CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Emile G. Ayoub

Project Number
J1101

Project Title
Do We Get What We Pay For?

Abstract

Objectives/Goals
To compare the price of each battery by analyzing the cost per one hour of lifetime.

Methods/Materials
18x6.5 piece of wood , Hammer, 9 nails, 9 Mini Scew lamp bases, Soldering tool, Soldering wire, 9v Battery Snap Connectors, 9 Screw Base Lamps, 9 Different 9v Batteries, Hot glue gun, Watch.

Results
The following are the best to least efficient batteries in comparing the cost per one hour of lifetime: Energizer Max, Eveready, Rayovac, Duracell, Panasonic,Energizer and Maxell, Sanyo and with the least efficient ,Duracell Ultra.

Conclusions/Discussion
Even though my hypothesis was incorrect, I was surprised to find that Duracell and Duracell Ultra did not do as well as I had thought they whould have done. Duracell was actually better than Duracell Ultra. Then by doing some background research, Ifound that tese two batteries had the amazing ability to recharge. After that I found that the two Duracells recharged for a very long time. i had interpreted that Maxell would stay for the longest period of time, but I was wrong. The battery that stayed the longest was Energizer Max. Although the results show Duracell Ultra as the seast efficient, the fact that Duracell recharged repeatedly would make it difficult to conclude that it is costly for its performance on the different batteries, allowing the consumer to select the best buy for his/her bucks.

Summary Statement
My project is to test which batteries produce electricity for the longest time and if that battery deserves what the consumer paid for its cost.

Help Received
Dad helped to solder wires

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Mitchell Baugh; Tim Robertson

Project Number
J1102

Project Title
Does Price Equal Performance?

Abstract

Objectives/Goals
We tried to determine if the various prices of three different soccer balls made a difference in its performance.

Methods/Materials
We used a contraption to take place of and represent a human foot kicking the soccer ball on three different surfaces. We tested each ball seven times on all three surfaces. The contraption was made to be pulled back and let go to which it would make contact with the ball.

Results
We found that the Adidas Glider was the average best on all three surfaces.

Conclusions/Discussion
From this conclusion we have reached our objective and discovered that the price of soccer balls are not determined by their price. We hope someone learned something from this because we know we did.

Summary Statement
Our project is about trying to discover if soccer balls prices are based on their performance on the field.

Help Received
Mitchell's father helped us make the graphs because we did not know how to use the program. We showed him all of our notes and told him what we wanted. Tim's father built the contraption from our designs. he was worried we would hurt ourselves with the machinery.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jenna M. Berry

Project Number
J1103

Project Title
Wool Strength

Abstract

Objectives/Goals
Objective: My project was to determine if different chemicals will affect the strength of rabbit wool. I raise rabbits in 4-H, and I have seen these chemicals used for all different reasons. Strength is important when you spin wool.

Methods/Materials
Material/Method: Five 2# samples of wool were hung between two binder clips, with a one ounce river sinker attached to the bottom. Five sets of samples were hung in a separate wooden compartment. Then each sample was sprayed 10 times with one of each: bleach, vinegar, cat flea spray, soap/water, and water. I ran each test for 24 hrs. I checked for both damage and stretch. I determined each result by both observation and measurement. I retested 5 times for each different chemical.

Results
Results: The bleach and cat flea spray, when sprayed on the wool, caused breakage to the fibers of the wool. The soap/water sample caused the wool to stretch and to stay stretched even after it dried. Both the cat flea spray and soap/water caused a residue on the wool. The water and vinegar did not cause any noticeable damage or extreme stretch.

Conclusions/Discussion
Conclusion: I was right in my hypothesis that bleach should not be used on the wool of a rabbit. I was incorrect when I thought that cat flea spray, or soap/water would be safe. I found that using bleach, cat flea spray, and soap/water can greatly damage or alter the strength of the wool. Water and vinegar can be used on the wool. Further research would include more tests run, and to try washing samples that left a residue to see if wool would return to normal texture.

Summary Statement
My project tested the effect of different chemicals on the strength of rabbit wool.

Help Received
My mother helped me cut the foam board for my backboard. My dad helped me cut off remaining wood on my box. Mr. O'Neill corrected my spelling and grammar.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ben Brian; Jackson Brian

Project Number
J1104

Project Title
Some Like It Hot

Abstract

Objectives/Goals
The purpose of this project was to compare heating materials that could be used as a backpack warmer in order to keep a person warm in the morning while walking or riding to school without having to put on layers of clothing.

Methods/Materials
A fabric pouch design was made and three filler materials were chosen: #EZ Heat#, #Grabber Mycoal#, and long grain rice. The EZ heat and Grabber were activated according to the instructions and placed within the pouch. The rice was sealed in the pouch first, and then heated in a microwave for 2 minutes. For each material, a thermocouple was placed on the body side of the pouch and the temperature measured over time, both with and without the backpack in place. The materials were compared for temperature, cost, and weight.

Results
The rice pouch started at the highest temperature and the Grabber Mycoal was the warmest at the end of the test. The rice pouch was the cheapest material, while the Grabber mycoal was the most expensive. The rice pouch was also the heaviest material, while the Grabber Mycoal was the lightest.

Conclusions/Discussion
The goal of this experiment was to find the best backpack warmer. Overall, the homemade rice pouch worked best because it could be heated to a higher temperature which held long enough for the walk to school, it molded better to your body making it more comfortable, and it was the cheapest because of a lower cost and you could reuse it. It did have the highest weight, so our next experiments would be to investigate smaller amounts of rice.

Summary Statement
The goal of this experiment was to find the best backpack warmer material

Help Received
Mother taught sewing and helped glue some of the sheets to the board. Father provided thermocouple/multimeter to measure temperature and helped with the graphs.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kristina Brooks; Kyla Price

Project Number
J1105

Project Title
Which Cutting Board Is Easiest to Sanitize?

Abstract

Objectives/Goals
Objective: The goal of our project is to determine which cutting board is easiest to sanitize.

Methods/Materials
Materials and Method: We mixed a stock solution of nutrient broth and added E.coli. We put 5 ml of the mixture onto one cutting board at a time. We swabbed them onto nutrient agar (bacteria food) with a sterilized Q-tip. We then rinsed each cutting board with a 90mlwater/10ml bleach mixture. After rinsing, we swabbed each board as before. Then, after 24 hours we counted each colony of E.coli.

Results
Result: As a result we found in our 1st trail that the stainless steel was the easiest to sanitize; however in our second trial we found that corian was the easiest to sanitize.

Conclusions/Discussion
Conclusion: In conclusion, we found that the corian and stainless steel cutting boards were the easiest to sanitize. The wood and poly were the hardest for the bleach to reach so they were the hardest to sanitize.

Summary Statement
The material that the cutting board is made of determines how easily it is to sanitize.

Help Received
We received help from our science teacher, Mr. Steve Duerr. He helped with the design of the experiment and he helped us make our graphs in Microsoft Excel. Also, our language arts teacher, Mrs. Erica Andrews, helped edit our report.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Arianna S. Cassani

Project Number
J1106

Project Title
The Effect of the Amount of Paint on Rust Formation

Abstract

Objectives/Goals
Determine if an environmentally friendly paint was capable of protecting mild steel in salt water and, if capable, the minimum amount required for protection thus determining the most efficient use of resources.

Methods/Materials
Procedure: 1.Paint pieces of steel with various layers of water-based polymer paint. Determine thickness with an electronic dry film thickness guage. 2.Leave two pieces without paint as your control. 3.Scribe pieces 3, 6, 9, and 12. 4.Suspend half of ea piece in salt water. 5.Take pictures/observations every 3 days for 3 weeks.
Materials: 28 coupons of 1/8th inch mild steel; 2 buckets of seawater; 1 qt water based polymer paint; 1 electronic dry film; thickness guage; 2 wooden poles; 3 metal hangers.

Results
The average measurment of sample 1 is 16.633, sample 2 is 17.733, and sample 3 is 13.533. (AVG.(single coat of paint each)is 15.966) Sample 4 average is 21.4, sample 5 is 22.366, and sample 6 is 19.566. (AVG. (two coats of paint each)is 21.110)The average of sample 7 is 33.6, sample 8 is 29.066, and sample 9 is 26.33. (AVG. (three coats of paint each)is 31.333. Sample 10#s average is 33.9, sample 11 is 31.966, and sample 12 is 31.3. (AVG. (four coats of paint each)is 32.388) The control group was used to determine that the panels would in fact rust in the saltwater solution. The thickness of the rust on the control group panels was measured with the results being Sample 13 measuring 1.566 and sample 14 measuring 1.7133, for an average of 1.6397.
The rust and paint combination on the panels was measured to determine the amount of resulting rust. The panels with a single coat of paint, panels 1-3, measured an average of 18.611. The panels with two coats of paint, panels 4-6, measured an average of 28.711. The panels with three coats of paint, panels 7-9, measured an average of 33.333. The panels with four coats of paint, panels 10-12, measured an average of 35.499.

Conclusions/Discussion
Pieces 1-3 failed. Pieces 4-6 had more rust than numbers 7-9. You need at least 34-35 mills of paint to protect the piece from rusting. This is consistent with the amount on pieces 7-9. Numbers 10-12 require more labor expended for the same result as 7-9. These results do not support the hypothesis that 2 layers is as effective as 3 layers. The findings determine that 34-35 mills (3 layers) is the right amount to use because it protects against rust and uses the least labor.

Summary Statement
The project is about the protection of steel with environmentally friendly paint, and what amount you need to protect the streel.

Help Received
Mom and Dad helped prepare and test; Mrs. McKinney helped me through a few problems.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Mane K. Chakarian

Project Number
J1107

Project Title
Determining the Effects of Natural Juices on Meat Preservation

Abstract

Objectives/Goals
My goal was to find out which natural juices prevent spoilage and bacterial growth on meat.

Methods/Materials
I used apple juice, lemon juice, vinegar, tomato juice, orange juice, beef meat, a cutting board, a knife, a juicer, and 12 two inch depth bowls.
First, I washed the fruits and cut them in two. Then, I cut the meat into 12 pieces and placed them into 12 two inch depth bowls. After, I strained the juices from the fruits and deposited half the juices into the 5 bowls and the other half into the other 5 bowls. Last, I placed 6 bowls in the refrigerator and the other 6 outside and kept track every few days to see when the meat starts to rot.

Results
I found out that tomato juice helps prevent spoilage the best and vinegar doesn't prevent spoilage at all.

Conclusions/Discussion
In conclusion people who store meat should add some tomato juice to keep it from rotting, or a fruit or vegetable that doesn't contain much citric acid otherwise the meat will rot quickly.

Summary Statement
How natural juices help prevent spoilage of meat.

Help Received
Mother helped provide materialsand helped set up board/ teacher went over papers.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Nathalie I. Chardon

Project Number
J1108

Project Title
How Hot Is Solar Heating?

Abstract

Objectives/Goals
My objective was to test three different materials of pipes (plastic, copper and steel), three different liquids (glycol, glycol mixed with water and water), and three different insulations (fiberglass, foam and no insulation) to see which combination heats the liquid the quickest and cools down the slowest.

Methods/Materials
Three different pipes, liquids and insulations were used. The experimental layout consisted of a 16 by 23 by 2 inch cardboard box, three thermometers, three 18 by 3/4 inch pipes (either plastic, copper or steel) filled with either glycol, glycol mixed with water, or water, insulation (third experiment only), an 18 by 24 inch glass plate, and a 24 by 25.5 inch reflective insulation. The setup was placed on a slanted spot hit by direct sunlight to heat the liquids, and then moved to a shaded spot to cool the liquids.

Results
Six trials showed that the combination of a plastic pipe and glycol results in the highest temperature, and that a combination of a plastic pipe, glycol mixed with water and foam insulation cools down the slowest.

Conclusions/Discussion
Solar heating is a definite alternative to conventional heating in climate zones comparable to Santa Barbara, California. To generate enough hot water, large heating surfaces are needed, as well as a well insulated storage tank. The system needs to be designed in a way that loses as little heat as possible.

Summary Statement
To find optimal materials to generate and maintain heat in liquids using solar energy.

Help Received
Parents helped with purchasing materials and proofreading report, younger sister helped with setting up experiment.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jacob B. Constance

Project Number
J1109

Project Title
Comparing the Effectiveness of Insecticide Residuals on Sand and Non-Sand Grout Mortars Treated with a Sealant

Abstract

Objectives/Goals
The objective of my project was to determine if sand and non-sand grout mortars treated with a sealant decrease the effectiveness of insecticide residuals.

Methods/Materials
For my comparison I made 12 - 4"x4" tile and grout samples using 2" tiles set with 1/8" grout joints. Half the samples were grouted with a sand grout mortar and the other half with a non-sand grout mortar. Then I applied a water and oil grout sealant to half of the sand and non-sand grout samples.
The samples were then divided into 3 observation groups. Each group consisting of 2 samples each of sand and non-sand grouts. One sample of each, sand and non-sand, were treated with sealant.the first observation group was then treated with 'Raid Ant and Roach Killer' according to label directions with all safety precautions taken during insecticide application. Each sample was then placed into a clear plastic container with 2 live healthy crickets. Cricket mortality observations were made every 24 hour period. The crickets, whether dead or alive, were removed and replaced with 2 healthy crickets every 24 hours.
The second observation group used the exact same procedure as the first, but I used 'Black Flag Ant & Roach Killer' on these samples.
My third observation group was my control group. Again the same procedure was used, but no insecticide was applied to these samples.
Observations were made for 11 days.

Results
Treating a grout mortar with a sealant makes relatively little or no difference in the effectiveness of an insecticide residual. However, it was interesting to see from my data that a non-sand grout mortar maintained a longer insecticide residual than sand grout mortar, and that 'black flag' was a slightly more effective insecticide than 'Raid'.

Conclusions/Discussion
Treating grout mortar with a sealant makes no difference in the effectiveness of an insecticide. My comparison did show that a non-sand grout mortar maintains a longer insecticide residual than sand grout.

Summary Statement
The use of a water and oil sealant on sand and non-sand grout mortars has little or no effect on insecticide residuals.

Help Received
Mother helped type report and helped with the layout of my project board. Father helped by making numerous trips to the bait shop for crickets. Both parents helped with expenses. A close family friend gave me the sand grout mortar.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Caitlin H. Couey

Project Number
J1110

Project Title
Film ASA R.I.P.

Abstract

Objectives/Goals
Which technology produces better photos, and is more efficient? Because of emerging image-gathering technology, I believe digital photos will be a better quality than the film photos.

Methods/Materials
· Nikon D1x camera (digital)
· Nikon--- F5 single lens reflex (SLR) camera
· Fujifilm (ASA 100, ASA 200, ASA 400 ASA 800)

Results
For both portrait and landscape subjects, I used the highest or "finest" digital ASA setting (Nikon D1x), various film speeds and used "faster" film from 100 - 800 ASA to see how it would render upon enlargement. Although this test will accurately compare the 100 ASA digital and 100 ASA film speed only, it does, however, illustrate how these faster films fall apart with extreme enlargement. Consequently, the digital/film 1:1 comparison (with fine film and high digital setting) concludes that digital quality surpasses that of film in almost all areas of measurement.

Conclusions/Discussion
Digital photos are a better quality than film photos. In both portrait and landscape examples, the two film/digital pictures are very different, even though the only difference was what kind of camera they were documented with. The still life photo, taken digitally, shows almost no difference between slow to fast digital film speeds.

My hypothesis was accurate. The digital photo is a better quality overall than the film photo.

Summary Statement
The comparison between digital and film.

Help Received
Dad, Visual Services Manager for SeaWorld/Mom, help arranging the board

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Michelle Lynn De Young

Project Number
J1111

Project Title
The Destruction of Acid Rain

Abstract

Objectives/Goals
The objective of my project was to see what sealent could protect marble the best from acid rain.

Methods/Materials
I coated marble pieces with different sealants. I put 3 marble pieces into each plastic container and poured dilute sulfuric acid (which was to mimic acid rain) into each container. I determined whether the marble was dissolving by measuring the pH with pH paper. If it was dissolving then the pH would increase as marble is a base. My different sealants where: Stone+Tile Sealer Finish, Kiwi Wet Proof,and Gel Gloss. I also had two controls which where marble in water and marble in dilute sulfuric acid with no sealant on the marble.

Results
The acid did dissolve the marble which I was able to see by the increase in pH. All three of the sealants made the marble dissolve more slowly. Of the three sealants Kiwi Wet Proof, which is a waterproofing product for leather, worked the best.

Conclusions/Discussion
My conculsion is that you can protect marble from acid rain by using a sealant on the surface.

Summary Statement
My project is about protecting marble from acid rain.

Help Received
Mother helped understand pH and acid base chemistry, Dad got sulfuric acid and pH paper.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Mason E. Eirich

Project Number
J1112

Project Title
Investigating the Effects of Polarized Eye Lens and Window Film in Preventing Light Passage

Abstract

Objectives/Goals
My objective is to find out which eye lens and window film are the most effective in blocking out light.

Methods/Materials
I am using Daphnia to test the effectiveness of different eye lenses and window films in preventing light passage.

Results
My results showed that the darkest eye lens and window film prevented the least light passage.

Conclusions/Discussion
Both my hypotheses were supported by my test results. The darker lens and window film let in less light. This project expanded my knowledge about how the darker lens and window film allowed the least amount of light passage, as it helped me to see how important it is to protect your eyes and home from ultraviolet light.

Summary Statement
To determine the effects of ultraviolet light passage on eyes lenses and window films.

Help Received
Father helped with the display board and mother helped with some of the typing.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Claire Y. Eisenberg

Project Number
J1113

Project Title
A Thirst For Spills: Tests of Paper Towel Fiber Structures

Abstract

Objectives/Goals
The goal of my project was to determine which paper towel fiber structure was most absorbent. I hypothesized that the fiber structure of the Brawny Prestige Prints paper towels would be the most absorbent.

Methods/Materials
Five brands of paper towels were viewed through a 250x microscope, taken pictures of, weighed, and analyzed. The paper towels were placed on a 1/4 cup spill of orange soda for five seconds each, and then weighed directly after that on a gram scale. The original weight was subtracted from the new weight to end up with the amount absorbed. Each brand was tested five times, and the official results were the average of the five tests.

Results
The Kleenex Viva paper towels consistantly absorbed the most orange soda throughout all five trials, and the Scott Towels absorbed the least, proving my hypothesis wrong.

Conclusions/Discussion
My conclusion is that paper towels with more air pockets in their fiber structure will pick up more of a spill than paper towels with thicker fiber strands.

Summary Statement
My project was testing different brands of paper towels in order to discover which fiber structure is most absorbent.

Help Received
Mrs. Glembotski helped me get in touch with people at SDSU in order to use a microscope there, Mrs. Wallin provided me with a gram scale, and my mom provided the other necessary materials for my project.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

Lauren N. Estrada; Eleanor S. Prack; Vanessa M. Villanueva

Project Number

J1114

Project Title

Oops! Now Where's That Napkin?

Abstract

Objectives/Goals

Our objective is to see which common beverage will leave the darkest stain after washing. We think that the chocolate milk will leave a darker stain than grape juice, orange juice, and fruit punch.

Methods/Materials

After applying 40ml of each liquid to seperate new, white cotton baby t-shirts. The t-shirts were washed individually in plastic tubs. Observations show that after washing, the chocolate milk left the darkest stain.

Results

We found that the chocolate milk and orange juice do not wash out of the white t-shirts. The grape juice and the fruit punch were completely washed off of the t-shirts.

Conclusions/Discussion

In conclusion, our hypothesis did match our results. Chocolate milk did leave the darkest stain on the baby t-shirts.

Summary Statement

We wanted to know which common beverage left the darkest stain on white baby t-shirts.

Help Received

Eleanor's Mother helped us plan our project and let us work at her school. Mr. Balderston lent us a graduated cylinder, let us do our science experiment in class, and helped us with the project abstract.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Kayla M. Gogarty

Project Number
J1115

Project Title
The Burn Glove

Abstract

Objectives/Goals
The purpose of my project is to find a convenient and reliable way to relieve pain from burns on the hand. My goal is to find the solution to that, and call it; The Burn Glove. I would also like to find out if my invention works.

Methods/Materials
You need one large latex glove, 1 large vinyl glove, 1 gel ice pack (6oz.), 1 glue gun, 2 hot glue sticks (approx.), 1 20 oz. can (3.25 inches in diameter.)

To make one (1) burn glove you need to: Gather materials. Place one large latex glove on your hand. Place one x-large vinyl glove over the latex glove. Cut off the tp of the gel icepack. Pour out the whole pack into jar (6oz.). Pour gel in between the two gloves. Place base of glove onto can. Use heated glue to glue where the two gloves meet, stopping every inch to press glue down. Fold gloves up 1in. and glue again. Wait until glue dries, then store in a box in the refrigerator.

Results
My results are that my Burn Glove worked and is very effective at relieving pain from burns on the hand and other places, too. I have tested it on minor burns, and it has proven effective in relieving the pain. It also has a soft, cushiony inside and protects the hand/burn from more injury. It has also proven effective to help those who have arthritis on the hand or finger joint.

Conclusions/Discussion
My conclusions are that The Burn Glove works for all of the purposes I would have liked it to. It sooths burns, is very convienient, is easily stored, and has other purposes besides relieving burn pain. It has proven effective and was a very successful project.

Summary Statement
The Burn Glove is a convenient and reliable way to relieve pain from burns on the hand.

Help Received
Mother and Father helped with the making of the prototype.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Thomas S. Grana

Project Number
J1116

Project Title
Yummy Donuts?

Abstract

Objectives/Goals
I did my project because after eating more than one donut I sometimes feel sick. I believe that #fattier# donuts make me feel this way. I wanted to find out which donuts have the most the fat. To get my project started, I chose seven different donut shops to test my idea. Out of the seven I think that Krispy Kreme donuts will have the most fat

Methods/Materials
I purchased two glazed donuts from each of the shops. I then weighed pieces of parchment paper and transparencies with a scientific balance. I used transparencies under the parchment paper so the drippings would not soak into the table. After putting one donut on each piece of parchment paper I labeled each one. I then covered all the donuts with aluminum foil using Duplos to make towers to prevent the foil from touching the donuts. After twenty-four hours I flipped half the donuts, one from each store. I flipped half of the donuts to see if more drippings would come off the donut to give greater results. After forty-eight hours, I weighed the drippings of the donuts and recorded all the information to a tenth of a gram. I then repeated all the steps because I was not totally satisfied with the results. The glazed donuts seemed to harden because of the sugar coating and visually the drippings on the parchment paper were not pleasing to the eye. I then decided to use plain cake donuts and cardboard pastry box pieces to see if I could get a better result.

Results
After the experiment was over, I discovered that Chuck#s donuts had the most fat with 1.2% of the donuts total weight. The donut that gave off the second most fat was Happy Donuts with 0.8% of the donuts total weight. Royal Donuts had the least amount of fat with 0.4% of the donuts total weight. These results are based on the #Flipped# group chart. I was extremely surprised because I thought for sure that Krispy Kreme had the most fat.

Conclusions/Discussion
My conlusion is that although all donuts contain some fat, of the donut shops that I tested Chuck's had the most fat and Royal Donuts had the least.

Summary Statement
The objective of my project was to find out the brand of donut that had the most fat.

Help Received
My parents helped with typing if report and buying donuts. My dad borrowed a scientific scale from his work for the weighing of the donuts.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Mitchell T. Jergensen

Project Number
J1117

Project Title
Is Brighter Better?

Abstract

Objectives/Goals
The objective of this experiment is to determine if there will be a better bond strength with the laser light cure or the high intensity visible light cure.

Methods/Materials
Obtain: Extracted teeth; Dental stone; Orthodontic brackets; Orthodontic cement; Power Pac Visible light curing light; Optilux high intensity visible light curing light; Optilux visible light curing light; Pulley; Fishing wire; Wheat; scale.
Steps: Obtain materials; place teeth in stone base; place brackets on tooth with light cured orthodontic cement; cure cement with first light; test strengths; record weights needed to break bond; repeat with other lights having 15 trials with each sample. Graph, analyze, conclude and communicate results.

Results
My hypothesis was proved correct after I did my experiment. The laser light cure held an average of 4949 grams. The high intensity visible light cure had held 3028 grams. The visible light cure held 4127 grams.

Conclusions/Discussion
The laser light cure held the most amount of mass with an average of 4949 grams. The high intensity visible light cure had held 3028 grams and did the worst while the visible light cure held the second best, 4127 grams. If I ever did this project again, I would add more trials or add a variatoion(soda-pop on some teeth, etc.). This experment worked out well and I feel that the results are accurate.

Summary Statement
The purpose of this experiment is to determine if there will be a better bond strength with a laser light or high intensisity visible light cure.

Help Received
My sister helped with display board; My Mom helped type; My Dad helped with trials and tooth preparation.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

Natasha Jundt; Danielle Nelson

Project Number

J1118

Project Title

Paint Permeability Analysis: What Paint Best Protects against Moisture in Actual Application?

Abstract

Objectives/Goals

The objective of our project is to determine which paint combination will best protect against moisture in actual application. Through our research we have found that it is impossible to completely seal out water from a wall, because the very nature of wood causes it to expand and contract allowing both diffusion and possible leakage. Knowing this persuades us to believe that a paint, which breathes, preventing the condensation of water vapor, will best resist water damage.

Methods/Materials

We constructed twenty-four, four inch square individual wall cavities. Eight combinations of paint were tested three times each in order to gather more accurate results. The paint combinations consisted of -- an interior coating of Elastomeric and an exterior coating Elastomeric, an interior coating of Latex and an exterior coating of Elastomeric, an interior coating of Elastomeric and an exterior coating of 100% Acrylic Latex, an interior coating of Latex and an exterior coating of 100% Acrylic Latex # the previous combination were also tested with identical cracks. Throughout the experiment temperature and humidity readings were taken to determine the direction in which the water vapor traveled.

Results

We found that the paint combination that best protected against moisture consisted of Elastomeric on the interior surface and 100% Acrylic Latex on the exterior surface. Interestingly this combination was one of the samples which included a crack. However, due to the appearance, most consumers would prefer a sealed combination of Elastomeric on the interior surface and 100% Acrylic Latex on the exterior.

Conclusions/Discussion

In conclusion we have found that it is better to leave a surface unpainted then to paint it with the incorrect paint. In affect consumers that have painted their homes with the inappropriate paint have faced serious moisture problems that in some cases have resulted in severe illness or even death. This demonstrates how important selecting the correct paint type is for each job.

Summary Statement

Our project, "Paint Permeability Analysis", was used to test various paint combinations in actual application to dtermine which paint combination would best protect against moisture.

Help Received

Father helped to cut wood and plexiglass, Mother drove us to purchase paper, Expert advise from Structural Engineer

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Justin J. Koh

Project Number
J1119

Project Title
Germ Warfare in the Oral Cavity

Abstract

Objectives/Goals
This experiment is designed to test what mouthwash is most effective in killing bacteria from the oral cavity. I hypothesized that Listerine would be most effective because it is very strong, chemically.

Methods/Materials
I cultured bacteria from my mouth on agar plates in an incubator. Later, I tested the different mouthwashes# effectiveness with water as a control variable.

Results
In the end, the prescription brand, Periogard turned out to be most effective, clearing 9.5 mm compared to Listerine#s 7.

Conclusions/Discussion
I concluded that this experiment could have been expanded if I had used more test reagents or had been expanded over a longer period of time.

Summary Statement
This experiment is designed to test what mouthwash is most effective in killing bacteria from the oral cavity.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jarret W. LaRose

Project Number
J1120

Project Title
Comparing Energy in Different Types of Wood

Abstract

Objectives/Goals
My objective was to learn which wood , