CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Coleman E. Baker

Project Number
J1901

Project Title
Deflection Detection: Wood That Stand?

Abstract

Objectives/Goals
Objective: The objective of this project was to see if pressure treated and fire treated wood were as sturdy as untreated wood and to determine whether chemically treated woods would make a good building material. My hypothesis was that untreated wood would be sturdier because it has not been treated with chemicals, which might cause chemical changes in the wood.

Methods/Materials
Methods and Materials: A stand was constructed from various 2 by 4 boards and pieces of plywood. A hole was drilled in the stand for the dial indicator. Pipes were nailed to the top of the stand to provide place for the test wood to rest. The untreated Douglas fir wood was cut into sixteen equal pieces and eight of those were sprayed with Fire Stop II fire retardant spray. The pressure treated Douglas fir wood was also cut into eight pieces the same size as the other wood samples. Each of the 24 pieces of wood were weighed and were ready for testing. The wood samples were then placed, one at a time, on top of the pipes so that the wood barely touched the dial indicator. The dial indicator was set to zero. A weight was placed on top of the wood at the center of the wood sample. The dial indicator#s probe was pushed down, and I recorded the reading of the deflection.

Results
Results: The pressure treated wood had the least amount of deflection and was the densest of the wood samples. The pressure treated wood had an average deflection of 94 mm. The flame retardant wood, which had the most deflection, had an average of 112 mm. The untreated wood had an average deflection of 110 mm.

Conclusions/Discussion
Conclusion: My conclusion is that the pressure treated wood showed the least deflection. When the chemicals were added to the wood, to protect it from fire and weathering, it did not significantly affect the amount of deformation under stress. The variation in stiffness was so small; it would probably not have any effects when used in the construction of homes or buildings.My

Summary Statement
My project tests deflection of different types of chemical treated wood to find which is the sturdiest.

Help Received
Parents helped purchase materials and supervised the building of the device.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Noam Baltinester

Project Number
J1902

Project Title
Soccer Ball Stitching: Does It Matter?

Abstract

Objectives/Goals
This project took place to see whether or not the stitching of a soccer ball affects how far the ball travels.

Methods/Materials
Materials: This project consisted of the following things: a #Kicking# machine and four soccer balls, a measuring tape and paper and pencils to record data.

Procedures: The machine is a swinging hammer suspended by a metal rod. The ball was placed on a designated spot on the bottom plank of wood (pg. 34). The balls were hit one after the other until each one was hit 50 times. The soccer balls were hit in order from 12 panels to 32 panels. The balls were hit in this system so that if there was a factor in the weather or anything else it would affect all the balls equally. After each ball was hit the distance traveled was recorded and later recorded on an excel spread sheet.

Results
Results: The results were inconclusive and the hypothesis was incorrect. The ball with the least amount of stitching did not travel the farthest. The reason the results were inconclusive is that there were many clashing results. Ball with 32 panels had the farthest average distance and ball with 30 panels had the shortest even though the stitching was very similar. On the other hand, the ball with 12 panels and the one with 32 panels traveled just about the same average distance but had totally different stitching patterns. The chance that the ball travels more or less because of the material it#s made from is ruled out because balls 12 panels and the one with 14 panels were made from the same material but had a significant gap between the distances.

Conclusions/Discussion
Conclusion: Although the results were inconclusive, a good amount of information is still available from the experiment. Based on the results it can be suggested to use the same ball type in tournaments so that all is fair and equal. Also I found out that the biggest reason most balls travel farther than others is the material the bladder is made of. Also if the balls are hand stitched or machine stitched makes a difference. Hand stitched is a tighter stitching and it lasts longer while machine stitching is more visible and does not help the ball travel farther.

Summary Statement
to see if the stitching (pannels) of the soccer ball affected if the ball would travel farther than other balls.

Help Received
Dad helped build machine; teacher helped with understanding how to write abstract etc.;

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Samantha Jean Beckett

Project Number
J1903

Project Title
The Effect Six Different Brands of Chocolate Have on the Glossiness of Handmade Candies

Abstract

Objectives/Goals
The objective of this experiment was to learn which one of six different chocolate brands results in handmade molded candies with the glossiest surface.

Methods/Materials
Six brands of raw chocolates were carefully melted and molded into candies, categorized and photographically recorded for evaluation. A reflective spot meter was used to make readings of reflective values before photographs and a digital color spot meter was used after image capture to gather data which was then graphed and evaluated.

Results
The results showed that the six brands of raw chocolates were quite different. Luminance values (fL) were; Wilton 64.122, Guittard 61.696, Ghirardelli 58.459, Nestle's 39.865, Raley's 42.934, and See's 53.800. Luminance values range from 0-black to 100-white and were taken with a 1 pixel digital color meter.

Conclusions/Discussion
In conclusion, one of the least expensive chocolates (Wilton Melt n Mold) was the glossiest and other, well known, more expensive raw chocolates (such as Nestle's) did now mold well for high reflective values. This experiment could provide information that would be very valuable to both advertisers of chocolates and photographic stylists that are employed to make foods look great for photography.

Summary Statement
The objective of this investigation was to learn what brand of chocolate resulted in handmade molded candies with the highest reflective value (glossiness).

Help Received
Mom helped collect and purchase materials needed and she supervised the melting of chocolate on the cooktop. Dad helped initial set-up of photographic and computer equipment.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

Leah Billeadeau; Courtney Lewis

Project Number

J1904

Project Title

Zip Factor: Which Brand of Sandwich Bags Has the Best Seal?

Abstract

Objectives/Goals

When strawberry juice ruined a lunch pail after leaking out of the baggy, we wanted to find out if there is a particular brand with a better zip-seal. We thought the name brand bags, Ziploc and Glad, would have the best seal

Methods/Materials

Testing four brands of sandwich size baggies, each was filled with one cup of colored water (total weight: 238 grams). Air was pushed out of the bags and the seals were compressed tightly 3 times. Each bag was suspended zip-seal side down from a plastic hanger with wooden clothes pins. We timed how long the bag seal could hold water until it leaked through the seal. The water was colored to make it easier to observe as it leaked. We did 25 trials for each brand. The average length of time bags hung without leaking determined which brand had the best seal. Bags were hung for a maximum of 60 minutes.

Results

Target bags did not leak water for an average of 50 minutes with 84% of the bags holding water up to 60 minutes. Great Value bags did not leak water for an average of 18 minutes with 20 % of the bags holding water for 60 minutes. Glad bags did not leak water for an average of 2 minutes and the Ziploc bag average was 7 seconds. Zero percent of the Ziploc and Glad bags held for 60 minutes.

Conclusions/Discussion

The data did not support our hypothesis. Target, a generic brand, did the best by holding the colored water for the longest time. Great Value (Wal-mart), also a generic brand, held the water the second longest. In fact, Glad and Ziploc, name brand bags, performed poorly and some leaked within seconds. Target was the least expensive and more than half the cost of Ziploc and Glad. Target is the brand to buy to prevent strawberry juice leakage in your lunch pail.

Summary Statement

We discovered that Target brand sandwich bags had a better seal and lasted the longest in preventing liquid from leaking out.

Help Received

Mother helped us type some of the project and Excel spread sheets; Dad showed us how to make graphs; Stepmother helped us design the Z in our project title on our board; Our science advisor helped us develop our abstract.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Holly C. Borg

Project Number
J1905

Project Title
The Oil Effect: The Removal of Oil from Bird Feathers using Common Household Solvents

Abstract

Objectives/Goals
The purpose of my experiment was to determine the most effective and safest way to remove motor oil from bird fathers.

Methods/Materials
The materials I used in my experiment were motor oil, 18 untreated craft feathers(that weigh .1grams each), T-Gel shampoo, L'Oreal Kids Shampoo, Dawn Dishwashing Detergent, Baby Powder, Baking Soda, Suave Conditioner, Water, Measuring Utensils, Clear Plastic Tupperware, Triple Beam Balance, Paper Towels, Toothbrush, Stopwatch, Composition Book, and a pen. I tested the buoyancy and weight of each feather at different intervals during the experiment. I tested the buoyancy of the feather at the beginning of the experiment, and after the whole process. I tested the weight at the start, then again after exposed to oil, and after cleaned with solvents. I 3 feathers for each solvent for 3 minutes. I used a toothbrush and water along with the solvent to cleanse the feather. The weight and buoyancy levels of each feather determined how much oil was removed.

Results
My hypothesis, that T-Gel shampoo would remove the most oil from the feather, was incorrect. Instead I found that L'Oreal and Dawn removed oil the best from the feathers tested. I found that L'Oreal and Dawn both returned their feathers to .3 grams after cleansing; all feathers weighed .1grams at the beginning of the experiment. Yet, the buoyancy test, proved different results. Baby Powder returned all its tested feathers to their original buoyancy level, while Suave Conditioner made all its feathers sink, and all other solvents retained the buoyancy of one feather while the other two sunk.

Conclusions/Discussion
L'Oreal and Dawn Shampoo were the most effective ways to remove motor oil from bird feathers. But, since my hypothesis was to find the safest and most effective way to remove oil from bird feathers, my results show that L'Oreal shampoo proves my hypothesis. Not only is L'Oreal gentle, it is tear free. So now, if the volunteers chose to use the shampoo, they could remove the oil from the birds head, moreover making the bird safer and healthier when it is returned to the wild. Since I found that Baby Powder enables the bird feathers to float again after exposed to oil, I have detected another process in which to remove oil. This data proves that L'Oreal and Baby Powder could be an alternative to Dawn Dishwashing detergent that is safer, more effective, and less time consuming.

