CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Jack H. Beck

Project Number
J2101

Project Title
Blocking UV Rays: Investigating Sunguard Treated Fabric

Abstract

Objectives/Goals
Skin cancer is a problem in the state of California. Sunscreens don#t always get the job done because the UV rays can get through your clothing. I heard about a new product called Rit Sunguard, a laundry additive that adds an extra 25 UPF to an ordinary piece of clothing#s original 5 UPF (ultraviolet protection factor) by using a special UV blocking chemical. I decided I would test Rit Suguard to see if it is as effective as advertised. My hypothesis was that the product would be effective in blocking UV rays.

Methods/Materials
In my experiment I used a UV-C lamp (5 cm from plates) and placed testing plates loaded with bacteria in it and covered it with treated and untreated shirts and in each trial I had two plates open to direct exposure. The bacteria source was contaminated creek water added to coli scan easy gel. I then placed the plates and two positive controls in an incubator for several days. Then removed the plates and counted the colonies.

Results
The shirts were white, gray, red or navy and cotton or polyester. The results were inconclusive, but it appeared the Rit Sunguard enhanced the UV protection in many cases. The shirts all provided protection since the plates exposed to UVC light alone were sterile or showed little growth.

Conclusions/Discussion
Though the results were inconclusive, they still proved valuable. I learned that the Sunguard product may work to a certain extent, and that all the shirts seemed to provide protection. Difficulty in controlling how much fabric was stretched when placed over the Petri dish may have affected the results. I would recommend performing more tests to confirm the results.

Summary Statement
I tested RIt Sunguard on shirt fabric and used a UV-C lamp and bacteria to investigate whether RIt Sunguard was effective in blocking UV rays

Help Received
Thanks to my teacher who provided guidance, appropriate equipment for my tests and supervised safety. Thanks to my mother and father for support and transportation.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Bryce Bishop; Luke Bovenzi

Project Number
J2102

Project Title
Comparing Carbon Water Filters with Reverse Osmosis Filters

Abstract

Objectives/Goals
In this project we were trying to find the best water filter (out of the two most common ones: reverse osmosis and carbon). We believed that the reverse osmosis would be the ideal filter because it has a special system that filters everything including bad bacteria, sediment, and chemicals.

Methods/Materials
For our experiment we filled five cups with 200 ml of water and place 1 chemical testing strip in each cup. After, we took out the stick after 30 seconds and recorded the results. We then repeated this with the carbon and reverse osmosis filtered water.

Results
We were trying to determine which filter filters hardness, pH, and chlorine out of Monterey tap water. Our first graph shows the levels of pH. The average of tap water was pH. 7.8, reverse osmosis was pH 6.2, and carbon was pH. 7.2. Our second graph shows the levels of hardness of the water. The averages for the hardness were 790 milligrams of calcium for tap water, 150 milligrams for reverse osmosis, and 260 milligrams for carbon.Our data seemed to indicate that our hypothesis was incorrect. It shows that the carbon filter is the ideal filter for the human body. This is because the ideal pH is between 6.5 and 8.5 and the pH for carbon filter was 7.2. The ideal hardness levels are between 150 and 200 milligrams. This suggests that the carbon filter is the ideal filter.

Conclusions/Discussion
Our experiment is important because it can greatly influence what type of water people decide to drink. They can make good decisions on which filter to use. The water filter companies could also be influenced because this could help them improve their filters.

Summary Statement
We wanted to find the most suitable water filter for the human body.

Help Received
Our science teacher helped us in revising our documents.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Claire E. Buchanan; Kelly E. Evans

Project Number
J2103

Project Title
Spectrogram Analysis of Trumpet Quality and Level of Musician

Abstract

Objectives/Goals
To determine if a spectrogram can detect differences in trumpet quality (low quality vs. high quality) and the level of trumpet players (beginning vs. intermediate).

Methods/Materials
Informed consent was received from 8 beginning trumpet players and 8 intermediate trumpet players to participate in this study. We recorded each musician playing two different notes (C and G) for five seconds each on the low quality trumpet (a Jupiter 600 L). Then we recorded each musician playing two different notes (C and G) for five seconds each on the high quality trumpet (a Bach ML 360). Using the GoldWave# (v5.58) software, we created the 64 spectrograms (4 notes for 16 participants) and then carefully examined them. We identified the number of consistent harmonics for each note recorded and entered our data into Excel. Next, we performed t-tests (a statistical test) to determine if our results were statistically significant.

Results
The spectrogram analysis showed intermediate students produced a statistically significantly higher number of consistent harmonics than the beginning students for both notes and both trumpets. For the note G, we found intermediate trumpet players produced significantly more consistent harmonics on the high quality trumpet than the low quality trumpet, However, the beginning trumpet players produced significantly fewer consistent harmonics on the high quality trumpet than the low quality trumpet for note G.

Conclusions/Discussion
These results suggest spectrograms can be used to detect differences in trumpet quality and trumpet players. The results supported our first hypothesis in that intermediate trumpet players produced a statistically higher number of consistent harmonics than the beginning trumpet players on both notes and both qualities of trumpets. This suggests spectrograms could be used by musicians to improve their music skills and by adjudicators at music festivals. The results partially supported our second hypothesis because intermediate trumpet players produced a higher number of consistent harmonics on the high quality trumpet for the G note. Surprisingly, beginning trumpet players produced a lower number of consistent harmonics on the high quality trumpet. This finding suggests beginning trumpet players should not invest in a high quality trumpet, for they actually produce fewer consistent harmonics, which makes for a less rich tone, when using a high quality trumpet.

Summary Statement
This project used a spectrogram to examine differences in the number of consistent harmonics between two different level of trumpet players and two different trumpet qualities.

Help Received
A parent helped set up the t-test analyses.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Anthony T. Camiccia

Project Number
J2104

Project Title
Impact Absorption

Abstract

Objectives/Goals
My objective was to determine which packaging material absorbs the most impact. My hypothesis was that the packaging peanuts would do the best because they are soft, flexible and don't have many air pockets in them.

Methods/Materials
Using a 4" PVC pipe, I drilled a hole that marked the fist 12 inches and then continued to drill holes every 2 inches above the initial 12 inch mark, until reaching 48 inches. I placed an egg at the bottom of the pipe in a viewing tee and I put 8 inches of material above the egg. I then dropped a 2 pound weight in 2 inch intervals above the material until the egg broke. I did the experiment three times on each material and then averaged the scores. Materials used: 4" PVC pipe (5'long), PVC tee, 2 pound weight (bar bell) string, duct tape, nail, drill, eggs, packaging peanuts, bubble wrap, cotton balls, newspaper, ladder bungee cord, swimming noodle, Sharpie pen, plastic wrap, paper plate, journal and pencil.

Results
The results showed that the bubble wrap and packaging peanuts did the best, with both averaging a 23 inch drop before breaking the egg. The cotton balls did the poorest, breaking the egg with only 16 inches of drop and the newspaper averaged only slightly better at 17 inches.

Conclusions/Discussion
My results show that the packaging peanuts tied with the bubble wrap for being the best to absorb the impact. My hypothesis was close to accurate, but not completely supported, because the bubble wrap did just as well and was actually more consistent. My results enabled me to meet my objective to determine the best absorbing material.

Summary Statement
Determine which packaging material will absorb the most impact.

Help Received
Mother helped me correct mistakes and taught me how to make a graph. Father tied the string to the weight, helped me drill the holes in the pipe and put a nail in the hole so I would know where to drop the weight.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Sunny Chera; Aron J. Valencia

Project Number
J2105

Project Title
Which Gasoline for Your Machine?

Abstract

Objectives/Goals
We are conducting this experiment in order to find out which brand of gasoline, if any, will give a go-kart more running time. We are going to be testing the regular, unleaded, 87 octane samples of Shell, Chevron, and Arco brands of gasoline. We predict that the three brands will have close to the same running time because they all come from the same refineries.

