are effective in eliminating bacteria, with no significant difference in efficacy.

Summary Statement
I tested for the difference in microorganisms in pool water treated with conventional chlorine versus saline pool systems and found no difference in bacteria level.

Help Received
Step-mom drove me to different houses and took pictures of me while I was testing; Science teacher helped me to acquire the Coliscan Easygel media and supervised me in her science lab; Mom and friend asisted with cutting out things for my board; Dad found an article that was relevant to my project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Andrew R. Silveira

Project Number
J1837

Project Title
Here Comes the Sun

Abstract

Objectives/Goals
My objective was to get an understanding of which sunscreens are most effective against ultraviolet radiation.

Methods/Materials
I used a UV detector to detect how many UV rays. First, i applied the suscreen on the detector to see how many rays the sunscreen blocked. After I tested all the sunscreens without water submersion, I then tested all the sunscreens with water submersion to see how many rays they bocked after being in cotact with water.

Results
I found that most of the sunscrees blocked about thesame amount of UVA rays, while after water submersion all the sunscreens were less effective. After the water submersion I found that the sunsreens blocked ten less than without water submersion.

Conclusions/Discussion
I concluded most of the sunscreens were effective in blocking UVA rays. But, because most sunscreens blocked less with water submersion, I concluded that most sunscreens are not waterproof.

Summary Statement
Which sunscreens block the most ultraviolet ?

Help Received
My dad helped me reord some of the data in my logbook.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Reba M. Smith

Project Number
J1838

Project Title
Hot or Not

Abstract

Objectives/Goals
My objective was to find out if chewing mint-flavored gum, cinnamon-flavored gum and simply chewing with nothing in your mouth would effect the temperature of your mouth.

Methods/Materials
Materials: 1. Big Red gum 2. Winter Fresh gum 3. Five volunteers 4. An oral termometer 5. Disposable thermometer covers. Methods: I had my volunteers not talk eat or drink for 30 minutes. Then I had them chew cinnamon gum for 5 minutes. Next I took their temperatures, asked how their mouth felt while chewing and repeated these steps with the mint gum and no gum at all.

Results
I discovered that the temperature of the subjects that chewed the cinnamon gum raised a total of 1.2 degrees. The subjects who chewed the mint-flavored gum raised a total of 9.4 degrees. The subjects who just simply chewed raised a total of 3.2 degrees. So I learned that the mint gum raised the temperature more than simply chewing and the lowest temperature change was with the cinnamon gum.

Conclusions/Discussion
My hypothisis was somewhat correct I thought the mint would raise the temperature the most which it did. But suprisingly chewing nothing raised the temperature of my volunteers more than the cinnamon (I thought the oppisite). Im my conclusion I stated that I believe the physical movement of a persons mouth while chewing is what causes the temperature to raise rather than the gum in their mouth. So if I had them all chew at the same rate I think my results/conclusion would be different.

Summary Statement
My project is about finding if chewing different types of gum and simply chewing nothing will affect the temperature of a persons mouth.

Help Received
My mother helped with croping and taking pictures. Mrs. Pealattere (science teacher) helped me decide what to look for in background research.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Nicole L. Sorace

Project Number
J1839

Project Title
S.O.S. Save Our Skin: Will Sunscreens with Higher SPF Ratings Provide More Protection from Solar Radiation?

Abstract

Objectives/Goals
My objective was to determine if sunscreens with different SPF ratings actually provide varying protection from solar radiation. I believe that sunscreens with higher SPF ratings will provide more protection from solar radiation.

Methods/Materials
Four different SPF rated sunscreens of the same brand, baby oil, clear sheet protectors, and photographic paper were the primary materials. I spread an equal amount of different rated sunscreens on equally divided sections of a clear sheet protector. I also provided a control section and one section with baby oil. I slid a piece of photographic paper inside, and placed it in direct sunlight for a specific time period. I conducted 3 different tests for each of 3 different time periods.

Results
The sunscreen that was rated SPF 45 gave better protection than the lower rated SPF sunscreens and the baby oil. I discovered these results after developing the photographic paper and scanning each sheet into a computer. Using Adobe Photoshop I tested the luminosity of each section, recorded and compared the readings.