Summary Statement
My project tests which household solvents will remove motor oil most effectively and safely from bird feathers.

Help Received
I did my project completely on my own.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

Steven Breitenstein; Brian Levin; Patrick Olsen

Project Number

J1906

Project Title

The Squeaky Wheel Gets Which Grease?

Abstract

Objectives/Goals

Every mechanical device a person uses has been lubricated to increase its efficiency. Our project focuses on identifying the lubricants that are best at reducing friction. In machinery the better the lubricant, the less energy needed to spin the wheel or gear. Tests like ours can help reduce energy consumption, thus lessening our pollution output.

Methods/Materials

Materials: String, 5 lubricants, Nut and bolt, Stopwatch, Clamp

Methods: The results will be based on the total time in which the nut spins, as well as the number of ridges on the bolt (distance) traveled by the nut, before friction pulls the nut to a stop. A stop watch will accurately measure the amount of time in which the nut spins, and we can count the number of ridges that the nut moves along the bolt. To ensure that no residue from separate lubricants interferes with the other types, the nut and bolt must be thoroughly washed and dried between tests. There will be five different lubricants as well as a control group using no lubricant at all. We will repeat the test 5 times to ensure accurate results.

Procedure:(1) Collect materials (2)Clamp the bolt (3) Put the nut on the bolt, lubricate well (4) Wrap string around nut (5) Stand on 20 foot mark and pull string and begin timing (6) When nut comes to a complete stop, stop timer, record (7) Repeat Steps 3 thru 6 five times.(8) Wash nut and bolt (9)Repeat steps 3 through 8 for each lubricant.

Results

The results of this experiment are quite clear. Using the amount of ridges traveled by the bolt, the magnetic aerosol turned out to be the most efficient, with graphite 2nd, and white lithium a close 3rd. In comparing the two types of data we collected # total spin time and number of ridges on the bolt traveled by the nut # we found some unexpected results. We thought that these two data items would directly correlate with each other. However, the WD-40 finished 4th in the category of ridges, but had the second longest spin time. Lubricants are used for different purposes # some are used for maximum endurance and others for maximum travel. Our results can help a person chose the right lubricant for their needs.

Conclusions/Discussion

This data does not support our hypothesis, which stated that graphite would be most effective lubricant. Magnetic aerosol moved the nut the farthest up the bolt. We have proven that some lubricants are more effective than others.

Summary Statement

Our project tries to determine which type of commercial lubricant is the most efficient at friction reduction.

Help Received

Our mothers took us shopping for supplies - and paid for them

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Christian A. Brown

Project Number
J1907

Project Title
Watered Down Facts

Abstract

Objectives/Goals
The purpose of this experiment was to determine if tap water or bottled water was more pure. Pure samples contain less constituents therefore they would be healthier for the body.

Methods/Materials
For this experiment I collected tap water from four different locations in the Frazier Park area: El Tejon School, Frazier Park Elementary School, Lake of the Woods, and Pinion Pines. I then purchased six leading brands of bottled water: Spring! (Natural Spring Water), Deja Blue (Purified Drinking Water), Evian (Natural Sping Water), Aquafina (Purified Drinking Water), Crystal Geyser (Natural Alpine Spring Water), and Arrowhead (Mountain Spring Water). I used water testing strips from "Water Works School Test Kit" to test for nine constituents determining the purity level of each water sample. The nine constituents I tested for were: Free Chlorine, Total Chlorine, Iron, Copper, Nitrate, Nitrite, pH, Total Alkalinity and Total Hardness. I tested each sample six times for validity running a total of 539 tests in all. With each test I was able to determine the parts per million (ppm) for each constituent so that I could compare the tap water samples to the bottled water samples.

Results
Total Alkalinity and Total Hardness were found to have the most amounts of measurable data resulting in well over 100 ppm. The pH and Nitrates showed an average of 10 ppm or less while the remaining five constituents--Free Chlorine, Total Chlorine, Iron, Copper, and Nitrites--tested below detectable limits.

Conclusions/Discussion
My results supported the portion of my hypothesis which stated tap water would be healthier for the body. My results disagreed with the portion of my hypothesis which stated that tap water would contain less constituents. I discovered that tap water contained a higher level of hardness and alkalinity. I learned that certain constituents such as alkalinity and hardness are necessary to replenish the minerals that the body uses throughout the course of the day. My finding is that tap water is the healthiest alternative.

Summary Statement
This experiment was to see if Frazier Park's tap water was compared to bottled water, would the tap water contain less constituents and would the tap water result in a healthier form of water.

Help Received
My Mom was my lab assistant, chauffer and financial supporter of this project; Mrs. Bloom was my Project Advisor; Mr. Robert Cortez and Mrs. Kerri Vaughan with Zalco Labs had provided information and ran two complimentary test; my mentor, Dr. W, Wayne Cooper, provided his knowledge and advise

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Faith A. Bryer-Ash

Project Number
J1908

Project Title
Third Headlight Is No Fifth Wheel

Abstract

Objectives/Goals
The purpose is to test the hypothesis that an additional central headlight at eye-level, which will turn on with the original two headlights, can cause faster reaction times for on-coming traffic to prevent more head-on accidents.

Methods/Materials
The Procedure is to design a board to make it look like a car is coming at you. Cut three circles in the front of car (two where the headlights are, and one below the windshield in the center) and place light bulbs in the holes. Attach the wires to a battery and to a) two side headlights and b) one light. Have the tester sit in a chair and hold the stopwatch. When you press the button to activate the chosen amount of lights and a button to activate the stopwatch, the participant presses the stop button to stop the stopwatch when they see the light. Record that time. Repeat process three times. Average times. Test the same participant#s reaction time again, but only with the two headlights. Record data. Repeat three times. Do the same process to twelve other people to come to a total of thirty-nine tests each for the two lights and three.

Results
The results are that the individual test with three lights averaged: 0.24, 0.24, 0.31, 0.22, 0.31, 0.25, 0.31, 0.43, 0.25, 0.16, 0.19, 0.26, 0.27 seconds. The overall average was 0.26 seconds. This is a significantly faster reaction time than the tests with only two lights, proving that the hypothesis was correct. The averages of each test for the two lights are 0.28, 0.29, 0.35, 0.21, 0.43, 0.22, 0.36, 0.44, 0.21, 0.21, 0.26, 0.25, 0.32 seconds. All the reaction times for the two lights as a mean are 0.29.

Conclusions/Discussion
If the cars that are simulated in this experiment (the car on the board and the participant in a car) are going thirty-five miles and hour, and if they were fifty feet away from each other going opposite directions but only one of the cars had a third brake light, then the distance of the cars would be 1.25 inches more apart than if you did this experiment with only two lights. Considering that both cars had the third light, then this number would double to 2.5 inches of space that the vehicles are distanced from each other. This would support the saying, #I just missed an accident by inches.# Sometimes inches are enough to make a big difference in whether you have an accident or not. Further testing in a real life scenario would increase the knowledge of the benefits of the third headlight.

Summary Statement
My project is to determine whether it is an advantage to have an additional third eye-level headlight versus the two standard headlights on cars.

Help Received
Father helped cut, drill, and wire board.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Kamala N. Buchanan

Project Number
J1909

Project Title
Knit Happens: A Yarn about Shrinkage

Abstract

Objectives/Goals
This experiment was designed to determine whether the type of yarn used in a knitting project affected its shrinkage rate when washed and dried. I hypothesized that the type of yarn would have an effect on the shrinkage rate, and that this effect would be due to the fiber material, and whether it was natural or synthetic.

Methods/Materials
Using six different types of yarn, I knitted 30 4-by-4 swatches: 5 swatches per yarn. After knitting them, I washed and dried them all in increments of 6, such that there was 1 swatch of each type in the washer and dryer at any given time. The swatches all washed and dried in the same circumstances. I then found the area after washing, and compared that to the area before washing, which was 16 square inches.

Results
I found that there was a significant difference in the post-washing areas of every swatch. After washing, they ranged in area from 16 square inches (no difference) to 11.2 square inches, which shrank 30%. However, when I found the average shrinkage rate of the natural and synthetic fibers, they came out to 12.9 and 13.9 square inches respectively; too close to be able to conclude a difference. So I examined other factors. I found the ply, or bulkiness, of each yarn, by calculating the wraps per inch (WPI) around a standardized stick. I found that the bulkier the yarn, the less it shrinks in the wash. For instance, the Homespun yarn, which did not shrink at all, had a ply of 7 WPI, whereas the Phoenix yarn, which shrank 30%, had a ply of 12 WPI.

Conclusions/Discussion
Using my data, I found a prediction equation for yarns of any ply. If x is the ply and y is the percentage shrunk, the equation $y=4.81x-33.71$ is approximately the percent any yarn will shrink when washed. While this equation will not provide you with exact numbers, it is a close approximation, and can be useful to determine whether a knitted object should be washed or not.

I hypothesize that the number of fibers in a yarn affects the shrinkage rate because more fibers add more insurance against shrinkage. If there are very few fibers, then a greater percentage of them will shrink, and vice versa. However, I do not believe that the ply is the only factor that affects shrinkage. There are many factors of yarn I did not test. This makes it very difficult to control all the variables when experimenting with yarn, but it also opens up an unlimited number of possibilities for further exploration.

Summary Statement
This project determines whether the type of yarn used in a knitting project affects its shrinkage rate when washed and dried.

Help Received
Mother taught me how to knit; friends and teachers offered help and support; parents both paid for supplies.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
James P. Chenevey, III

Project Number
J1910

Project Title
Effectiveness of Fire Retardant Paints

Abstract

Objectives/Goals
When I found out that there were types of house paints that could protect a home in the case of a fire, I wanted to see if the paints really worked. In California in the fall, Santa Ana winds cause wildfires all over the state. Any protection that one could offer a home should be considered. The purpose of this test was to see if fire retardant paints were truly effective. The idea of these paints is that the paint exposed to the heat will #puff up# providing a carbon barrier to block the fire#s fuel supply. Based on my research, I believed that the fire retardant additive would be most effective.

Methods/Materials
I tested a fire retardant house paint that was pre-mixed and a paint additive that could be mixed into any plain, water-based, latex paint. For my control samples, I tested the same latex paint and plain cuts of Douglas fir. I burnt each plank of wood with a blow torch at approximately 1300 degrees Fahrenheit for a minute from 5 cm. After a minute I removed the blow torch and timed how long it took for the fire to extinguish itself.

Results
Unexpectedly, all the wood samples did not burn as much as I had predicted. I found the pre-mixed paint lost an average of only one gram and took an average of only 0.14 sec. to extinguish itself. The paint additive samples had about the same amount of weight loss as the wood with ordinary latex paint. These samples lost about three grams on average. The fire retardant additive samples took approximately 5.5 sec. to extinguish itself. The ordinary latex paint took approximately 6.5 sec. to extinguish itself. The wood with no paint lost an average of four grams and took approximately 6.75 sec. to extinguish the flames. In order to obtain a more significant weight loss in the wood samples, I set up a second testing where I burned twenty-eight more wood samples and for two minutes at a closer distance of 2.5 cm.

Conclusions/Discussion
According to my findings, the factory mixed fire retardant paint was most effective in stopping the fire and its spread. I also found the fire retardant paint additive was effective and that a flat latex paint also provides some fire protection compared to plain wood. If I were to do this project again, I would try to control the humidity and see how it affected the burning of the wood samples. I recommend using a fire retardant paint if you live in Southern California because it might save your home from a wildfire.

Summary Statement
The purpose of this project was to determine whether fire retardant paints were truly fire resistant when applied to wood and exposed to a flame.

Help Received
I would like to thank my father for driving me to Home Depot and for supervising my testing. I would like to thank my mom for helping me with my board. I would like to thank my science teacher for her advice and help with my project.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Katherine L. Hahn

Project Number
J1911

Project Title
Showering: More Heat with Less Water

Abstract

Objectives/Goals
My objective is to indentify the key aspects of a showerhead design that transfers the maximum amount of heat to the body using the least amount of water.

Methods/Materials
The materials used in this project were, funnel, hose, thermometer, plastic bag, fifteen showerheads, and timer.
Procedures:
1. Fifteen showerheads were timed to see how long six gallons took to spray. A plastic bag of 90 degrease water was then hung twelve inches away from the shower in a position that the shower hit when running.
2. Each showerhead sprayed out six gallons of water, hitting the bag when running. The shower sprayed water at 110 degreases.
3. After six gallons have been sprayed out, the temperature of the bag was recorded to see how much the temperature of the bag rose.

Results
Showerheads numbers 2, 6, 7, and 15 had the best GMP per temperature increase.

Conclusions/Discussion
Based on this experiment, it appears that showerheads that spray droplets of water in random patterns tend to transfer more heat with less water.

Summary Statement
By using a showerhead with the key aspects identify in this experiment, less water will be wasted by taking showers, even by changing something as little as a showerhead can really help conserve water.

Help Received
Dad helped edit papers. Mom helped with board.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Hannah L. Heitzig

Project Number
J1912

Project Title
Yucky Water: Is Your Water Safe to Drink?

Abstract

Objectives/Goals
The objective is to test water samples from different sources for various properties such as bacteria, lead content, pH Levels, etc. My hypothesis was that Thousand Oaks tap water would be cleaner than the other samples tested.

Methods/Materials
I obtained water samples from 4 sources including tap water from my home in Thousand Oaks, Arrowhead Bottled Water, tap water from Van Nuys, and tap water from a United Airlines 747. I used test strips to measure the levels of Lead/Pesticides, Nitrate, Nitrites, pH, Chlorine, and Hardness. To measure the bacteria content, I filled a vial with a bacterial growth powder and the selected water samples. I kept the vials in a warm place for 48 hours and then determined whether bacteria was present or not based on the color of the water.

Results
None of the samples tested showed the presence of bacteria. All other measurements were within the normal, or desired, range except the hardness level for the Thousand Oaks tap water. The desireable range of hardness for drinking water is below 50 ppm. This water sample showed a hardness level of 120 ppm!

Conclusions/Discussion
I found the Arrowhead Bottled Water tested best for drinking water, while the Thousand Oaks Tap Water had the overall worst results. I was pleased that all the water samples tested were safe and none showed signs of bacteria.

Summary Statement
My project tested various drinking water samples for the presence of bacteria, lead, pesticides, etc.

Help Received
N/A

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Christine E. Herrmann

Project Number
J1913

Project Title
It's "Counter" Intuitive! A Study of the Effectiveness of Different Kitchen Countertop Surfaces

Abstract

Objectives/Goals
The purpose of my science fair project is to determine the most functional kitchen countertop surface based on durability, stain resistance, and cost.

Methods/Materials
I selected several countertop materials to test and found samples of each. Next I developed tests to determine the functionality of each countertop, including durability and stain tests. For durability I dragged a weighted knife, dropped a soup can from a constant height, and held a direct flame to each sample (a test I eliminated, given no variation in the results). To test for stains I drew on each sample with a Sharpie, crayon, marker, and pencil. I also placed a drop of food stains on each sample for an hour before wiping them with a damp sponge. I then entered all of my observations into an Excel database, converting my qualitative notes to numbers.

Results
Most kitchen countertops are very effective these days. All are durable and heat resistant, and most are also stain resistant. For the budget-conscious person, Formica would be their best bet. Next ceramic or porcelain tile would be best. The natural stones were the least functional and durable. My project did not consider aesthetic value, which may influence a consumer#s decision in spite of my analyses.

Conclusions/Discussion
The results of my experiments were counter intuitive. My hypotheses were very incorrect. I had expected the black granite to be among the top countertops, yet it ended up among the bottom six of the samples I tested! Even more surprising was how well Formica did. I thought that my three Formica samples would be at the very bottom, but they actually took the top three places. In completing my project I was especially surprised to find that it is virtually impossible to light any countertops on fire. Even with a direct flame, I could not get Formica to burn, which shows that over the years, man-made surfaces like Formica have improved dramatically.

Summary Statement
My science fair project tested the functionality of different kitchen countertop surfaces based on durability, stain resistance, and cost.

Help Received
Mother helped collect countertop samples;

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Amelia C. Hillier

Project Number
J1914

Project Title
I Bet You'll Never Guess What Puts Out Fires Best!

Abstract

Objectives/Goals
My hypothesis was that the firewater would put the fire out more effectively. The problem I was attempting to solve is what is the best substance to use when putting out a fire? I plan to build a contraption that can have a fire in the bottom and liquid in the top. I will dump the liquid onto the fire to see how many dumps it will take for the fire to completely extinguish.

Methods/Materials
I first measured out the water and the wood. I took out 2.46 milliliters of water to add the 2.46 milliliters of soap if necessary. Then I poured the 30 milliliters of lighter fluid onto the wood after it had been placed in a baking tin. Then I placed the tin in the bottom box and lit a match. I let the fire burn for ten seconds and then poured the water into the tin on top and then pulled the lever which released the water. I repeated this until the fire was completely out. One thing I learned was that many things can be added to water to reduce its surface tension.

Results
It took an average of 2.4 dumps to put out the fire. Regular water took an average of 4.25 dumps before it went out. Firewater turned out to be third between Jet Dry with 2.75 dumps and Tide Detergent with 2.55 dumps. Firewater took 2.55 dumps to extinguish.

Conclusions/Discussion
I found that Dawn Soap mixed with water, was the best to put out a fire.

Summary Statement
How does the type of soapy substance affect its ability to put out a fire?

Help Received
My dad helped me build the fireproof box and my mom and sisters helped me measure out things during the testing. My project was approved by the firefighters at the Santa Barbara Fire Station.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Ryan M. Howes

Project Number
J1915

Project Title
Explosions

Abstract

Objectives/Goals
The purpose of my project was to determine which resealable bag could withstand the most pressure without breaking. I predicted that Glad Zipper Bags would perform the best in my experiment.

Methods/Materials
The experiment involved combining vinegar, water, and baking soda to form a chemical reaction that would test the strength of each brand of reclosable bags. The bags were labeled and then the same combination of baking soda, water and vinegar was added to each of the bags. They were sealed, shook, and the results recorded. The experiment was repeated three times for each of the bags to be tested.

Results
Of the five resealable bags tested, the Vons/Safeway store brand withstood the most pressure without breaking or the seal opening.

Conclusions/Discussion
The Vons/Safeway resealable sandwich bags consistently preformed better than the other bags tested. It would be the brand to use when strength is needed

Summary Statement
The purpose of my project was to determine which brand of resealable sandwich bags could withstand the most pressure.