Methods/Materials
In order to test our hypothesis, we used precisely one cup of each brand of gasoline, testing each brand three times, each in a different order, and waiting half an hour between each round of testing. In order to maintain the same speed, we propped the go-kart up onto a wooden beam and accelerated the engine at full-throttle, using a bungie cord. We recorded the time when tank was empty and the engine came to a hault. Between tests, we cleaned the fuel tank using a siphon pump and an absorbant cloth.

Results
Shell had the longest running time, with an average of 8 minutes and eleven seconds. Chevron came in second with an average running time of 7 minutes and 50 seconds. Arco had the shortest running time, averaging 6 minutes and 51 seconds.

Conclusions/Discussion
We reject our hypothesis because Shell ran an average of 1 minute and 20 seconds longer than Arco brand gasoline. This is a notable difference between the highest and lowest performing gasolines tested. This may be a result of the additives in more expensive brands of gasoline. If we were to apply this experiment to a gallon or several gallons of gasoline, the results would be even more significant. We conclude that spending a little more on gasoline is worth more driving time in your machine!

Summary Statement
We are conducting this experiment in order to find out which major brand of gasoline will give a go-kart more running time, if any.

Help Received
Father supervised go-kart experimentation. Our supervisor, Mrs. Lorch, guided us through the scientific method. Mother edited written materials.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Bassil A. Dakelbab

Project Number
J2106

Project Title
Seeing Through the Smoke

Abstract

Objectives/Goals
My objective was to set put and prove that smoking Hookah is worse for you than smoking cigarettes.

Methods/Materials
Ten empty juice bottles
Package of filtered and non-filtered cigarettes
4 foot pumps
Duct tape
Hookah Pipe
Hookah tobacco
Cotton
Face Mask
Scale that can measure in grams

First I designed and built a "human lung" machine to test the different types of smoking tobacco. I tested equal amounts of Hookah tobacco, filtered cigarettes and non-filtered cigarettes. I ran a control lung first. Than three trials of non-filtered, three trials of filtered cigarettes and finally three trials of Hookah. I collected all my data then analized it, then formed my conclusion.

Results
After weighing all the bottles, I proved that smoking Hookah is worse for you than smoking cigarettes. Even thought the bottles of cigarette smoke appear to be dirtier, the hookah bottles had more residue trapped inside them so they weighed more.

Conclusions/Discussion
Originally an Iranian physician created the Hookah as a healthier alternative to smoking. He thought that people could smoke it and because the smoke passes through water it would be purified. Smoking anything is very harmful to the human body and should not be marketed as one is being better for you than the other. There really is not that vig of a differnce whin it comes to filtered and non-filtered cigarettes. Hookah which was suppose to be a healthier alternative to smoking, turns out to be even worse. Bottom line is smoking is no good for anyone and the environment.

Summary Statement
To determine if smoking Hookah or cigarettes is more harmful to your body.

Help Received
Mother helped me purchase the tobacco produces and supervised me while I was doing my experiments.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Kyle J. Davis

Project Number
J2107

Project Title
In Pursuit of a White Smile: Do Whitening Toothpastes and Electric Toothbrushes Really Help?

Abstract

Objectives/Goals
My objective is to determine if whitening toothpastes and electric toothbrushes actually work better than regular toothpastes and manual toothbrushes, and do the extra costs give you whiter teeth. Based on advertising and ingredients, my hypothesis was that Colgate Total Advanced Whitening toothpaste would work better with the Sonicare electric toothbrush.

Methods/Materials
I purchased and tested a regular and a whitening toothpaste from the two leading brands, Crest and Colgate. For the toothbrushes, I used a manual (Oral-B), an electric that spins in a circular motion (Oral-B), and an electric that gives a rapid side-to-side motion (Sonicare). I emptied some eggs and let the shells, which represented teeth, sit in either coffee, cola, or apple juice for 48 hours. Then, I washed off any residue, and let the stains dry. After this, I brushed the egg shells for 30 seconds with 1/8 of a teaspoon of toothpaste, and let them sit for an additional 90 seconds with the toothpaste still on. Next, I washed off the toothpaste, and let the egg dry. I visually rated the improvement in stain removal and later, I compared the stains to a dental stain chart.

Results
My testing showed that Colgate Total Advanced Whitening toothpaste was the best toothpaste with a score of 37.5 points, and the Oral B electric toothbrush was the best toothbrush with a score of 47 points. Surprisingly, the Oral B manual toothbrush was a close second with 43 points. The best combination for whitening was Colgate Total Advanced Whitening toothpaste with the manual toothbrush.

Conclusions/Discussion
Based on the numerical results my conclusions are that whitening toothpastes whiten teeth better than regular toothpastes, and Colgate toothpastes work better than Crest toothpastes, at whitening teeth. Electric toothbrushes do not significantly help whiten teeth. Paying a higher price for and using a whitening toothpaste does give you whiter teeth, however using the higher cost electric toothbrush does not significantly improve whitening.

Summary Statement
Do the extra costs associated with whitening toothpastes and electric toothbrushes result in whiter teeth?

Help Received
Father helped with experiment design, Dr. Beemer, DDS provided the VITAPAN Classical Stain Guide, Mother helped with editing

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Isabelle D. de Wood

Project Number
J2108

Project Title
Under the Sun: Measuring Ultraviolet Irradiance and Sun Protectant Barriers' Effectiveness in Reducing UV Exposure

Abstract

Objectives/Goals
The objective of this investigation is to evaluate the relationship between the intensity of the sun's Ultraviolet (UVA/UVB) radiation and the most effective sun preventative products required to block UV exposure. A secondary goal is to increase scientific understanding of sun exposure, UV radiation, and make recommendations about precautions that will decrease chances of sun-related health problems like sunburns, eye damage, skin aging, and skin cancer.

Methods/Materials
Using a Digital UV Radiation Indicator, UV irradiance (mW/m^2) with no barriers and directly behind the sun protective barrier item were repeatedly measured for 75 common sun protective products grouped according to specialized use (sunscreens, lip protection, clothing, eye protection, shade coverings, windows/auto glass, hats, and beach equipment).Utilizing two ways of measuring UV light-direct solar radiation and a UVA/UVB emitting Black Light (representing high summer UV index ratings); tests were repeated at three elevations and on clear, sunny, days between 11-2pm. Average UV irradiance, change in UV irradiance, and the percent decrease of UV penetration representing percent effectiveness were calculated.

Results
The results of the data collected showed that overall 47% of all barrier products tested were 100% effective (sunglasses/clothing); 12% of the items (various windows/shade barriers) were above 90% effective; and another 10% were above 80% effectiveness at blocking UV radiation. The charted data showed that the sunscreens and shade barriers were inconsistent at their protection effectiveness-58.9% blocking ability.

Conclusions/Discussion
It is evident that a majority of the common barrier products analyzed for sun protection are highly effective protective barriers. Not only do the direct sun rays have to be blocked by objects before coming into contact with human skin, but the barrier must be used constantly to increase the percentage of protection. Since UV light is most present during the afternoon hours and is strongest during the summer, using any common sun protective products tested will reduce the risks associated with UVA and UVB exposure and future risks of sun-related injuries and diseases. Ultimately, our society needs to become aware of the sun's harmful radiation and what to protect themselves with. In California, the sun shines pretty much every day, so it is important to protect ourselves every day.

Summary Statement
The purpose was to determine the intensity of UV light and the effectiveness of sun protective products ability to protect against harmful UV radiation.

Help Received
7th and 8th grade science teachers for guiding and reviewing my project; my mom for buying the materials and her support, the Synopsys Outreach Foundation for donating the Digital UV indicator.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Edwin H. Do

Project Number
J2109

Project Title
Drinking Water: Is Higher Price Better Quality?

Abstract

Objectives/Goals
The objective of this experiment is to identify cleaner and cheaper brands of drinking water and to educate consumers about purchasing drinking water.

Methods/Materials
A TDS (Total Dissolved Solids) water meter to measure the impurity count in various tested waters. Ten different types of drinking water: tap water, distilled water, reverse osmosis water, Kirkland bottled water, Fiji bottled water, Crystal Geyser bottled water, Dasani bottled water, refrigerator filtered water and Glacier Vending Water and Aquarius Vending Water. Equations were used to calculate prices of drinking waters.

Results
Drinking water that had a higher price did not necessarily have a lower impurity count. It was hypothesized that drinking water that costs more than a reverse osmosis purified drinking water should have a lower impurity count. However, many of the drinking waters tested cost more than reverse osmosis purified drinking water and had a higher impurity count.

Conclusions/Discussion
Using a reverse osmosis purification system has many benefits. It is cheaper than most bottled water brands and has a low impurity count. Although it uses water as a one to four conversion ratio, this water can be properly recycled. Also, reverse osmosis purification process eliminates the use of plastic bottles which is beneficial to the environment. Lastly, reverse osmosis drinking water is effective in removing many chemicals and contaminants missed by basic tap water and certain drinking water bottle brands.

Summary Statement
There is no direct correlation between the purity and the cost of drinking water.

Help Received
My dad helped me research and understand the water purification methods, Teacher helped edit science fair work

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Anna K. Erickson

Project Number
J2110

Project Title
BerryFun

Abstract

Objectives/Goals
The purpose of my project was to see what types of bags preserve berries the longest.

Methods/Materials
The materials I needed were strawberries, blueberries, blackberries, raspberries, Green Bags, Ziploc Bags,paper bags, and a fridge.

Results
Ziploc Bags preserve berries the best.

Conclusions/Discussion
Green Bags had five out of sixty berries mold, Ziploc Bags had three out of sixty berries mold, and paper bags had sixteen out of sixty berries mold in them.

Summary Statement
My project is about finding what types of bags preserve berries the best in one week.

Help Received
My science and language arts teacher helped me edit my report; my mom bought me all of the supplies I needed.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Bryce S. Farrell

Project Number
J2111

Project Title
How Permanent Are Permanent Markers?

Abstract

Objectives/Goals
The objective is to determine if permanent markers are truly permanent. Does it depend on the material that is marked? Does the type of cleaning solution used effect the ability to remove the mark?

Methods/Materials
Five marks were made with a Sharpie permanent marker pen on glass, oil based painted wood, latex painted drywall, galvanized steel, hard plastic, natural stone, and ceramic tile. The material was allowed to set up for two weeks, afterwhich an attempt was made to remove each mark by using 1/2 to 1 teaspoon of the following cleaning solutions: soap and water, nail polish remover, bleach, Graffiti Remover, and Goof-Off. Once the solution was applied, a non-scratch scouring pad was used to rub the mark up to 10 times. Rubbing stopped once the stain was no longer visible.

Results
The most effective cleaning solution was the Graffiti Remover. It removed the mark off most of the surfaces. Both soap and water and bleach were the least effective on all surfaces. They only fully removed the mark from the glass. The surface that was the most difficult to clean was the natural stone surface. None of the cleaning solutions were able to lift the stain from the natural stone. The easiest surface to clean was the glass. The marks were removed quickly and easily from the glass.

Conclusions/Discussion
The solutions containing alcohol performed the best. Most of the marks were either deeply faded or completely removed using solutions with alcohol. These solutions may have removed the stain, but they also removed the paint along with it. Natural stone, being the most porous, was unable to clean completely no matter which solution was used. The stain was able to settle into the porous material.

Summary Statement
How permanent are permanent markers?

Help Received
Father supplied the materials; Mother help with the presentation

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Erik J. Godlewski

Project Number
J2112

Project Title
Ri-i-i-i-i-i-ip! Which Paper Towels Are the Strongest and Most Absorbent?

Abstract

Objectives/Goals
The objective was to determine which paper towel brands are strongest, and which are most absorbent. Does one-ply or two-ply matter? Is name brand better than store brand? Does density or quilting affect performance? Does it matter what kind of liquid is being cleaned up?

Methods/Materials
I tested two-ply and one-ply name brand and two-ply store brand paper towels. I used water, canola oil, orange juice, Windex, and Diet Coke as "spill liquids". My procedure was to put a paper towel in an embroidery hoop and set it over a large bowl. To test absorbance, I added drops of liquid to the towel until the liquid dripped into the bowl. To test strength, a small bowl was placed on the towel after 10 ml of liquid had been applied, and coins were added to the bowl until it broke through the towel.

Results
Number of plies and texture were not as important as density for strength and absorption, though higher density did not guarantee best results. A combination of ply, density, and texture seemed to make the most difference. Name brands performed better than store brands with some exceptions. Paper towels soaked with canola oil were almost as strong as dry towels, and much stronger than towels wet with other liquids. Paper towels did not absorb canola oil as well as other liquids.

Conclusions/Discussion
In conclusion, for both strength and absorption, the best performers were Bounty and Brawny. For strength, the store brand Thirsty was almost as good, and for absorbance, dense (but one-ply) Viva performed well.

Summary Statement
Determine which properties of paper towels contribute to strength and absorbance using various liquids.

Help Received
My parents helped with photos and my sister helped with typing. My father helped with graphs.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Jacob A. Haselden

Project Number
J2113

Project Title
Determine Your Detergent

Abstract

Objectives/Goals
My objective was to determine which laundry detergent, Tide, Dreft baby detergent, Planet Organic detergent, provides less pH after washing.

Methods/Materials
Materials: Washing Machine, Tide Laundry Detergent, Dreft Laundry Detergent, Planet Organic Laundry Detergent, Electronic Metric Weight calculator, pH Meter, 42 L Water, 2kg clothes, Cups for recording water samples.
Method:
1. Measure the recommended amount of detergent for 2kg load of clothes
2. Placed the designated amount of clothing for recommended sample into the washing machine and set the washing machine to cold water
3. Dissolve recommended amount of Tide detergent into washing machine
4. Take a sample of the dissolved water and measure its pH. Record data.
5. Wait until the clean cycle ended. Once rinse cycle began, obtained another sample and measure the pH. Record data
6. Wait until the water goes down. Restart the cycle and let water gather with the clothes still in the machine. Obtain a sample and measure pH. Record data.
7. Wait until the Rinse cycle begins. Once the water collected again, obtain a sample and measure the pH. Record data.
8. Repeat steps 2-7 with half the recommended amount of detergent
9. Repeat steps 1-8 with a Dreft laundry detergent
10. Repeat steps 1-9 with a Planet Organic Laundry detergent

Results
The Dreft baby laundry detergent provided the lowest pH and less excess laundry detergent after the wash cycle.

Conclusions/Discussion
The results were not as I had predicted. I believed that the Planet Organic laundry detergent would have less pH after washing because the detergent was supposedly chemical free and organic. However, it was the Dreft baby detergent that showed less pH in all of the testing. This makes sense as the detergent is made for babies and therefore is focused on providing less chemicals to harm the baby's skin and cause skin rashes and other skin diseases.

Summary Statement
My project is about determining which type of laundry detergent, Tide, Dreft or Planet Organic, provides the lowest pH after washing clothes.

Help Received
Mother gave me materials to use for my board

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Timothy P. Heiduk

Project Number
J2114

Project Title
The Helmet Crisis: Do Helmets Effectively Protect the Brain?

Abstract

Objectives/Goals
The purpose of my project was to identify the side of a standard youth football helmet and a standard youth baseball helmet that most and least effectively protected the brain. I also identified which helmet, between the two, better protected the head overall.

Methods/Materials
I used a Vernier 25-g accelerometer to measure the force felt inside the helmets. A styrofoam ball was used to replicate the human skull, where the accelerometer was placed through a hole that was drilled in one side of the ball. A six-pound sledgehammer applied force to the two helmets. I suspended this sledgehammer from a pull-up bar, drilling a hole through the side that had two meters of rope threaded through it.

Results
The left side of a standard youth football helmet was the most effective at protecting the brain and the top side was the least effective. For the baseball helmet, the back side was the best and the right side was proven the worst. Overall, a standard youth football helmet better protects the head than a standard youth baseball helmet.

Conclusions/Discussion
Two of my five hypotheses were proven correct. I correctly predicted that the football helmet would better protect the head than a baseball helmet. I also properly hypothesized that the top side of a standard youth football helmet would be the least efficient side of the five. I inaccurately foresaw that the front side of the football helmet would best protect the head for that helmet. Both of my predictions for the baseball helmet were incorrect. Like the football helmet, I hypothesized that the front side of the helmet would be the best and the top side the worst.

Summary Statement
The focus of my project measures the effectiveness of helmets in protecting the brain from injury.

Help Received
Father helped set up project for data collection and helped research proper accelerometer to measure force.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Chase R. Hughes

Project Number
J2115

Project Title
Come On Baby, Light My Fire!

Abstract

Objectives/Goals
The goal of my project is to discover the best ignition source to light a #Strike a Fire# fire starter in three different extreme conditions.

Methods/Materials
I used three different ignition sources: a strike on box match (match), a waterproof match, and a disposable butane lighter (lighter). These ignitions source were tested under Cold, Wet and Windy weather conditions for reliability to ignite and the time required to transfer their flame to the #Strike a Fire# fire starter. I test in the cold condition by placing my ignition sources and the #Strike a Fire# starters into a -15 degree Celsius industrial walk-in freezer for 30 minutes. Then I moved my materials to a 1 Celsius degree cooler and tested all three ignition sources. To test under wet conditions, I placed all my materials in a zip lock baggie filled with water for 2 minutes. After removing the materials from the baggie, I waited 30 minutes before testing the ignition sources. I tested the windy condition by positioning a fan four meters from the testing area, setting the fan speed on lowest setting and tested each ignition source again.

Results
The results showed that the butane lighter had the best average lighting time in Control and the Cold conditions. In the control group the average flame transfers time was 2.48 seconds. For the Cold condition, the average was 5.82 seconds. My results also demonstrated that the water proof match had the best flame transfer speed in both the wet and Windy scenarios. For the wet scenario the average time was 5.59 seconds. For the Windy conditions, the average was 4.67 seconds.

Conclusions/Discussion
I learned that the best ignition source to light a fire under these adverse conditions was the water proof match because it was the only ignition source that worked under all three conditions. The butane lighter was the second best ignition source.

Summary Statement
I wanted to see what the best fire lighter was in bad weather conditions Cold Wet Windy.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

Neelesh "Neel" K. Karody

Project Number

J2116

Project Title

Effectiveness of Balance Bracelets: A Double Blind Study

Abstract

Objectives/Goals

The objective of this experiment was to investigate the validity of the claims of the XPB Balance Bracelet Companythat using this bracelet immediately improves user#s strength,balance,and flexibility. All tests repeated three times each, in random order with test bracelet, placebo,and no bracelet (control). Readings were recorded by the participant#s father to maintain double blind nature of experiment.

Methods/Materials

Using Saehan Brand Grip and Pinch Dynamometers,stopwatch, a six foot measuring tape, and test and placebo bracelets thirty subjects were tested for strength, flexibility, and balance as follows. All tests were conducted with subjects standing barefoot on a tiled floor with eyes closed with thirty second rest periods between each repetition of each test. Conducted T test analysis of all readings.

1.Grip strength measured with subject holding dynamometer in dominant hand with arm close to the body elbow flexed to 90 deg. Grip strength measured by subjects squeezing dynamometer. The test was repeated three times each, in random order with the test bracelet, placebo bracelet, and no bracelet (control). Readings were recorded by the participant#s father to maintain a double blind nature of the experiment.

2.Pinch strength measured with subject holding dynamometer in dominant hand with arm against body elbow flexed ninety degrees.

3.Hamstring flexibility tested by the subject#s ability to touch ground by bending at the waist measuringdistance between third digit of dominant hand and ground.

4.Balance measured with subject standing on one leg starting with the left and balance maintainance in a single leg stance was timed.

Results

Results showed there was minimal to no difference between the control,test,and placebo.

Conclusions/Discussion

After analyzing the results,it can be concluded that the hypothesis,that XPB Balance Bracelets do not work can be accepted.

Summary Statement

To test XPB Balance Bracelet's claim of instant improvement in strength flexibilty and balance.

Help Received

Father recorded the results to maintain double blind nature of the experiment. Mother provided the instruments for the experiment. Parents helped explain statistics and any questions I had.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Meghana Khurana

Project Number
J2117

Project Title
War of the Detergents: Green vs. Synthetic: Which Is Better, Green or Synthetic Laundry Detergent?

Abstract

Objectives/Goals
Do synthetic laundry detergents clean better than green laundry detergents? Does green really clean? I believe synthetic detergents would clean better than the green ones. Synthetic soaps may have harsh chemicals but they are made to clean tough stains well. Green detergents are more eco-friendly, however they may not clean as well.

Methods/Materials
9 inch square fabric swatches; Laundry Detergents - Tide, Gain, Sun Harvest , Seventh Generation; Stains - Hot sauce, Mustard, Yoplait Peach Yogurt, Grass, Coffee, Red Wine; Top loading washing machine
I tested 4 detergents Tide and Gain in the synthetic category and Sun Harvest and Seventh Generation in the green category. I tested them with 6 stains in the following capacities: cleaning ability, bubble foaming and fragrance. I performed 3 trials per detergent with 3 washes per trial. So there are 9 washes for each detergent. For 4 detergents there are a total of 12 trials. After applying the stains and starting each wash, I would open the machine lid and rate for bubble foaming. After each wash I rated for Cleaning. At the end of each trial I recorded fragrance readings for the swatches right after the wash and 2 hours after the wash. 3 trials * 6 stained swatches * 3 trials = 54 clean ratings per detergent. 3 trials * 3 washes = 9 Bubble foaming readings per detergent. There will be a total of 6 readings for fragrance for 3 trials.

Results
I had total of 276 readings.
Cleaning Ability: Seventh Generation and Tide came 1st, Gain 2nd and Sun Harvest 3rd.
Fragrance: Seventh Generation had least scent, then Tide, next Sun Harvest, last was Gain with a very strong scent
Bubble Foaming: Sun Harvest had most bubbles, next was Seventh Generation, Tide and Gain came 3rd

Conclusions/Discussion
My hypothesis was proved wrong. Seventh Generation, one of my green laundry detergents, did as well if not beat the other laundry detergents. Taking all things into consideration, cleaning capacity being similar, the fact that Seventh generation was more honest about their ingredients, no harsh dyes or perfumes and had no materials listed as hazardous as well as it was safe for gray water systems, led me to the conclusion that Seventh Generation appeared to be the better detergent. The outcome actually surprised me, because some green detergents are good for the earth and your laundry. Some are just good for the earth, but not for your laundry!

Summary Statement
Do synthetic laundry detergents clean better than green laundry detergents?

Help Received
Mr. Mark Hobbs, my Science Teacher guided me through the Project Schedule and reviewed Project report and procedure. My Mother helped me stay on task and acquire materials.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Zackary Liles

Project Number
J2118

Project Title
Does Price of Two Stroke Oil Affect RPM's?

Abstract

Objectives/Goals
To determine if a more expensive two-stroke oil produces more RPM's than a cheaper oil. I chose this project because I want to be able to go the fastest I can and know if the extra money is actually worth it.

Methods/Materials
In my experiment I will be using two stroke oil and a Trailtech Vector Computer. I am using two-stroke oil in my project to find out if the more expensive two-stroke oil is actually worth it. I am also using a Trailtech Vector Computer Kit in my experiment to track how many RPM's my motorcycle is producing. I will be running the motorcycle at half throttle in second gear and recording the RPM's using the Trailtech computer. During my experiment I will be using Chevron brand gasoline. I am using Chevron gasoline because I want the gas that I use to be consistently at 91 octane level. I will be using the gas to mix with the two-stroke oil to start and run the motorcycle. All experimental procedures will take place with adult supervision (my dad). I am also using proper safety equipment (helmet, gloves, and pads). All used oil will be taken to a local automotive store for proper disposal.

Results
Price does matter to a slight degree.

Conclusions/Discussion
Price of two-stroke oil does affect the RPM"s produced. The more expensive oils produced on average more RPM's (but not by a lot).

Summary Statement
to determine if a more expensive two-stroke oil produces more RPM's than a cheaper oil.

Help Received
my dad for safety procedures

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Robin G. Lillie

Project Number
J2119

Project Title
What Is the pH of Soda? And What Causes It to Change?

Abstract

Objectives/Goals
My goal in this project was to find the pH of soda and see what caused it to change. Coca-Cola was tested in different containers, at various temperatures, with different flavors, when ice was added, and as the soda went flat.

Methods/Materials
Using a LabQuest and pH probes, the pH of Coke was recorded upon opening and hourly for 14 hours. It was then recorded at 12 hour intervals for the following 48 hours as the soda lost its carbonation. The pH was tested in aluminum, plastic, and glass containers to see if packaging material mattered. Seven different varieties of Coke were tested to see if sweeteners changed the pH. The pHs were recorded on standard Coca-Cola at different temperatures. They were also recorded over time, while being heated from 0°C to 80.3°C and sitting on the counter with ice cubes in it.

Results
There was not much change in pH as the Coke went flat. There was no significant difference in pH between the types of container. Temperature made a difference. It appeared that as the temperature increased the pH decreased. This was consistent in all temperature tests. The Coke sweetened with sugar had a lower pH than those containing aspartame.

Conclusions/Discussion
Since the pH did not change much as the soda lost its carbonation (carbonic acid), phosphoric acid which is added as a preservative and for tangy flavor could be responsible. The soda container didn#t really affect the pH. This made sense since a company like Coca-Cola would not want their products to be inconsistent. It was interesting to see the different sweeteners used in Coke changed the pH values slightly. Sugar, aspartame, and Splenda react differently in soda or have slightly different formulations. I have concluded that the variable that made the most difference in changing pH was temperature. All the tests done with temperature showed a decrease in pH with an increase in temperature.

Summary Statement
I looked at the pH of Coca-Cola and tested to see which factors caused the pH to change.

Help Received
Dave Carr, Butte College Chemistry Department, let me borrow a LabQuest, pH probes, temperature probe, thermometer, and pH 4.0 and 7.0 buffers. My mom proofread my report, showed me how to calibrate the pH probes and take care of them, helped me understand more about pH, and bought sodas.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Brandon K. Lim

Project Number
J2120

Project Title
Which Children's Toys Can Damage a Child's Hearing?

Abstract

Objectives/Goals
The objective of this project was to determine if certain children's toys would produce a high decibel level loud enough to damage a child's ears when the toys are played at different lengths of the arm.

Methods/Materials
The problem is, "Which children's toys can damage a child's hearing?" It was hypothesized that toy sound level would be determined by distance from the toy to the child's ear. The decibel levels of four different toys and no toy as a control were measured 50 times. Variables were controlled by using a room without ambient noise, using fresh batteries in each toy, and by using the same method of measuring distances and the same sound meter.

Results
The toys were tested at six different distances- 0 centimeters, 5 centimeters, 10 centimeters, 15 centimeters, 20 centimeters, and 25 centimeters. At each distance, the toy's decibel level was at least borderline potentially harmful. The lowest mean decibel (dB) level was from the Buzz Lightyear toy, and that was 84 dB at 25 centimeters, the highest distance used in this experiment. The limit for possible hearing loss is 85 dB, and the decibel levels of the other toys were higher than that, even at 25 centimeters.

Conclusions/Discussion
The experiment indicates that all of the toys should be considered as potentially dangerous because they are all close to the limit for possible hearing loss. Children are diagnosed with hearing disorders caused by loud noises. When children play with toys, they usually put them near the ear, and if the toy is loud, it could damage hearing and, in the worst case, lead to problematic hearing disorders.

(267 words, 1,572 characters)

Summary Statement
For my project, I tested the decibel level of children's toys on the market to determine if any of them could potentially harm a child's ears, resulting in complicated hearing disorders that would be costly to alleviate.

Help Received
My teacher gave guidance in the organization of my project; my parents helped me get materials and take photos, etc.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Emma M. Markey

Project Number
J2121

Project Title
Cookies Galore

Abstract

Objectives/Goals
To test 3 gluten-free flours (corn, millet and white rice) against 1 wheat flour with gluten in cookie making to determine the effect on the baking and taste preferences of chocolate chip cookies. People who have Celiac disease and some children with autism, who may be intolerant of the gluten in wheat flour, need yummy cookies to eat that are gluten free. I would like to find a way to make them delicious cookies.

Methods/Materials
I did 1 trial and made 4 batches of cookies, each with different flours, and kept everything else the same. I obtained the informed consent from 20 taste testers and conducted a blind taste test of the 4 cookies. The cookies were ranked in the order of their taste preference and given scores of 1 (most favorite) to 4 (least favorite). Comments about appearance and texture were also recorded. I observed the dough while it was being mixed and the cookies while they were baking. I measured the height and diameter of the cookies. The score points for each cookie type were added up, the results analyzed, and a conclusion was made.

Results
The corn flour cookie received the highest score of 275 points. The white rice flour cookie received a score of only 15 points less than the corn flour of 260 points. The wheat flour cookie with gluten, the traditional flour that is used, was the 3rd most favorite with a score of 240 points. And the millet flour cookie was the least favorite with 195 points. These scores were surprisingly close to each other. Some of the taste testers liked some of the cookies and really disliked some of the other ones. Other taste testers felt completely differently about the cookies, which led to the scores being so close.

Conclusions/Discussion
My hypothesis was incorrect. I expected the cookies made with the gluten-free flours would not bake properly and would not be appealing to the taste testers. I was surprised that all 4 cookie types had just about an equal number of people that liked them and others who disliked them. I want to continue to work on this project, so that I can find a few delicious cookie choices for people who must follow a gluten-free diet.

Summary Statement
My science project tested the effect of using 4 different flours, specifically 1 wheat with gluten and 3 gluten-free on the taste and appearance, as well as, the mixing and baking of chocolate chip cookies.

Help Received
My science teacher and I discussed project ideas. I choose which project I would do and how to do it. My parents showed me how to do the higher level functions in Word and Excel, so I could format my writing and generate the data charts and pie graph.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Annika V. McBride

Project Number
J2122

Project Title
Back Busters

Abstract

Objectives/Goals
The objective of my project was to find out which backpack effected your posture the most. My hypothesis is that the 6 pocket backpack will negatively effect your posture the most because it has a lot of pockets and will pull on the subjects back and make them lean foward.

Methods/Materials
I used a ruler, a wood pole with a base, a timer, a pencil, a notebook, 3 backpacks, 3 subjects, backpack contents and a scale. First I measured the backpack and backpack contents to equal 5,10 or 15 pounds. I told one of my subjects to walk around and set my timer for five minutes. When the timer was up I lined my subject up against the wood pole and measured with my ruler how far they were leaning over and how far they were leaning to the side. I wrote what I measured in my notebook and repeated the steps for the other backpacks, subjects and pound increments.

Results
The 6 pocket backpack negatively effected the posture the most. I think that it effected the posture the most because it had a lot of pockets and so it pulled down on the subjects back and made them have to lean over.

Conclusions/Discussion
My hypothesis was correct. This project could help people have more knowledge about which backpack would be better to buy and would not hurt your back.

Summary Statement
My project explains which backpack is the worst for your back.

Help Received
My sisters and neighbor helped me by being my subjects.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Katherine E. Paladichuk

Project Number
J2123

Project Title
Brand Name Sunscreen: Are You Getting Burned?

Abstract

Objectives/Goals
The objective is to determine if different brands of sunblock with the same SPF number block the same amount of UV light.

Methods/Materials
Different brands of sunscreen were applied to a clear, plastic page protector. An acrylic sheet was placed on top of the drops, to form an even, thin layer of sunscreen. UV sensitive Sun Art paper was placed underneath the page protector and exposed to the sun. After exposure, the color intensity on the Sun Art paper was measured by scanning the Sun Art paper and analyzing it using the Photoshop Elements 3.0 computer program.

Results
SPF 30 Banana Boat and SPF 30 Banana Boat Kids were more effective than SPF 30 Trader Joe's in 8 out of 9 comparisons or trials. SPF 30 Banana Boat was more effective than SPF 30 Target in 2 out of 3 comparisons. SPF 50 Banana Boat and SPF 50 Banana Boat Kids were more effective than SPF 50 Coppertone in 5 out of 6 comparisons. SPF 50 Banana Boat and SPF 50 Banana Boat Kids were more effective than SPF 50 Target in 2 out of 3 comparisons. Surprisingly, the effectiveness of SPF 50 Coppertone was consistently lower than two of the SPF 30 samples.

Conclusions/Discussion
Different brands of sunblock with the same SPF number did not block the same amount of UV light. Some of the sunscreens with high SPF were not as effective as those with lower SPF.

Summary Statement
UV-sensitive paper is used to compare the effectiveness of different brands of sunscreen.

Help Received
Mother supplied materials; Neighbors supplied sunscreen samples; Father taught me how to use Photoshop Elements Program

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Vinisha D. Prajapati

Project Number
J2124

Project Title
Fragile: Handle with Care. Which Packing Material Is the Best?

Abstract

Objectives/Goals
To determine which packing material is the best for protecting a fragile object.

Methods/Materials
Five different packing materials were tested; airbags, bubble wrap, shredded newspaper, cotton balls and packaging peanuts. A box (4.5inches x 4.5 inches x 4.5 inches) was filled to 2 inches with a particular packing material. A large egg was placed in the box, on the packing material. The box was dropped at increasing heights until the egg cracked and this height was recorded. This process was repeated 20 times for each different type of packing material. The experiment was also conducted with a different sized box and repeated again with ½ the packing material to see if these changes had any effect.

Results
The packaging peanuts were the best at protecting the egg; the egg cracked after being dropped at an average height of 7.35 feet. Airbags performed the worst with the egg cracking after being dropped from an average height of 3.25 feet. The size of the box made a difference, with the egg cracking on average 3.1 feet higher with the bigger box. The amount of padding also had an effect, with the egg cracking on average 2 feet higher with 2 inches of padding than 1 inch of padding.

Conclusions/Discussion
My conclusion is that packaging peanuts are the most effective at protecting a fragile object and airbags are the worst. I hypothesize that this may be due to packaging peanuts, by being able to move individually, are able to absorb the force of the egg better than other materials.

Summary Statement
My project is about determining which type of packing material is the best for protecting a fragile object.

Help Received
My mother helped me by climbing the ladder and dropping the egg at higher heights than I could reach safely, and she helped me with cutting display papers with the paper trimmer safely.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

Dominic Schillace; Benjamin Zdasiuk

Project Number

J2125

Project Title

Survival Blanket Showdown: Testing the Heat Retention of Survival Blankets and Other Lightweight Insulators

Abstract

Objectives/Goals

Our objective was to test the heat retention performance of different survival blankets and alternative insulators in the outdoors. We also wanted to determine the mechanisms by which heat was lost in our experiments and how the results were affected by human-like heat production.

Methods/Materials

Eight buckets filled with 10 liters of hot water each simulated a human. We wrapped seven of them in different types of survival blankets/insulators, then measured temperature drop overnight outdoors using a thermocouple thermometer. We repeated the experiment for a total of four trials, systematically switching positions to eliminate any possible location-based bias. Additional experiments used data loggers to measure time dependence, bucket heaters for better human analogs and different insulators underneath the buckets to investigate losses due to thermal conduction.

Results

Every one of the lightweight metal-coated film blankets reflects heat back into a bucket better than the other types of blankets do. The Adventure Medical Heatsheets Blanket was best; it barely surpassed the Adventure Medical Bivvy, which we had hypothesized would do best. The bubble wrap was the worst of the blankets/insulators but still better than the (blanket-less) control. We also found that radiative loss dominated conduction and convection losses in our experiments.

Conclusions/Discussion

Our conclusion is that a metal-coated film survival blanket will keep you warmer than any other insulator in a survival situation. This type of blanket is very light, weighing less many other insulators. You should always carry one when hiking.

Summary Statement

We tested the heat retention of different survival blankets and insulators, finding that lightweight metal-coated film survival blankets are definitely worthwhile.

Help Received

The people assisting us were parents Julie Fouquet, George Zdasiuk, Angela Schillace, and Sam Schillace. They helped with the design and physical labor of setting up the experiments, Microsoft Excel and editing the write-up.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Toni Schollum; Emily Thomas

Project Number
J2126

Project Title
Soaking Up Oil: How Effective Are Hair and Fur Booms?

Abstract

Objectives/Goals
In May 2010 Central Valley hair salons and pet groomers tried to help with the Gulf of Mexico Oil Spill by saving hair clippings that were stuffed into nylon tights by volunteers to make sausage shaped booms to string out along beaches and collect the oil. BP decided they would not use the hair booms, and discouraged people from collecting and donating hair. We decided to do a comparison test of commercial booms, hair booms and fur booms.
We expect hair booms and fur booms to work better than commercial booms because they do not just sit on the surface.

Methods/Materials
Three 1ft long booms in each of the three materials; hair, fur and polypropylene were constructed. Three large storage bins were set up with 10 gallons of water and 1 quart of oil. Booms were left in the bins for 30minutes, sweeping them across the bins every 5 minutes. The oil remaining in the bin was recorded after 15minutes and 30minutes. Also, at 30 minutes the depth below water level of the lowest and highest parts of the bottom surface of the boom was recorded.

Results
On average one foot long polypropylene booms, hair booms, and fur booms soaked up 73%, 86%,and 93% of 4 cups of used motor oil. There did not seem to be a problem with the fur booms sinking, but in 30minutes the hair booms were just below water level.

Conclusions/Discussion
As expected the hair booms and fur booms worked better than commercial booms. There didn#t seem to be a problem with the fur booms sinking, but in 30minutes the hair booms were just below water level.

Summary Statement
How effective are hair and fur booms for soaking up oil?

Help Received
Mother collected waste oil for us, and helped us use Excel to plot our data.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Benjamin Sheehan

Project Number
J2127

Project Title
What Golf Ball Would You Choose?

Abstract

Objectives/Goals
The purpose of this experiment was to determine the performance of different golf balls on a putting green. Does it matter what ball is used, if it's dirty, how many dimples it has, or if the aim marker on the ball is facing towards the target? I predict that all seven balls that I test would have similar results for distance.

Methods/Materials
I chose seven different golf balls. I simulated long putts and short putts using a consistent force by using different size ramps. Two pipes placed on the ramps created a straight pathway for the ball to roll down. A tape measure was used to measure the distance. Each ball was rolled down three times and the distance measured. The same procedure was used with the aim marker aligned and off target, and with dirty balls.

Results
My results indicate that different golf balls traveled different distances on a putting green when given similar force of putts. This difference shows up mostly in long putts than short putts. This is most likely due to two factors, weight of the ball and the number of dimples on the ball. Dirty balls, which are heavier, rolled an average 12% farther than clean balls. The number of dimples on the ball reduced how far a ball rolled, most likely due to increased friction with the grass on the putting green. The alignment of the aim marker had little effect on how straight the ball rolled.

Conclusions/Discussion
This experiment disproved my hypothesis; different golf balls do perform differently when putting. Knowing what these differences are and how they affect the performance of your ball on the green will make you a better golfer.

Summary Statement
I developed my project to verify my hypothesis that different golf balls perform the same on the putting green; but to my surprise, this was not true.

Help Received
Used putting green at a local golf course

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Klynn S. Shelton

Project Number
J2128

Project Title
All Fired Up!

Abstract

Objectives/Goals
My objective in this project was, to learn how does the type of fire protection substance (Barricade Gel, Phos-Chek Class A Foam, Wet Water, and Water) affect the time it takes for Douglas Fir Wood to combust.

Methods/Materials
A 1.22 meter x 2.44 meter sheet of Douglas Fir Wood was taken and cut down into 16 30.48 centimeter x 60.96 centimeter pieces using a circular saw. The pieces were then divided into 5 groups (one piece left over), and 4 of the groups, were covered in their protection substances which include; Barricade Gel, Phos-Chek Class A Foam, Water, and Wet Water (a mixture of water and dish soap). The last group was left as the control and wasn't covered with a protection substance. Then one of the groups was taken and one at a time the pieces were set at a 45 degree angle against a rack. The handheld propane torch was set 45.72 centimeters away from the edge of the wood. The handheld propane torch was then set to 193 degrees celcius and turned on followed by the starting of the stopwatch. Wait until the wood combusts, or catches flame, then count to five and stop the stopwatch. The tests were then repeated with the remaining groups of wood.

Results
Barricade Gel sustained the heat of the flame the longest with an average of 86.6 seconds followed by Phos-Chek Class A Foam which sustained the heat with an average of 82.6 seconds. Then came Wet Water with an average of 28.6 seconds, next was Water with an average of 18 seconds, and last was the Control which sustained the heat of the flame with an average of 17.3 seconds.

Conclusions/Discussion
In conclusion, my hypothesis, which was, Barricade Gel would sustain the heat of the flame the longest, was proven correct by the experimental data. Barricade Gel sustained the heat the longest because it is a gel made of many hydrating polymers that can absorb up to 4 times their weight in water. This allows the wood to be protected for longer as the polymers in the gel acts as a barrier between the wood and the flame.

Summary Statement
My project focuses on finding out which fire protection substance will resist direct flame impingement for the longest amount of time until Douglas Fir Wood combusts.

Help Received
Father helped with experiment at his Fire Station, helped supervise during board construction; Used fire fighting equipment at Los Angeles Fire Station 38 under supervision of two firemen there; Mother helped glue papers to board.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Jose Luis Sosa Jurado

Project Number
J2129

Project Title
Food Bio Film

Abstract

Objectives/Goals
Extraction of chitin and from shrimp shells for bio film formation.
It will help strawberry have a longer shelf life.

Methods/Materials
Made a bio film from shrimp shells (chitin).
Submerged strawberries in the chitin, and placed in refrigerator.
Strawberries shelf life was prolonged

Results
Obtained good result in the development of bio film. Food bio-film extends the shelf-life of the strawberry. Refrigeration also contributes to prolonging the shelf-life of such fruit.

Conclusions/Discussion
Throughout research, data, and experiments, I have a result that explains #how to prolong the shelf life of a strawberry#. The food bio-film does prolong the shelf-life of a strawberry, but only at certain temperatures. The result was that it does prolong the shelf life of a strawberry up to one month. The strawberry was submerged into the chitin, and then placed in the refrigerator. Refrigerator temperature might contribute to the prolonging of the shelf life of this fruit. Strawberries are a very delicate fruit, and with the experiments that I fulfilled, I can prolong the shelf life of a strawberry.

Summary Statement
My project is about making a bio film made out of shrimp exoskeleton to prolong the shelf life of strawberries.

Help Received
Lab provided me chemicals; Biochemist tutored me

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Brittany A.D. St. Clair

Project Number
J2130

Project Title
Wood Finishes

Abstract

Objectives/Goals
My objective is to determine the best type of wood finish that is most sealant against water -- Shellac, Lacquer, Polycrylic, or Polyurethane.

Methods/Materials
A long strip of pine wood was cut into ten block pieces using a power miter saw. I used a triple beam balance to weigh the wood blocks after each step. An outdoor barbecue grill was used as kiln for the wood for 24 hours. When I tested the wood blocks with water, I placed all blocks into one bucket with room temperature water and soaked them for 42 hours. I put two weights on top to keep the wood from floating up.

Results
The Shellac finish was the most sealant against water, but clouds. Polyurethane was second best but yellows. Polycrylic was third best and kept a very good natural color. Lacquer was the least sealant and smeared the number I wrote on the piece of wood.

Conclusions/Discussion
This project can help expand our knowledge by helping us to know how the different types wood finishes will affect the wood that it is applied on. For example, if you had a piece of painted wood, you would not use lacquer because lacquer smears. If you had a work table and didn't care how pretty it was, or that it clouded, and need a finish that was durable and sealant against water, you would use shellac. Another example would be if you had a nice coffee table that got spilled on frequently and cared if there were cloudy spots, then you would use polycrylic.

Summary Statement
My project was to determine the most sealant type of wood finish against water.

Help Received
My step-father helped cut the wood and supervised me.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Nathaniel A. Thompson

Project Number
J2131

Project Title
Are the Dosing Devices for Pediatric Over-the-Counter Liquid Medicines Accurate?

Abstract

Objectives/Goals
My objective was to test the accuracy of dosing devices for pediatric OTC liquid medicines. I hypothesized (1) that the mean error rates for devices included with the medicines would be negatively correlated with their degree of compliance with 2009 FDA guidelines and (2) that the mean error rates for each medicine, across all tested devices, would be positively correlated with relative viscosity.

Methods/Materials
For 11 pediatric OTC liquid medicines, I gave each medication's included dosing device a score of 0-5 for compliance with 2009 FDA guidelines and measured the relative viscosity of each medication. I tested included devices and alternate dosing devices for accuracy over 5 different sample dosages, using a graduated cylinder. I calculated the error of each device for each medicine. To determine correlations, I plotted the mean errors against (1) the FDA compliance score and (2) the relative viscosity.

Results
Mean errors for the 11 included dosing devices ranged from 0% to 15%. The mean error for all included dosing devices was 12%, the same as the oral syringe. Among alternative dosing devices, the flatware spoon had a 27% mean error, but dropper, medicine spoon, and measuring spoons all scored better, with only an 8% mean error for each. Mean errors for individual dosing devices were negatively correlated with FDA compliance scores and mean errors for each medicine, across all dosing devices, were positively correlated with relative viscosity.

Conclusions/Discussion
Most parents' substitute for the included dosing device is a flatware teaspoon, according to Madlon-Kay and Mosch (2000). In my observations, this was the least accurate choice, with an error more than double that of included dosing devices, on average. However, included dosing devices were less accurate than several alternative dosing devices, including kitchen measuring spoons, and all of the included devices I tested met 3 or fewer of the 5 FDA guidelines. Since the CDC reported in 2010 that 70,000 ER visits (1/3 of all ER visits for children under 12) were a result of overdoses of OTC medicine, parents should reach for a kitchen measuring spoon or pick up a medicine spoon or dropper at the pharmacy, rather than using the dosing cup included in most OTC medicines.

Summary Statement
My project tests the accuracy of dosing devices for pediatric OTC liquid medicines and correlates errors with lack of FDA compliance and higher viscosity.

Help Received
Mother bought supplies and helped edit and type report; brothers washed equipment between tests.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Kachia Vang

Project Number
J2132

Project Title
Using a Digital Camera to Measure Skyglow

Abstract

Objectives/Goals
My overall objective is to determine the effects and compare photos that were taken at night. Different locations affected by light may produce a different number of pixels from within a photo.

Methods/Materials
The materials I used are simple home found objects. My personal digital camera, a tripod, a computer, and ImageJ, a computer software.
The method I will undertake is also a simple process. On the first night, I went to the park and took 10 photos. Then on next night using the same materials, I took pictures in my neighborhood. On the final night, I went to the mountains and performed my usual routine. After gathering all the photos together in prep for the final step, I used an image software called ImageJ to analyze the amount of pixels there were in each photo taken in the different locations I had chosen.

Results
The results proved that the photos taken from areas with more light were significantly different and lower in pixel level than those taken within areas that held less light.

Conclusions/Discussion
I conclude that photos taken in areas where there are more light had a lower amount of pixel level, whereas photos taken from areas with less light were more visible and had a higher amount of pixel level.

Summary Statement
My project is about taking pictures of the night sky at different locations and weather using ImageJ to analyze the photos to determine how many pixels there are.

Help Received
Mother helped proofread and dice cut the letters; Ms. Romero helped take some pictures of the night sky; Maixialia helped with the precision of words.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Quinn A. Vosmera

Project Number
J2133

Project Title
Go Green with Glue

Abstract

Objectives/Goals
My objective was to determine if natural glue would be as strong as synthetic glue for general purposes. My hypothesis was that hide glue would be the strongest glue when I compared natural glues to synthetic.

Methods/Materials
Four different glues were tested: hide glue(natural glue), gorilla glue, wood glue,and elmers glue(all synthetic glues). Five different trials were done on each glue. The test boards were pine cut into a top board 6 inches long and a bottom board 4 inches long. The top board had a 2 inch whole drilled through the center and the bottom a 1/2 inch whole. A specific amount of glue was applied between the two boards and clamped for 24 hours. Then weights were attached to only the bottom board to determine how much weight each glue could withstand before breaking.

Results
The results of my investigation showed it was difficult to weaken the bonds of any of the glues. Three different testing trials were done on the boards with increasing weights as well as reducing the amount of glue used. The maximum weight used was 184 pounds. One of the hide glue samples broke and two of the wood glue samples broke

Conclusions/Discussion
From this investigation I learned that there was little difference between the four glues and their weight tolerance strength. The natural glue did almost as well as the synthetic glues making it a contender for more use. Do not judge a glue by its container, label or marketing, consider what is good for the environment and your health.

Summary Statement
Testing the strength of natural glues verses synthetic glues

Help Received
mother helped type report and put board together, dad helped cut and drill the boards and apply some of the weights

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Reed J.D. Williams

Project Number
J2134

Project Title
A Greener Way of Drying Clothes

Abstract

Objectives/Goals
Test several ideas for drying clothes to see if they are more energy-efficient than a commercial clothes dryer.

Methods/Materials
A 142 x 122 mm piece of felt cloth weighed 5 g when dry. It was soaked with 13 g of water, then dried using five different methods: in a clothes dryer, in a vacuum chamber at room temperature, on a hot plate, on the hot plate in the vacuum chamber, and squeezing in a vise. Drying was determined by measuring the mass of the felt + water. Energy for the electrical devices was measured by multiplying the power from the PG&E power meter by the time that the device was on. Energy for squeezing in the vise was calculated from the maximum force read from a fishing scale and the distance the handle was pulled.

Results
Squeezing was the fastest and most efficient in terms of grams of water removed per joule of energy, but did not dry the felt completely. The hot plate without vacuum was the most efficient for complete drying, followed by vacuum with hot plate. Drying in vacuum alone at room temperature was stopped after three hours because little drying had occurred.

Conclusions/Discussion
Squeezing water out of cloth takes way less energy per gram of water than the heating or vacuum methods.
Removing water in its liquid state is more energy-efficient than removing it as a vapor.
The vacuum with a hot plate is a lot more energy-efficient than a clothes dryer, but is not likely to replace the dryer because it takes a long time and can only dry one piece of cloth at a time.

Summary Statement
This project is about finding a more energy-efficient way of drying clothes.

Help Received
My dad showed me how to read the PG&E power meter on the outside of our house. He helped me run the first experiments, then I took the data myself. I typed the data into Excel and graphed it. My dad showed me the equations for electrical energy (P * t) and mechanical energy (1/2 * max force * d).

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Alexander Woodside

Project Number
J2135

Project Title
Lifesavers Dissolving in Water

Abstract

Objectives/Goals
The purpose of this project was to find the dissolving rate of different flavors of Lifesavers in water. The experiment involved keeping the water temperature at 70 degrees fahrenheit and recording how fast the Lifesavers dissolved.

Methods/Materials
This process was achieved by measuring the 1/2 cup of water with a thermometer in the glass jar before dropping the Lifesavers in the water. As soon as the Lifesavers hit the water, the stopwatch was started. When the Lifesavers completely dissolved, the stopwatch was stopped. All 12 Lifesavers were recorded in this fashion.

Results
The Lifesavers dissolved at different rates due to the variability of ingredients and size.

Conclusions/Discussion
My results proved my hypothesis that Lifesavers dissolved at different rates.

Summary Statement
Lifesavers dissolving in water.

Help Received
Mother helped put together display board; Father helped with graphs; Sister helped type graphs.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Ryan D. Yoon

Project Number
J2136

Project Title
Noise Barrier Efficiency: Concrete Wall vs. Earth Berm

Abstract

Objectives/Goals
The purpose of this experiment is to research and decide which material would work best as a noise barrier to prevent noise pollution. The materials that will be tested include earth mounds, concrete walls and without any noise barriers.

Methods/Materials
The materials include: three Extech 407730 Decibel Meter, Decibel Calibrator ND9B, a 30 meter tape measure, and a stop watch. To test the noise barrier, arrive along a highway with the noise barrier being tested; concrete wall and earth berm. Calibrate decibel meters and set up the three decibel meter at their designated locations, in front of the noise barrier, 1m behind the noise barrier, and 5m behind the noise barrier. Record the noise level in decibels on a data sheet every 30 seconds for 10 minutes for each decibel meter simultaneously. Repeat steps 1 to 7 for each noise barrier.

Results
The earth berm noise barrier proved to be the most effective by reducing an averaged total of 19.31815 decibels and the concrete noise barrier reduced an averaged total of 17.10903 decibels. The highway alone without any noise barrier reduced an average total of 9.18185 decibels.

Conclusions/Discussion
The reason why the design of an earth berm worked better than a concrete wall is mostly because of the angle that it is at. If an earth berm is steeper than approximately 22 degrees, it will work efficiently. Wall. Concrete walls are based on their height. For every meter added to the height of the noise barrier, 1.5 decibels will be reduced. Because it#s easier to make an earth berm slightly steeper than it is to add a meter of concrete, earth berms are in general much more efficient. Another reason is because of the material. The earth berm is made of loosely packed soil so therefore, when sound waves make contact, it is not able to vibrate because there is so much air in between. Because the concrete is a much more rigid material with very little air, the sounds waves can easily vibrate and transmit through to the other side.

Summary Statement
By testing the decibel level of several locations by highways with different noise barriers and observing the results, we can see which noise barrier is the most effective.

Help Received
Mother helped by providing transportation to different testing locations

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
G. Will Abele, Jr.

Project Number
J2199

Project Title
Hot Pajamas! How Does Washing Flame Resistant Pajamas Multiple Times with Different Additives Affect Their Flammability?

Abstract

Objectives/Goals
I conducted this experiment to determine how washing flame resistant pajamas multiple times with different laundry additives would affect the flammability of the pajamas.

Methods/Materials
I cut ten strips of fabric from new, unwashed pajamas and timed how long it took each strip to ignite when held over a flaming candle.
Next, I washed four pairs of pajamas three times. Pajama 2 was washed with Kirkland Ultra Laundry Detergent. Pajama 3 was washed with Kirkland Ultra Laundry Detergent and Kirkland Fabric Softener. Pajama 4 was washed with Kirkland Ultra Laundry Detergent and Oxi Clean Stain Remover. Pajama 5 was washed with Kirkland Ultra Laundry Detergent, Kirkland Fabric Softener, and Oxi Clean Stain Remover. I cut ten strips of fabric from each pair of pajamas and timed how long it took each strip to ignite.
Lastly, I washed the same four pairs of pajamas seven more times, for a total of ten washings. Each pair of pajamas was washed with the same laundry additives shown above. I cut ten strips of fabric from each pair of pajamas and timed how long it took each strip to ignite.

Results
The unwashed pajamas ignited faster than the washed pajamas. The more the pajamas were washed, the slower they were to ignite. The effect of using different laundry additives was inconsistent and, in any event, minimal.

Conclusions/Discussion
Contrary to my hypothesis, unwashed pajamas ignite faster than washed pajamas. Laundry additives have little, if any, impact on the pajamas' flammability.

Summary Statement
I investigated whether washing flame resistant pajamas multiple times with different laundry additives affects their flame resistance.

Help Received
I received guidance from my teacher throughout the process. Also, I received help from my parents with washing 40 loads of laundry and with burning the fabric strips.