Conclusions/Discussion
Sunscreens with higher SPF ratings did provide more protection from solar radiation than sunscreens with lower SPF ratings.

Summary Statement
This project was to determine if there was varying protection from solar radiation between different SPF rated sunscreens.

Help Received
My parents helped me to gather materials. My Dad showed me how to scan the photo sheets into his computer and how to use the Adobe Photoshop program to get luminosity readings from each of the different sections of the photo sheets.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Gianna G. Spinosa

Project Number
J1840

Project Title
Crazy Candles!

Abstract

Objectives/Goals
The objective of my project was to determine which type of candle out of beeswax, paraffin, and soy would burn for the longest amount of time and produce the most light.

Methods/Materials
I lit each candle, 2 beeswax, 2 paraffin, and 2 soy, one at a time, placed it in a plastic experiment tube, and started the timer. I then took light measurements with a light meter at 2, 5, and 30 minute intervals. Burn time and brightness were recorded.

Results
The soy candles burned for the longest amount of time, followed by paraffin and then beeswax. The beeswax candles burned the brightest, followed by paraffin and then soy.

Conclusions/Discussion
I originally thought that the paraffin candles would burn the brightest, and the soy candles would burn for the longest amount of time. However, this was incorrect. I learned that the candles that burned the brightest (beeswax) also burned the fastest, and the candles that burned the longest (soy) were also the least bright. Therefore, either of these candles would be good to have in an emergency.

Summary Statement
My project tested beeswax, paraffin, and soy candles to determine which one would burn for the longest amount of time and produce the most light.

Help Received
My dad helped me light the candles, and my mom helped me arrange the backboard.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Ashley Su

Project Number
J1841

Project Title
Ashley's Secret Formula

Abstract

Objectives/Goals
My mom sprays herself with a little of perfume everyday and she smells great. I am wondering why perfume smells so soothing and which ingredient in the perfume causes it to smell differently? Can I make a new kind of perfume with a variety of scents and perhaps could change different moods (happy, thirsty, relaxation, concentration, or others) for preteens like me?

Methods/Materials
The procedures of this experiment are to analyze the ingredients of each kind of perfume oil, mix different types of fragrance oil or add new ingredients together with different alcohol density to create a new mixture that would smell differently. The results are then recorded and analyzed.

Results
The three scents that I think that will benefit to a teen are for concentration, refreshment, and relaxation. After analyzing essential oils and other ingredients in details, I chose 10 different educational guesses of mixtures for each targeted scent that I want. The total mixtures that I tried in this project are 30. My secret formulas are:

Formula # 1 (1.59% of Lavender, 3.17% of Bergamot, 86.7% of Alcohol, and 8.6% of Water), with a smell of floral, sweet, pure and feminine scent that makes me happy, is great for relaxation.

Formula # 15 (10.53% of Lavender, 5.26% of Bergamot, 5.26% of Ylang Ylang, 26.32% of Lemon Soda, 47.89% of Alcohol, and 4.74% of Water) cleanses and refreshes whole body, plus a hint of lemon that makes me feel like I am going to have a wonderful day.

Formula # 10 (5.88% of Lavender, 5.88% of Lemon, 29.41% of Lemon Soda, 53.53% of Alcohol, and 5.29% of Water) helps me to concentrate with a whiff of lemon, mint, pine trees, and flowers.

Conclusions/Discussion
My hypothesis was that the scent in perfume can be altered and a new scent can be created. The experimental results support my hypothesis by producing different kinds of perfumes with new scents made by mixing or changing ingredients in perfume. The experiment also suggests that different people might have various results with each mixture due to differences of body chemistry.

Summary Statement
To make new kind of perfumes with a variety of scents that perhaps could change different moods (happy, thirsty, relaxation, concentration, or others) for preteens like me.

Help Received
My mom helped me get all materials needed in this project; my dad assisted me brainstorm the ideas and let me use his computer and printer to illustrate the results.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Nishant Surapaneni

Project Number
J1842

Project Title
Friction Frenzy

Abstract

Objectives/Goals
The objectives of my project were to test which type of synthetic oil best preformed the job of reducing temperature or friction on the pistons of a cars engine, which in my project is represented by gear pairs.

Methods/Materials
My method was to build a set of 10 gears, 2 for each of the five oils and run the m for 10 minuites withg oil ande see which one reduced the temperature the most from the benchmark of 157 degrees.My materials were:10 gears, a steel box, 5 oils, a 1500 rpm engine, tools, plexiglass, and 2 5/16th's rods.

Results
My results stated that the american made Lucas oil best reduced oil to around 27 degrees lower and it preformed the best in all the tests of further testing and popular demand.

Conclusions/Discussion
My conclusion is that Lucas Oil preformed the best, and it was rated number 1 in my science fair experiment

Summary Statement
My project is about the best type of synthetic oil in regards to temperature reduction.

Help Received
Father helped build rig, Mother and older sister helped in board and pitcures

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Dominic J. Thomas

Project Number
J1843

Project Title
Nail That Wood

Abstract

Objectives/Goals
I chose the science project that I did because I have always been interested in building with wood and using it. I figured that if I started doing tests on wood that I might find a lot of interesting facts about how wood works and how it could help me when I build with different types of wood. I also chose this project because I like using hammers and hitting things with a hammer such as nails.

Methods/Materials
Methods: The first procedure that I had to do was build a uniform hammering device, which allowed me to produce standerdized measurement samples. Then I started the testings of my four samples of four different types of wood. The tests included pounding seven nails, one at a time, into each of the four samples of each wood type. I measured the results of each test in millimeters by first marking a nail in a pilot hole and then hammering it three times and putting another mark to measure where the nail was after the pounding. In oder for me to measure the nails I had to pull them out and measure them from the bottom of each mark.

Materials: White Pine from Frost Hardwood Lumber; Red Oak from Frost Hardwood Lumber; Birch Plywood from Frost Hardwood Lumber; Sugar Maple from Frost Hardwood Lumber; 0.9 kilogram drilling hammer from Home Depot; 2 pieces of scrap wood from Home Depot; 1 miter box from Home Depot; A box of 1# nails from Dixieline; Ryobi power drill.

Results
My data shows that softwoods are easier to nail into than hardwoods. White Pine and Birch Plywood, softwoods, had a nail depth average less than Sugar Maple and Red Oak, hardwoods. My data also shows that hardwoods are more likely to break because one of the Red Oak samples split during testing.

Conclusions/Discussion
According to my test results I know that the Birch Plywood was the easiest wood to hammer into because it was the softest wood out of the four different types. The plywood was the wood with the deepest nail depth average because it was the least dense wood that was tested by me. Even though I thought that Birch Plywood would be the hardest to hammer through, I was wrong. Red Oak was the hardest wood to nail into because it was the densest type of wood that I tested. Because the Red Oak was so dense it would need to take more than three hits with a 0.9 kilogram drilling hammer. This is why the average nail depth was only 4.8 millimeters. These are the main reasons why I know my results are true.

Summary Statement
Do different woods work differently with a certain type of nail?

Help Received
Dad helped with getting wood and the device for hammering

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)

Bradley L. Tradonsky

Project Number

J1844

Project Title

Does Specific Protein Content and Quality in Hot Dogs Affect Price? Analysis of Nine Types

Abstract

Objectives/Goals

This study was designed to evaluate what types of proteins make up the protein content in different hotdogs, and to see if variations in protein content and quality affect price.

Methods/Materials

Hotdogs were sliced, processed in an automated tissue processor, cut into thin sections on a microtome, placed on glass slides, stained and examined under a microscope. All protein seen was marked on the slides by covering the protein with dots using Sharpie pens. Each protein type was dotted with a different color pen. The total number of dots on each slide was counted to evaluate total protein content. Then each of the different colored dots, representing each of the different types of protein, was tallied individually. The percentage of each protein type was calculated. The price per unit weight of each type of hotdog studied was obtained from a major supermarket chain. Results were graphed and compared.

Results

The types and quality of proteins present varied in each of the nine types of hotdogs as did the percentage of each protein component. Six different types of protein were identified : skeletal muscle (pure beef), collagen, blood vessels, bone, cartilage and nerve. Skeletal muscle, collagen and blood vessel were found in all nine hotdogs tested, bone and nerve in seven and cartilage in three. The price of the hotdogs varied from 21.8 to 39.9 cents per 30 grams. Price was not directly related to the types, quality or amounts of protein present.

Conclusions/Discussion

There are two major aspects of protein quality - nutritional, which is objective, based on the amino-acid sequences present, and "eating quality" which is subjective, involving factors such as taste and texture as perceived by the consumer. Skeletal muscle is the highest quality of all six proteins in this study, objectively and subjectively. Bone and cartilage which are not well absorbed are the poorest. Since monetary value of a protein is determined by it's quality hotdogs with the most skeletal muscle and the least bone and cartilage are expected to be more expensive than those with less muscle and more bone and cartilage. The results of this study show that the different proteins used in different hotdogs do not directly determine price. Factors such as marketing and brand recognition appear to play an additional role.

Summary Statement

Nine different types of beef franks were examined microscopically to evaluate their protein content and to determine wether variations in protein quality affect sales price.

Help Received

Hotdogs were processed for microscopic evaluation in the anatomic/surgical pathology department of Grossmont Hospital,La Mesa, CA, under the supervision of Dr. Sharon Mair.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Cambria L. Ullrich

Project Number
J1845

Project Title
The Better Ball: A Comparison between the Titleist ProV1 and Titleist DT So-Lo Golf Balls

Abstract

Objectives/Goals
My project was to see if the repetitive impact of a 10 degree Titanium Driver would knock the Titleist DT So-Lo golf ball out of balance more quickly than the Titleist Pro V1 golf ball. My hypothesis is that I believe that the Titleist DT So-Lo golf ball will go out of balance more quickly than the Titleist Pro V1 golf ball.

Methods/Materials
I took ten Titleist Pro V1 and Titleist DT So-Lo golf balls. I then numbered the balls 1-10. Then I weighed and measured each ball and rolled them each ten times down a ramp onto an artificial putting green. I then hit ball number one 10 times, I hit ball number two 20 times and each successive ball 10 more times than the preceding ball until I hit ball number ten 100 times. I then reweighed and remeasured each ball to see if there was a change in mass or diameter. I then rolled each ball ten times down a ramp onto an artificial putting green onto a chalk line to see if they would roll straight.

Results
I found that after the repetitive striking of the golf balls, the Titleist Pro V1 golf balls stayed in balance longer than the Titleist DT So-Lo golf balls.

Conclusions/Discussion
I discovered that the Titleist Pro V1 golf balls would stay in balance longer than the Titleist DT So-Lo golf balls. This proves that my hypothesis was correct, and that price makes a difference in the performance of the golf balls. Titleist makes the Pro V1 balls $44.00 while the DT So-Lo balls are only $29.00, this states that it may be more useful to spend a little bit more on the golf ball you use because you might get a better result.

Summary Statement
I tested two popular Titlest golf balls to see if the repetitive impact of a 10 degree titanium driver would knock either ball out of balance.

Help Received
Dad helped with the golf ball hitting machine and the greens.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Luke D. Van Houten

Project Number
J1846

Project Title
Effectiveness of Moisturizers and Sunblocks in Filtering UVA Rays

Abstract

Objectives/Goals
It is widely agreed that sunblocks do a relatively effective job of blocking UVB rays which are ultraviolet rays that cause sunburn as well as skin damage, and potentially, skin cancer. UVA rays also contribute to the development of skin cancer and play a larger role than UVB rays in the creation of wrinkles and premature aging. The FDA has no accepted test for measuring UVA protection. The SPF (sun protection factor) does not correlate to UVA ray exposure. As a result, there may be a wide variance in the effectiveness of sunblocks and moisturizers in protection against UVA rays. The goal of my experiment was to determine the range of effectiveness in filtering UVA rays for various moisturizers and sunblocks. My hypothesis was that there would be significant differences in the range of UVA protection provided by moisturizers and sunblocks with the same SPF ratings.

Methods/Materials
I constructed a device from a box for the purpose of viewing results. I used UVA detecting beads whose "colors" become visible to the human eye when exposed to UVA light, especially at about 365 nm. I coated one side of a sheet of acrylic plastic evenly with 15ml of the moisturizer/sunblock substance that was being tested. I placed the acrylic with sunblock on the top of the box and took it outside. I started the minute timer, and then recorded results. I preformed six repetitions of the entire experiment for all test moisturizers/ sunblock. I assigned ranking numbers 1-10 to the bead colors, since I noted the beads required different amounts of UVA exposure to "change" color.

Results
The most protective moisturizer I tested, "Anthelios", was even more effective in filtering UVA rays than the SPF 15 sunblock. Olay SPF 15 moisturizer was not as effective, but appeared to also be a good UVA filter. L'Oreal and Purpose however, were far less protective than the other products.

Conclusions/Discussion
The amount of UVA protection offered by products with the same SPF rating varied widely. The public assumes since the SPF ratings are the same, the total sun protection offered will be the same in these products. Unfortunately, the amount of protection provided is not equal.

Summary Statement
This Project investigated whether products with the same SPF (UVB) rating were also equally UVA protective and found UVA protection varied widely.

Help Received
Thanks to my parents who helped me purchase supplies and my science teacher who helped edit my report.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Laura M. Van Voorhis

Project Number
J1847

Project Title
Proof of Waterproof: Quantifying UVA Penetration of Water-Exposed Sunscreen

Abstract

Objectives/Goals
I have noticed that after I go swimming I sometimes get sunburned. I wear sunscreen whenever I swim. I wondered if the types of sunscreens I wore made a difference in how my skin burned. I wanted to know if waterproof sunscreens would still be protective after being soaked in water for 30 minutes. I wondered how waterproof sunscreens would compare to ordinary sunscreens. My hypothesis was that after water exposure, waterproof sunscreens would be more effective in blocking UVA rays than ordinary sunscreens.

Methods/Materials
I obtained bead containers 3.2 centimeters in diameter. I spread 0.5 grams of sunscreen on each case. I tested Aveeno waterproof sunscreen SPF 30, Banana Boat waterproof sunscreen SPF 30, Neutrogena sunscreen SPF 30, Coppertone sunscreen SPF 30, and a container with no sunscreen (the control). I placed red UVA sensitive beads inside each container. I used three different bead containers for each sunscreen type. Each container stayed under a black light (which I switched on and off remotely), for time intervals of one minute, 3 minutes, and 5 minutes. I placed the bead containers in a plastic tub filled with water for 30 minutes. I removed the containers and placed them under the black light for each time interval: one minute, 3 minutes, and 5 minutes. I took images both before and after water exposure. I uploaded the pictures onto my computer. Using a formula I created based on RGB color values, I evaluated how red each bead was (how far away its color was from white). I repeated the entire experiment. I performed a total of 60 tests and assessed 240 bead values which I scored according to the formula I created using RGB color ratings.

Results
I found Aveeno waterproof sunscreen most effective in blocking UVA rays. Consistently, the beads remained nearly white. In contrast, the Banana Boat waterproof sunscreen produced the reddest (darkest) beads in nearly all the trials. Coppertone and Neutrogena sunscreens "chipped" while underwater, and UVA light was able to reach the beads.

Conclusions/Discussion
According to my results, "Aveeno" waterproof sunscreen was most effective in blocking UVA rays. Although the sunscreens were tested on an acrylic surface rather than skin, in this experiment, ordinary sunscreens were more protective than the other brand of waterproof sunscreen tested, "Banana Boat".

Summary Statement
My project compared the protectiveness of ordinary sunscreens to waterproof sunscreens through the use of UVA sensitive beads and a formula I created using RGB color value.

Help Received
Father took bead containers out from under UVA light source.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Patti R. Wassem

Project Number
J1848

Project Title
How Does the Brand of Popcorn Affect the Amount of Popcorn Popped?

Abstract

Objectives/Goals
My goal with my project was to find out which microwaveable popcorn brands produced the highest percentage of popped kernals.

Methods/Materials
I popped thirty varying brands and types(buttered and unbuttered) of microwaveable popcorn and then counted the number of popped kernals and unpopped kernals in each bag. I used a Sharp Carousel Microwave Oven on the Popcorn Setting for each bag. I used 5 Orville Redenbacher buttered and 5 unbuttered bags; 5 ACT II buttered and 5 unbuttered bags; and 5 Ralph's Brand buttered and 5 unbuttered bags.

Results
Overall, the buttered popcorn produced a higher percentage of popped kernals for most of the brands(except for Orville Redenbacher's where the average for the buttered(88.5%) and unbuttered(89.5%) was very close). The highest average of popped kernals among the buttered popcorn was the ACT II(95.2%) followed by Orville Redencbacher's(88.52%) and Ralphs(79.3%). The highest average of popped kernals for the unbuttered popcorn was the Orville Redenbacher's(89.5%) followed by Ralphs(75.5%) and ACT II(67.6%).

Conclusions/Discussion
The data I found shows that the buttered popcorn bags produced the higher percentage of popped kernals. I think that the oil from the butter produced heat, so more kernals popped with it. If I could continue this experiment, I would investigate how the butter affects how the popcorn pops.

Summary Statement
My project evaluates differing brands and types of microwaveable popcorn as to their popability(percentage of kernals popped).

Help Received
My Father took the photographs for my project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Christopher W. Weddington

Project Number
J1849

Project Title
Drip Emitter Performance

Abstract

Objectives/Goals
The objective is to determine if the 2004 field emitters used on our farm still perform well in water output and uniformity. New emitters from 2005 and 2006 were also tested. All three sets of emitters were compared against industry standards for water output in gallons per hour (gph) and uniformity (coefficient of variation, CV).

Methods/Materials
25 in-line emitters in 4 inch segments from each of 2004, 2005,and 2006 years were connected in series and attached to a water supply system. Individual emitter water output was collected in graduated cylinders for 4 minutes, at a pressure of 20 pounds per square inch. The gph and CV were calculated. Results were compared to industry standards.

Results
All emitters delivered water output less than the manufacturer published standard. Used 2004 emitters had the lowest gph. New 2006 emitters, and used 2004 emitters, were uniform. New 2005 emitters were not uniform. None of the emitters rated excellent according to the industry standard CV rating system.

Conclusions/Discussion
The used emitters had the lowest water output, but it is still acceptable and the farmer can irrigate longer to compensate. The used emitters had good uniformity and did not need to be replaced. Results showed there is too much variability in the new emitters, indicating a need for better quality control in the manufacturing process.

Summary Statement
Used and new drip emitter performance is evaluated and compared to industry standards.

Help Received
Used university lab equipment under supervision of parents. Mother reviewed mathematical calculations.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Ruth Wong

Project Number
J1850

Project Title
Comparison of Vegetables' Shelf Life in Different Kinds of Bags

Abstract

Objectives/Goals
The objective is to investigate which grocery storage bags have the best shelf life of vegetable in refrigerator.

Methods/Materials
A stalk of broccoli was cut into five crowns. Each crown was placed in the Ziploc Freezer bag, Glad Storage Double Lock Zipper Bag, brown paper bag and plastic produced bag. The control has no bag. Repeat the same thing with baby bok choy, except that each stalk was taken from the bundle and placed into each different storage bag. Weigh all the samples before storing them in the refrigerator crisper at 40F. Observed the samples and weigh each of the samples. Record my observations to see how the vegetables begin to change color or wilt over time. Repeat this experiment the second time.

Results
All the samples A and B of the broccoli and the baby bok choy in the brown paper bags and all the controls started to wilt on Day 3 in both set of experiments, but the samples in the grocery plastic bags started to wilt on Day 16. The broccoli in the Ziploc Freezer bags began to wilt on Day 24, and in Glad Storage bags on Day 22 in both sets of the experiments. The baby bok choy in the Ziploc Freezer Bags and the Glad Storage bags started to wilt on Day 17. Both broccoli and baby bok choy in Ziploc Freezer bag didn't lost much moisture because there wasn't much weight lost as compared to the other samples.

Conclusions/Discussion
Ziploc Freezer Bag is the most effective in extending the shelf life of broccoli and has the least moisture lost.

Summary Statement
Vegetable shelf life varied greatly in different kinds of storage bags, and Ziploc Freezer yields the best result at 40F.

Help Received
Mother guided in recording journal and buying the products used in the experiment.