Help Received
My mother took pictures for the project board and journal.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Lisa Huang

Project Number
J1916

Project Title
Tone Perception and Flute Compounds: Is There a Correlation?

Abstract

Objectives/Goals
The objective was to determine whether there was a correlation between the type or placement of metal in a flute and the tone quality that an audience would perceive. My hypothesis was that the handmade flute with a 14k gold riser and sterling silver headjoint would outperform the other samples.

Methods/Materials
The materials included a sound recording system, several flutes with different metallic properties, survey for human subjects, sheet music, disinfectant, and a metronome/tuner. I played on and created a recording with the above flutes. Over 50 volunteers listened to the recording, completing the survey. They chose 1 from 4 different words describing the tone quality, and rated each flute#s tone on a rubric from 1-4. Each tone description represented the tonal "feel" (eg., pop singer vs. opera singer). The average of every flute's score and each separate tone description's percentages were computed to determine if there was a connection to metallic properties.

Results
The highest scoring flute had a double gold-plated lip plate and the second highest had a gold riser. Between the lowest and highest scoring flute, there was a 19.92% difference. The highest-scoring flute had 42.2% of its descriptive words as "rich" compared to a nickel flute with the lowest percentage - a 17.4%. The handmade flute with the 14k gold riser had 13% of its descriptive words as "thin" compared to the same handmade flute without the gold riser where 33.3% of its words were "thin". "Rich" was defined as "warm, powerful, strong". "Thin" was "shrill, reedy, transparent".

Conclusions/Discussion
My hypothesis that the handmade flute with the 14k gold riser and sterling silver head joint would have the best tone quality of my samples was unsupported because the machine-made flute with the double gold-plated lip plate and sterling silver head joint scored highest. I found there to be a correlation between the flute materials and tone perception because of the differences in tone description percentages and tone quality averages. My experiment suggests that the presence of gold in a flute makes a difference in the audible tone quality towards an audience.

Summary Statement
My project tested whether there was a correlation between a flute's metallic properties and tone quality by testing a given audience with a flute recording I created.

Help Received
Borrowed flutes from flautists in my school band; Teachers for letting me use their students to test; Choir director Gail Barbour and band director Steve Charnow for use of recording equipment

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Annie Kingman; Anna Stroe

Project Number
J1917

Project Title
Energizer

Abstract

Objectives/Goals
The reason we did this project was to see which type of alternative fuel source provides the most amount of energy. We compared the plant based material to coal and gel alcohol to see if it would be a better choice for power plants to burn.

Methods/Materials
We used the following experimental method in our project and these formulas helped us find the biomass energy content:
To find total energy content we multiplied 50 g of water (assuming a density of 1g per 1ml) with the heat gain that equals total energy content. (50 gxH=TEC)
Then, we needed to find the fuel consumed which was the mass before minus the mass after and we got the fuel consumed (MB-MA=FC).
To find the total energy per gram we took the total energy content divided by the fuel consumed and we got total energy per gram (TEC/FC+TEC per gram).
Finally we took the total energy content minus the gel alcohol energy content (from the gel alcohol test alone) and we got the material energy alone. (TEC-GAE=BE).

Results
We found the two highest energy generators were the gel alcohol and the coal; however, it takes energy to create these materials. Out of the plant based materials wood was the highest. Plants are the best choice to burn because they take C02 out of the air when they grew.

Conclusions/Discussion
After much discussion we decide there really wasn't an overall best because each material had its pros and cons. For example, the plants take CO2 out of the air when thy grow, but they don't have a high energy content. The gel alcohol has a high energy content but it reqires energy to be made.

We burned different material to see which on had the highest energy content.

Summary Statement
Which alternative fuel source has the highest amount of energy

Help Received
My Dad supervised the burning of materials and my Science teacher Ms. White guided us the first steps to get started.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Bryan I. Kronenberg

Project Number
J1918

Project Title
Which Insole Lasts the Longest?

Abstract

Objectives/Goals
The objective of this project was to find out which replacement insole stays the thickest under constant compression over five days.

Methods/Materials
Four major brands of insoles were purchased: Dr. Scholl's, Rite Aid, Spenco, and Life Fitness. A 2x1 inch rectangle was cut from the ball-of-foot area of each insole. The thickness of each insole piece was recorded. Then, the insoles were placed on a hollow, rectangular steel tube with tapped holes. Another tube With non-tapped holes was placed on top of the insoles, then bolted down with ten bolts. Each bolt was tightened to 100 inch-pounds using a torque wrench. After three days, the insoles' thickness was measured, then the blocks were re-set and tightened for another two days. The thickness was recorded again.

Results
When the blocks were removed and the insoles were allowed to sit for ten minutes so that they could regain part of their lost thickness. When measured, Dr. Scholl's remained the thickest, then Rite Aid, then Spenco, and last was Life Fitness.

Conclusions/Discussion
My conclusion is that Dr. Scholl's is the best insole. According to my project, they are high quality and last long. However, after about a week, Life Fitness started to spring up again, almost completely reaching its original thickness. However, I do not believe this is too important, since it would take a whole week to regain its thickness.

Summary Statement
My project is about finding which insole lasts the longest under constant compression.

Help Received
Mr. Rodger Thomason provided machinery for project; Mother helped type data table; Both parents drove me to and from Mr. Thomason's house.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Austin H. Lee

Project Number
J1919

Project Title
What Is the Most Effective Fire Retardant for Both Large and Small Fires?

Abstract

Objectives/Goals
This experiment was carried out to identify the most effective fire retardant overall in both large and small fire situations.

Methods/Materials
Six sets of five 5"x5" squares of different materials; wool, rayon, cotton, polyester, and paper, were soaked in 6 different fire retardants; soap water, cornstarch, flour, baking powder, Flame Stop, and Flame Guard. One set was left untreated. All of the materials were hung to dry for one day. Then, over a barbecue grill, a lighter was held at each square until ignition and that time was recorded.

Results
The retardants flour, soap water, and cornstarch created an almost unnoticeable change in ignition time for all of the materials. Baking powder, Flame Stop, and Flame Guard made great changes to the ignition time.

Conclusions/Discussion
The baking powder, as predicted, outperformed flour, cornstarch, and soap water in functioning as a fire retardant. However, the two commercial fire retardants were far superior to all of the homemade ones, preventing the materials from igniting at all and, instead, just allowing them to be blackened.

Summary Statement
The project was used to find out what common household substances work well as fire retardants.

Help Received
Father supervised fire.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Carl P. Lejerskar

Project Number
J1920

Project Title
Fully Charged

Abstract

Objectives/Goals
I believe all of the batteries will all last at least 24 hours, but more popular brand-name batteries like Energizer and Duracell will provide longer, higher, and more continuous amperage than other batteries.

Methods/Materials
Materials: Multimeter that is able to measure both amps and volts. 5 Brass Indoor Electric Candles; 2 Home Alkaline Batteries; 2 Duracell Batteries; 2 RadioShack Alkaline Batteries; 2 Alkaline Enercell Batteries; 2 Energizer Batteries; Timer; Ruler.

Method: 1. Obtain two batteries from each brand. 2. Mark one battery of each brand with a black permanent marker. 3. Set the multimeter to AA voltage measurement. 4. Connect the red, positive wire, to the positive side of the battery. 5. Connect the black, negative wire, to the negative side of the battery. 6. Record the voltage. 7. Repeat steps 1 through 6 for each battery. 8. Unplug the red wire from the multimeter, and plug it into the first hole. 9. Set the multimeter to the amperage measurement. 10. Repeat steps 4-5. 11. Read the Amperage. 12. Place the batteries into the electric candles. 13. Repeat steps 3-13 for each candle. 14. Set the timer on for one hour. 15. Turn off all candles when timer goes off. 16. Repeat steps 3-14 regularly until the battery runs out of power.

Results
All battery brands lasted past 24 hours, and even 33 hours, until they could not be tested further. Through the data I could collect, I predict that Energizer would last the longest, and Home Life Alkaline the shortest.

Conclusions/Discussion
In support of my hypothesis, the brand name Energizer was the most successful battery and will likely be the longest lasting battery, whereas Home Life Alkaline was the least successful battery.

Summary Statement
Which battery brand lasts the longest?

Help Received
Mother helped with the board. Brother helped with the format of report.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Eddie Martinez

Project Number
J1921

Project Title
Oil Viscosity and Flow

Abstract

Objectives/Goals
Which motor oil has the best viscosity and flow under different temperature conditions?
After going through a blind test, by looking at the color of the oils and how they flow, I would say that the better brand of motor oil would have to be Quaker State. It has a color that#s in between light and dark and has a descent flow.

Methods/Materials
30w Motor Oils-Napa, Castrol, Quaker State, Valvoline, Pennzoil
A metal track (24#-12# metal sheet, wood, screws, glue)
Small plastic top wares (at least 8)
Tape
Temperature Laser Gun
2 Heating Pads (miniature stove)
Freezer
Color marker, or pen
Ruler
Protractor
Paper towels
Droppers (1ml)
Beaker # 80ml (glass cup)
Stopwatch

Results
1ST TEST- Castrol 1:03:35 Napa 00:44:91 Pennzoil 1:27:36 Quaker State 1:03:28 Valvoline 1:22:35
2ND TEST- heated up to 212 degrees (100 degrees C)
Castrol 00:28:29 Napa 00:06:63 Pennzoil 00:28:43 Quaker State 00:04:38 Valvoline 00:05:22 3RD TEST- cooled down to 32 degrees F. (0 degrees C)
Castrol 01:04:32 Napa 01:10:76 Pennzoil 01:38:49 Quaker State 01:33:39 Valvoline 01:24:22

Conclusions/Discussion
All motor oils are not the same, even though it might look like they are, theres a slight difference which was proven by my tests. Over all, the better motor oil that would work best, in all these type of weather conditions would be Napa motor oil. The worst or not so good motor oil would be Pennzoil motor oil. After finding this out, my hypothesis was proved wrong.

Summary Statement
Out of five different 30w motor oils, which one has the better viscosity and flow under different temperature conditions.

Help Received
Mr. Minton helped with the idea of this project ; Bob, a friend helped with suggestions ; Cousin helped build and run my experiments ; Mom helped take me to stores ; NAPA, HOME DEPOT, RITE AID, OFFICE DEPOT, provided me with materials

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Jamie M. Mensching

Project Number
J1922

Project Title
Dyeing to be Pretty: A Study of Natural Dyes

Abstract

Objectives/Goals
I am experimenting with natural dyes. I want to find out how well natural dyes color different types of natural fabrics. I used a series of different natural dyes with different mordants that helped to set the dyes. These were applied to different natural fabrics.

Methods/Materials
I took 3 natural fiber fabrics (linen, silk & cotton), prepared sample pieces with 4 different mordants and I left 1 sample of each fabric untreated. I prepared 3 different natural dye bathes and treated each sample. All fabric samples were looked at visually and microscopically. A pH test was also run on each fabric sample. Next the fabrics were compared within each category. (Ex. all silk fabrics were compared by fabric type, mordant type, and dye.)

Results
Because of the number of variables and the resulting combinations (3x3x5) there were many resulting fabric samples. In some cases, certain combinations of mordant and dye worked very well. In others, they didn't permeate the fabric as well.

Conclusions/Discussion
In my series of tests, I found that in the fabric category, silk accepted the dye best. In the mordant category, alum prepared the fabric the best to receive the dye. In the dye category, cranberry had the darkest color saturation. The pH make up of the mordants and dyes greatly effected the resulting color of the fabrics.

Summary Statement
Studying natural dyes and natural fabrics with various mordants.

Help Received
My mom helped me finish my board, my science teacher allowed me to use equipment, and my dad helped me with the mordants and the dyes.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Brian M. Messner

Project Number
J1923

Project Title
The Limits of Going Green: Cold Weather Effects on Biodiesel

Abstract

Objectives/Goals
My project was to find which common blend of biodiesel (which is blended with #2 diesel) will perform best in cold conditions. I was also trying to find which one of them gelled or thickened the least. This is a major problem with biodiesel in cold weather.

Methods/Materials
I used a freezer set to 0 degrees, a refrigerator set to 35 degrees,18 samples of biodiesel blends, fuel line tubes, a ruler, a stopwatch, wood, red pen, pencil, liquid measuring tube, 5 gallons of biodiesel, 3 gallons of #2 diesel, and a temperature gun.

Results
My results were that of the 5 variables, the 5%bio/95% #2 diesel blend performed best. Next was the 10%bio, 20%bio, 50%bio, and last, the 100% bio blend. My control, a 100% #2 diesel sample performed best over all. A cool part of all this was that at 0 degrees, neither the 50% or 100% bio samples even came out of the glass test jar because they were so gelled. The 20% bio sample thickened a little bit, but still flowed okay. All the rest flowed fine.

Conclusions/Discussion
I found that in 0 degree conditions, it isn't wise to use a blend above 20% bio because most likely, any other higher blend will get to gelled, such as the 50% and 100% bio samples did in my tests. But this only applies for cold areas.

Summary Statement
I did this project to find which common blend of biodiesel would perform best in cold conditions.

Help Received
My mom helped me assemble display board. My dad helped assemble test rig.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Grace I. Ng

Project Number
J1924

Project Title
Rust, Rust, Go Away. Don't Come Back Another Day

Abstract

Objectives/Goals
Metals remain the favorite raw material to be used to build enormous structures as big as oil drilling platforms to as little as small nails. Unfortunately, it is a constant battle to ward off rust from developing in metals. There are many means to prevent rusting, however many are hazardous to human health and harmful to the environment. This research is attempting to use safe common household products to explore ways to protect metal from rusting in different environments.

Methods/Materials
Use steel wool to remove any protective and/or galvanized layer. Pick six nails to be the controls, six each to be coated with vegetable oil, shortening, mink oil, baby oil, Lanolin, and Vaseline. Place nails into cups filled with tap water, tap water and vinegar, rain water, and tap water with salt; completely submerge the nail and place it outdoor under the shade. Observe and record the changes over a 7-day period.

Results
Lanolin provided the best protection. Vaseline was almost as good as Lanolin in the salt water and vinegar water. Mink oil and shortening provided moderate protection. Baby oil and vegetable oil seemed to provide the least protection. The condition of rusting for the control was, somehow, similar to baby & vegetable oils. The medium and conditions played a significant role for the extent of rusting. Rusting in salty water was substantially higher for all coatings.However, nails in vinegar water did not rust at all.

Conclusions/Discussion
No single coating material worked well in all environments. Depending on the medium and conditions, many of the coatings ended with no rust to complete rust in a relatively short time. Salt water hastened the rusting process to a much greater pace. Nevertheless, most of the time, any protection was better than none at all.

Summary Statement
Explore safe coating materials that slow rusting and examine effectiveness of coating materials in different environments.

Help Received
Dad and Mom gave advice; Brother and Sister inspired; Mrs. Maiorca supported in every way.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Ashley S. Ogasawara

Project Number
J1925

Project Title
Energy to Burn! Sugary vs. Healthy: Which Type of Cereal Oxidizes the Highest Amount of Caloric Chemical Energy?

Abstract

Objectives/Goals
My project compared five sugary breakfast cereals to five healthy breakfast cereals to determine the amount of caloric chemical energy stored in each cereal. My hypothesis was that Apple Jacks cereal would oxidize the highest amount of caloric chemical energy because it has the largest amount of sugars per serving.

Methods/Materials
I constructed a homemade Calorimeter to capture caloric chemical energy by measuring the increase of temperature of distilled water after the heat captured in the cereal is released by the chemical reaction of oxidation. Once the raw data of milliliters of water, temperature of water in °C, and weight of cereal in grams was recorded before and after oxidation for ten trials per cereal, the calculations of energy released per cereal/per unit weight were averaged.

Results
Honey Nut Cheerios released the highest amount of caloric chemical energy with an average of 1,388 calories per gram.

Conclusions/Discussion
Sugary cereals and healthy cereals oxidized relatively similar total amounts of caloric chemical energy per gram. The data suggests that the healthy cereals in my experiment contained high amounts of processed sugars or simple carbohydrates which are easily oxidized by cells in the body. Yet, the cereal which contained the highest amount of caloric chemical energy is high in starch and glycogen, which are easily digestible forms of complex carbohydrates. Glucose is the major energy source needed by the cells in the body to maintain and perform optimal cellular functions.

Summary Statement
Many students consume cereal to sustain optimal physical and intellectual energy levels at school, but which type of cereal, sugary or healthy, supplies the cells in the body with the highest amount of caloric chemical energy to burn?

Help Received
Mother helped take photos, obtain food science/chemistry books, and purchased cereals; Father helped construct display board and purchased project materials; Dr. Andrew Olson of Stanford University advised me concerning project design; The experts at Science Buddies answered my math questions.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
David A. Proctor

Project Number
J1926

Project Title
Tennis String Stretching

Abstract

Objectives/Goals

To detemine the amount of elastic deformation of polymers in common brands of Tennis Racket String by stretching under equal amounts of tension and measuring the length of the stretching.

Most tennis players know that tennis string stretches and that different brands produce various amounts of spin. In my research I found another experiment that determined that Nylon string produced the most spin on a tennis ball. This project is to determine if there is a connection between the material of the string and its elasticity. My prediction is that the brand 'Forten 16 gauge' should stretch the most because it is made of pure Nylon.

Methods/Materials

1 Racket Stringer with manual tension control.
7 different brands of tennis string
1 Metric Ruler
1 Tension Calibration Device

Each brand of string was stretched under a constant 28.7kg of tension and measured to find the total length of stretching.

Results

Brand 'Wilson Reaction 16 gauge Multifilament' stretched the greatest amount at 1.2cm, while brand 'Max Touch Hybrid Main 17 gauge (kevlar)' stretched the least at 0.2cm. My prediction of the 'Forten 16 gauge' brand was in second place at 1cm.

Conclusions/Discussion

My hypothesis about the 'Forten' brand was not supported by my data. The 'Forten' brand was not the most or least elastic, but tied for second. This must mean that there must be other variables that determine a balls spin other than the material it is made out of. This would need to be investigated further before a conclusion about a string's perfomance can be made.

Summary Statement

The possible connection between the elacity of tennis string and it's ability to put spin on a ball.

Help Received

My mother helped with the research and producing the board.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Luisa A. Ramirez

Project Number
J1927

Project Title
Fire Retardant

Abstract

Objectives/Goals
My objective was to learn if Flamex PF Fire Retardant really did delay the burning of cotton, polyester, cardboard, paper, and cork, and on which material would it work better on. My hypothesis was that I think that Flamex PF Fire Retardant will work on each material but the time it takes to retard the fire will vary. I think that the flame retardant will work better on cork because cork is said to be fire retardant.

Methods/Materials
The materials I used were the Flamex PF Fire Retardant, cotton, polyester, cardboard, paper, and cork. I also used a gas lighter to burn the materials and a timer to record the time it took the materials to burn. First I placed a pair of cotton material on the grill. Next I sprayed an even amount of fire retardant on one of them. Then I lit up the two of the materials. I recorded the time it took the material without fire retardant to burn and the material with fire retardant to delay fire. I repeated these steps replacing the cotton materials with polyester, paper, cardboard, and cork.

Results
Each of the materials without fire retardant burned completely, each at its own pace. Cork took the longest to burn and polyester took the shortest amount of time to burn. But the materials with fire retardant did not even ignite. Polyester did light up and burned completely in only 12 seconds. Even though polyester did burn with the fire retardant, it took longer for it to burn than without the fire retardant.

Conclusions/Discussion
The evidence did not support my prediction because the fire retardant did work one each of the materials except for polyester. I could not really say that the time it took for the materials to retard fire varied because all of the materials never lit up except for polyester.

Summary Statement
I bought a fire retardant spray from the internet and tested it on cotton, polyester, cardboard, paper, and cork, and found out it prevented the materials from igniting except from polyester.

Help Received
Father helped me burn the materials.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Alexander T. Ryan

Project Number
J1928

Project Title
Fire Prevention by Water Retention

Abstract

Objectives/Goals
During the recent San Diego wildfires, some homeowners protected their houses with a preventive fire fighting gel. I wanted to test how effectively these gels protect wood. I theorized that the gels would be ineffective because all of the water would soak into the wood, or the wood would heat to a point where it would spontaneously combust.

Methods/Materials
I tested painted and unpainted samples of Douglas fir 2x4, Douglas fir 2x6, and cedar 1x6. I used 12 samples of each kind of wood, half of which were primed and painted. I used tongs to place one of the painted samples of 2x6 into a grill. I then repeated all of the above steps with different materials until I ended with 3 samples of each possible combination of wood, protection, and paint. There were four other samples, which were two 2x6 pieces tested with extra Barricade, and two 2x6 pieces tested with Thermo-Gel, another brand of fire fighting gel. The reason that I did not test a full set of Thermo-Gel samples is because I was not able to obtain enough of the gel from the manufacturers.

Results
The averages for the unprotected samples were as follows: time before sparking of 20 seconds, time before flaming of 20 seconds, time before smoking of 78.5 seconds, weight loss of 22 grams. The averages for the protected samples were as follows: time before sparking of 37.5 seconds, time before flaming of 68 seconds, time before smoking of 69.5 seconds, weight loss of 13.5 grams.

Conclusions/Discussion
The gel did work, increasing the time before sparking by 88%, and the time before catching fire by 240%, on average. It did decrease the time before smoking by 11%, but this may have been because some of the Barricade boiled off, creating steam that I thought was smoke. The effectiveness was also less than it would have been had the gel been used in a real situation, because I applied the gel only approximately one-eighth of an inch thick, while the manufacturer recommends at least one-quarter of an inch thickness. I would recommend that anyone living in an area prone to wildfires buy a case of this product, because if a wildfire occurs and your house is in danger, it might make the difference between escaping unscathed and total destruction.

Summary Statement
My project tested the effectiveness of fire fighting gels in protecting Douglas fir building materials from combustion.

Help Received
Father helped purchase materials and supervised me during testing; Science teacher provided helpful suggestions; Barricade and Thermo-Gel companies donated materials.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Aaron J. Schroeder

Project Number
J1929

Project Title
Lithium, Titanium, Alkaline, Oh My

Abstract

Objectives/Goals
The objective of my experiment was to see what was the energy efficiency of each type of battery.

Methods/Materials
My materials were 1 Energizer AA lithium battery, 1 Energizer AA titanium battery, 1 Duracell AA batteries (Pile Alkaline), 3 Screw-Base Lamp light bulb (1.44 watt), 2 Single AA battery holders (With Wires attached to them) (Any number of battery holders is fine), a Journal, and 2 Screw-Base Lamp light bulb holders (Any number of light bulb holders is fine). First, I label each battery holder (#power source#) by the type of battery. Next, I put that type of battery into each of the battery holders. I screwed on the wires to the screw on the light bulb holder. Screw on the Screw-Base Lamp light bulb to the light bulb holder. I made sure that the light bulb is lit (glowing). In the journal, I recorded the time that each light bulb went on (#beginning time#). In the journal, I recorded the time that each light bulb went off (#ending time#). Subtract the ending time with the beginning time for each to see how long the battery lasted. I used James Watt's equation Power(Watts) = Energy(Joules) / Times(Seconds). Then I divided how many joules were used to how many joules were set out which came out as a decimal. I made the decimal into a percentage. That percentage showed how efficient the battery was.

Results
What new information was provided as a result from my testing was that I now know that Duracell Alkaline is more energy efficient than Energizer Lithium and Titanium. I also know that Energizer Titanium is more cost efficient, because the amount of joules per dollar of the Energizer Titanium is 35,175, while Duracell Alkaline is 28,222 and Energizer Lithium is 20,108.

Conclusions/Discussion
What I have learned that just because a battery is longer lasting, does not mean it is more energy efficient. Also just because it costs more does not mean that the battery is better. I did not prove my hypothesis and Duracell was more energy efficient than Energizer Lithium.

Summary Statement
To determine the energy efficiency of various types of common batteries.

Help Received
My Dad helped collect some of the data, buying the materials, and bouncing off ideas.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Sergio M. Segura

Project Number
J1930

Project Title
Examining Bubble Gum Circumference and Diameter

Abstract

Objectives/Goals
My objective is to determine if different brands of bubble gum produce the same size bubble by measuring circumference and diameter.

Methods/Materials
I weighed the gum on a triple beam balance by cutting it into pieces until it measures 2 grams. Then I chewed the gum 17 times. After that I put the gum on the tip of the needle and then pumped the gum 17 times. When it was blown, I put the string around it without touching the gum. Then I recorded my observations on a piece of paper. Next, I placed a ruler behind the blown bubble and I found the diameter of the bubble, after which I recorded my results. Finally I repeated all the procedures 30 times for a total of 30 trials.

Results
The average for Hubba Bubba was 3 cm and the average for Bazooka was 2.3 cm. For Bubble Tape it was 2.2 cm. Finally, the average for Juicy Friut was 1.4 cm.

Conclusions/Discussion
My hypothesis was partially correct because instead of Juicy Fruit being the lowest I thought Bubble Tape was gong to the lowest bubble blown. My results are important because the price of the gum plays an important role in this project because the more expensive the gum the bigger the bubble it blows.

Summary Statement
My project compares the circumference and diameter of various brands of bubble gum in order to see if they produce the same size of bubble in a controlled enviornment.

Help Received
Teacher helped on organazining the board; Parent helped on title; Mother helped on research

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Elly J. Shao

Project Number
J1931

Project Title
Fighting Hard Water Deposits

Abstract

Objectives/Goals
The objective of this project is to find out what solution is most effective in removing hard water deposits on glass.

Methods/Materials
Hard water deposits are mostly calcium carbonate. The solutions included in the experiments were 10% acetic acid, vinegar, Vinegar Windex#, Lime Action# Windex#, and 10% hydrochloric acid. I conducted my experiments by adding the solutions to calcium carbonate and seeing how long it took to dissolve, if it did so at all. Then, I applied the solutions to cotton balls and toothbrushes and rubbed them against a piece of glass covered in hard water deposits. Finally, I put 0.2 gram of calcium acetate, calcium carbonate, and calcium chloride in test tubes with water and timed how long it took for them to dissolve.

Results
My results showed that the hydrochloric acid solution reacted with calcium carbonate quickest. Calcium chloride, the product formed when hydrochloric acid reacts with calcium carbonate, also dissolved the quickest. The acetic acid solution and vinegar could also react with the calcium carbonate, but the reaction was slower than the hydrochloric acid solution. Calcium acetate also dissolved slower than calcium chloride in water. The other liquids were not noticeably effective in reacting with calcium carbonate or in removing hard water deposits.

Conclusions/Discussion
Compared with the other solutions I tested, hydrochloric acid fights hard water deposits most effectively.

Summary Statement
In this project, I studied the chemical principles of the reactions, and compared the effectiveness of various solutions, including commercial cleaners, in removing hard water deposits on glass.

Help Received
Mrs. Usher, my science teacher, provided guidance and feedback to my project report. My mother took the pictures while I was doing experiments. She also helped me to borrow books from the libraries.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Ashley Su

Project Number
J1932

Project Title
Ashley's Secret Formula, Year II: From Lab Samples to Products

Abstract

Objectives/Goals
This is the second year of my project. The first year project started from wondering why my mom's perfume smells so soothing and which ingredient in perfume causes it to smell differently? I proved my hypothesis that perfume scents can be altered or created by mixing different types of essential oils with some ingredients. I also created new perfumes just for preteen girls like me for better concentration, refreshment, and relaxation! Following the success of my first-year progress, I continuously worked on further research trying to convert my lab samples to be new products in the market. In doing so, I had to make my perfumes more effective (stronger scents) and stable (last longer). There were many challenges to face and most of them were not easy.

The hypothesis of one of the challenges was that Up to Some Certain Level, the Greater Density of the Alcohol, the More Effective the Perfume is; But Less Stability. However, Using Oil Instead of Alcohol, the Perfume Will Be More Stable, But Less Effective.

Methods/Materials
I selected two sets of perfume samples (Top Notes vs. Middle Notes). Each set of perfumes has 20 different mixtures of alcohol density ranging from 6-44% or without alcohol (use Jojoba oil only). I tested them under three different temperature conditions and measured the distance that the perfume scent can reach my nose without fading every 15 minutes. I did this nine times for each mixture. There are total 1080 data tested and recorded.

Results
The perfumes with higher alcohol density produce stronger scents initially but fade quickly. The oil-based perfume last much longer, but is not that effective. The colder temperature seems to be able to hold the perfume scents better and last longer. In addition, the impact of alcohol reduces significantly when its density reaches above 40%.

Conclusions/Discussion
The experimental data strongly supports my hypothesis. In addition, adding odorless oils to dilute essential oils without using alcohol is also proven to be a good choice for perfumes to last longer. Other alternatives such as adding fixing agents (e.g. Aldehydes) need further exploration and research to find out their effectiveness to my perfume products. Detail results can be found in my website www.topkids.com/ashley.htm in which my lab samples are given out free of charge for market tryout.

Summary Statement
This project focuses on converting my perfume lab samples to be products in the market; six perfume blends had been created, tested, and ready to be commercialized as new products targeted for teenagers.

Help Received
Thanks to JCHRIS FOUNDATION for sponsoring all financial need in my research and pre-production cost of my perfume products. My mom helped me to get all materials needed in this project and my dad assisted me in designing my website. Many of my friends were volunteers to be my perfume testers.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Mattew A. Tatarka-Brown

Project Number
J1933

Project Title
Gone with the Light!

Abstract

Objectives/Goals
Does CD-R optical media degrade in fluorescent light under constant temperature and humidity? Degradation is measured as data loss using commercial, off the shelf, CD optical read/write drives.

CD-Rs are optical media, designed to be affected by the laser light inside of optical drives. Therefore, CD-Rs will degrade under fluorescent light. CD-Rs with cyanine green or azo blue dye layers will decay the most.

Methods/Materials
Materials: -Light chamber with a reflective interior holding two, two tube 25 watt fluorescent light fixtures 36 inches above the samples -Lead-lined, photographers film bag -20 paper CD sleeves -20 CD-Rs of five different brands -FTK Imager 2.5.3 -CD/DVD Inspector Version 2.1.4 -CD burning software -Computer with a CD writer -Log Book

Procedure: A known 1 MB file was generated. 698 identical copies of the known file were placed on each sample and confirmed with forensic software. 20 of the 100 CD-Rs, four from each brand, were stored in a lead-lined photographer#s bag as a control. The 80 test samples, 16 of each brand, were placed in the fluorescent light chamber. Test samples and controls were maintained at manufacturers# recommended temperature (76-82 degrees Farenheit) and humidity (30-52%). All 698 files on all 100 pieces were compared to the known weekly using commercially available CD-R optical media read/write drives, and forensic software to detect bit level errors in each file on each sample. There was minimal exposure of the samples to incandescent or sunlight.

Results
All 16 Comp USA CD-R test samples, which used a cyanine green or azo blue dye layer had data loss. Most often, the Table of Contents was damaged, rendering the entire CD-R inaccessible or unreadable. None of the Comp USA control samples failed, therefore the failures were due to the fluorescent light. Degradation was apparent after 936 hours of exposure. After 1092 hours, data loss was over 99%.

Conclusions/Discussion
CD-Rs, especially those with cyanine green or azo blue dye layers degrade under fluorescent light at manufacturer recommended temperature and humidity. The degradation of CD-R optical media under fluorescent light in controlled temperature and humidity has not been extensively studied. Like media should experience significant data loss after approximately 3276 hours or 137 days of exposure.

Summary Statement
CD-R media degrades under fluorescent light, even if maintained at the manufacturer recommended temperature and humidity, causing catastrophic data loss in as little as 137 days.

Help Received
My stepfather, a Computer Analysis Response Team Forensic Examiner, oversaw this experiment. He also assisted with construction of the light chamber. My mother helped with the display board. Mr. Eric Thompson, CEO of Access Data, provided the forensic software used, FTK Imager 2.5.3.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Haley R. Trenfel

Project Number
J1934

Project Title
Which Packing Material Is Best?

Abstract

Objectives/Goals
People have been using air cushion type of insulation because they perceive it to be the most dependable insulation for fragile items. The hypothesis for this experiment is that if 5/16# bubble rolled air cushioning is used as insulation around a raw egg in a container, and then the damage to the egg shell when the container is dropped will be minimized. The most important materials for this experiment were raw eggs, plastic Chinese take-out containers, Biodegradable packing peanuts, shredded newspaper, 5/16# Bubble Wrap, and Aspen Wood Excelsior. The procedure of this experiment involved surrounding raw eggs with different types of insulation in the plastic Chinese take-out containers and dropping them from three different heights: one, one and a half, and two meters. The eggs were inspected and the damage was recorded. The results showed that the Aspen Wood Excelsior provided the best overall protection to the eggs. This did not support the hypothesis. The Aspen Wood Excelsior did a better job protecting the eggs than the Bubble Wrap because it surrounded and supported the egg better.

Results
At 1 meter, the results showed that the Aspen Wood Excelsior, insulation proved to be the most effective, with no damage, a 0.00 average rating, to any eggs throughout all twenty trials. At 1.5 meters, the 5/16# Bubble Wrap cushioning insulation provided the best insulation for the eggs with an average damage rating of 0.55. At 2 meters, the Aspen Wood Excelsior, once again, provided the best insulation for the eggs with an average damage rating of 1.1, with the biodegradable peanuts ranking second at 1.25.

Conclusions/Discussion
The results came out this way because the Aspen Wood Excelsior insulation surrounded the egg more evenly, allowing for more protection around the whole egg. The 5/16# Bubble Wrap had large air bubbles, which did not bend and mold easily. Maybe a smaller air bubble, the 3/16,# might have molded around the egg easier and snugger.
Errors might have occurred in the experiment because some of the eggs may have been more fragile to start with. Also, the way each egg was packaged may not have been exactly the same throughout the experiment. The results may have been different if the egg was dropped in a different position, such as horizontal. And finally, the way each egg was dropped may not have been exactly the same throughout the experiment.

Summary Statement
Determining which packing material provides the best protection for fragile items.

Help Received
Mom and Dad helped perform experiment and record results. Friend, Taylor, helped drop eggs.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Cameron W. Wallace

Project Number
J1935

Project Title
Coefficient of Restitution: A Comparison of Major League and Little League Baseballs

Abstract

Objectives/Goals
The Coefficient of Restitution (COR) is the ratio of the relative velocity before and after impact of two colliding bodies. For baseballs, the COR is established by ASTM International to equal .5460 +/-.032 when the ball strikes a 4 in. piece of ash at 85 ft/sec. My project tests whether there is a difference in the COR when comparing Major League (MLB) balls and Little League (LL) balls each manufactured by Rawlings. My hypothesis is that the MLB baseballs will meet the required COR, and the LL baseballs will have a lower COR value.

Methods/Materials
Using two independent methods and three trials for each ball, I calculated the velocity of two MLB baseballs and two LL baseballs before and after hitting a 4 in. ash strike plate at approximately 85 ft/sec. Method 1, FIXED TIME-VARIABLE DISTANCE, used a high-speed camera and Photoshop software to measure the distance in pixels the ball traveled in .0294 seconds (12 frames). I calculated velocity in ft/sec and miles/hr, then calculated the COR as Vout/Vin. Method 2, FIXED DISTANCE-VARIABLE TIME, used an electronic speed trap that I built to measure the time the ball took to travel 12.125 inches (the fixed distance between two light walls). Using Vernier LoggerPro software to find the time between voltage drops, I calculated Vout and Vin, and then COR.

Results
The average COR of the two MLB baseballs over three trials for each of two methods was .5388. The average COR of the two LL baseballs over three trials for each of two methods was .5227. This was a difference in COR of .0161.

Conclusions/Discussion
I proved my hypothesis correct that the COR of the MLB baseballs was within ASTM standards, and the COR of the LL baseballs was lower by .0161. Research by Dr. Robert Adair (The Physics of Baseball, 2002, p. 95) states that the mean ball-to-ball difference in COR of MLB baseballs currently in use is actually only .005. This means the difference in COR I found between MLB and LL balls is three times that which would be expected for MLB balls alone. I attribute this difference to the dissimilar quality of materials and workmanship used in manufacturing the MLB and LL balls. The real world application of this experiment is that an MLB baseball is livelier than a LL ball, and would travel farther if hit equally hard. As an extension of this experiment, I also tested the COR of two NCAA baseballs, and found it to be between that of the MLB and LL balls.

Summary Statement
My project compared the Coefficient of Restitution (COR) of Major League and Little League baseballs, finding that the average COR of the MLB balls met the ASTM standard of .5460+/-.032, and the average COR of the LL balls was .0161 lower.

Help Received
Shawn Howard, Pacific Gas and Electric: Schematic, assisted in design for Speed Trap; Dr. David Kagan, Chico State University: Schematic for Speed Trap; Bob Wallace: My father helped me build the Speed Trap; Scott Wallace, Aeromech Engineering: my brother provided the computer equipment for Method 1.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Davis K. Waugh

Project Number
J1936

Project Title
Light Bulb Efficiency

Abstract

Objectives/Goals
The experiment is trying to find not only the most efficient light bulb available, but also the best overall value, taking into account price, availability, and energy efficiency. I think the Compact Fluorescent Bulb (CFL) will be the best overall value and that the incandescent bulb will be the worst overall value.

Methods/Materials
The bulbs that I tested were halogen, incandescent, compact fluorescent light(CFL) and Light Emitting Diode (LED). To find this, the wattage registered was compared to the wattage on the box of each bulb. A volt meter was used to measure the wattage of each test. Each light would be turned on and the data would be recorded. I also tested which bulb is the hottest to the touch and which is the coolest.

Results
The wattage for all four bulbs registered the about the same on the volt meter as the package stated. Out of the four bulbs tested, the halogen, incandescent, CFL and LED, the halogen and incandescent were the hottest. The CFL was only warm to the touch. The LED bulb was the same termperature on or off.

Conclusions/Discussion
In terms of efficiency, value, the CFL bulb turned out to be the best overall value because it was inexpensive to buy, easy to find and was very energy efficient. The Halogen turned out to be the worst value. The LED is the bulb of the future, but it needs to be easier to find, less expensive and have better light quality.

Summary Statement
I took the four most commonly used light bulbs and compared them based on cost (bulb price and electrical cost), availabilty and efficiency.

Help Received
My dad helped me build the test rig; Mother helped with organization of display board

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Christopher W. Weddington

Project Number
J1937

Project Title
Effects of Motor Oils and an Additive on Friction

Abstract

Objectives/Goals
My project was to determine the effects of 4 different types of motor oils and 2 rates of an anti-friction additive on the level of friction measured between a moving and a stationary part. I hypothesize that the additive will decrease the level of friction measured between a moving and a stationary part in the 4 motor oils tested.

Methods/Materials
A drill press was used to generate friction between a flat aluminum drill pad and a flat-bottomed stainless steel cup, simulating the moving metal parts of an engine. Four treatments (friction levels 1 to 4) were produced by hanging a 5 pound weight at 4 positions along an extension arm mounted to the drill press handle. An amp meter was clamped on one wire of the electrical cord to measure amps, reflecting the level of work done by the motor and the amount of friction between the pad and the cup. Four different motor oils and 2 rates of anti-friction additive were tested. One third cup of oil was poured into the cup, the pad was lowered into the cup, the 4 friction treatments were conducted, amps were recorded for each treatment. The test was repeated with 1/2 rate and full rate of additive for each of the 4 motor oils.

Results
All motor oils performed best at lowest friction and worst at highest friction level. The 4 oils showed differences from each other except at friction level 1 (lowest). Three oils had a benefit from the 1/2 rate of additive at friction levels 2 though 4. All 4 oils had a benefit from the full rate of additive at friction levels 2 through 4. At the highest friction level and full additive, the reduction in friction was 12% (regular), 10.6% (synthetic), 3.3% (low emission), and 2.8% (non-detergent).

Conclusions/Discussion
The results supported my hypothesis that the additive would decrease the level of friction measured between a moving and a stationary part in the 4 motor oils tested. The additive shows potential in improving motor efficiency and may help to reduce air pollution and resource consumption. The benefits of using the additve depend on the type of motor oil used, and there may not be an economical benefit in low friction applications. The additive and motor oils should be further tested under other conditions such as higher temperatures.

Summary Statement
My project is about the effects of 4 types of motor oils and 2 rates of anti-friction additive on the friction produced between a moving and a stationary part.

Help Received
CW Industries made the drill pad. Mr. Harris loaned the amp meter. Father loaned shop equipment and supervised data collection. Mother guided calculations and reviewed report. UCCE personnel advised on statistics.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Amanda J. Wong

Project Number
J1938

Project Title
Can You Hear Me? A Comparative Study of Headphones/Earphones for MP3 Players

Abstract

Objectives/Goals
The objective of this project is to compare different types of headphones. Such as active noise-canceling; non noise-canceling and in-the-ear earphone for their effectiveness in blocking out ambient noise and to find out the risk of hearing loss associated with their uses.

Methods/Materials
Two noise-canceling headphones, one non noise-canceling headphone, and earphone (earbud), were used with a musical device (my Compaq laptop or the Rio). The experiments were performed in the audiologist's sound field laboratory and results were recorded.

Results
The Sony headphone and the earbud block the noise the best. Another noise-canceling headphone, Koss QZ50, was less effective because of poor fitting. The Radio Shack over-the-ear non noise-canceling phone provided the poorest blockage and therefore resulting in high listening volume.

Conclusions/Discussion
The results agree with my hypothesis that noise-canceling headphones and earbuds block ambient noises well. Though, as point out in my discussion section, it actually increases the risk by using the earbud. From this experiment, it is clear that to reduce risk of hearing loss from listening to MP3 players, one must listen to the music at a comfortable level, use appropriate headphones and take frequent breaks.

Summary Statement
My project is a comparative study of headphones/earphones for MP3 players.

Help Received
An audiologist, Mr. Anderson, worked with me in his sound field laboratory for the actual testing. Dr. Gary Zerlin, an ENT specialist was consulted regarding the tests to be used. My dad provided transportation and purchased the materials for this project.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Kikei O. Wong

Project Number
J1939

Project Title
Bat Power

Abstract

Objectives/Goals
My objective was to learn if different bat materials have an effect on the distance a softball is hit.

My hypothesis was that composite material bats will hit a softball the farthest distance.

Methods/Materials
Materials used in experimenting were: a batting tee, a softball, a composite material bat, an aluminum material bat, a hybrid material bat, a wooden bat, a plastic bat, and a batting device made of a plywood base, a wooden column, a wooden swinging arm, a door hinge, two screw eyes, two pipe straps, and an extension spring.

Methods used in experimenting were to strap a bat and hold it still using the pipe straps on the batting device, pull the swinging arm back, place a softball on the tee where the bat will hit the ball in it's "sweet spot," release the swinging arm, and measure the distance the softball travels before the softball hits the ground. This method is repeated ten times for each bat, and the average distance is taken.

Results
The plastic bat hit the softball the least farthest, an average of 1.57 meters. The wooden bat hit the softball the next farthest distance, with an average of 1.58 meters. The aluminum bat hit the softball the next farthest distance, with an average of 1.87 meters. The composite bat hit the softball the second farthest distance, with an average of 1.91 meters. The hybrid bat hit the softball the farthest, with an average of 2.14 meters.

The averages show that the hybrid bat hits a softball the farthest distance.

Conclusions/Discussion
My results show that hybrid bats hit a softball the farthest distance, which do not support my hypothesis that composite bats will hit a softball the farthest.

My results expand knowledge of the distance a softball bat can hit, which help other softball players know which bat product is the best for hitting. The results also expand knowledge that the density of the bat has an affect on the distance a softball is hit. It determines how loose the bat can be (for creating a whip effect), and if the trampoline effect can be applied when the ball hits the bat.

Summary Statement
The project is about finding out if the bat material of a bat affects the distance a softball is hit.

Help Received
Brother helped buy materials; Brother helped build batting device

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Hunter A. Young

Project Number
J1940

Project Title
My Achy Breaky Back: A Better Backpack Design

Abstract

Objectives/Goals
My objective was to determine what causes back pain when wearing a backpack and to improve the design of backpacks to decrease pain and increase comfort.

Methods/Materials
Three designs of backpacks were purchased. Participants were weighed and given a calculated load to simulate weight in their backpack. Each design was worn by a test subject for approximately 2 minutes to simulate walking between classes. The participant rated each backpack on a scale of 1 to 10 and shaded areas that were uncomfortable. Each backpack style#s rating was totaled giving a ranking for each backpack. The lower number indicated a more comfortable fit and a higher number was less comfortable. The materials used are listed below.

Evaluation forms, shoulder strap backpack (green backpack), shoulder and waist strap backpack (blue backpack), front and back backpack (red backpack), scale, calculator, books for using as load, pencils, and clipboards.

Results
The majority of subjects (60%) preferred the Front and Back Backpack. The second favored (23%) was the Shoulder Strap Backpack and last was Shoulder and Waist Strap Backpack (17%).

Conclusions/Discussion
The majority of subjects preferred the Front and Back Backpack. Even though they thought this was the most comfortable, some found the design strange commenting; it feels funny, I feel like I#m pregnant, and who would wear this kind of backpack. This new design seems to be the most comfortable style allowing the weight or load to be more evenly distributed between the front and the back. The problem with the back loaded style of backpacks is that the weight is all on the back. This can make the wearer lean too far forward or backward and puts their spine out of balance which causes pain on the lower back. Putting the weight on the front and the back keeps the spine in a more aligned position over the hips creating a straight line from the head to the bottom of the spine. The other styles of backpacks were preferred by some people but this may have been because they are more used to these styles. Overall, the Front and Back Backpack is a better design for balancing load on the structure of the spine.

Summary Statement
This project was conducted to find causes of backpack pain and design a backpack which alleviates or decreases the pain or discomfort.

Help Received
My chiropractor, Dr. Claudette Satnick-Nasoor, educated me on the importance of structural balance and weight distribution over the back. My dad and mom hauled materials needed for testing to many places. My mom helped type and proof my paper. My sister obtained some of the participants for testing.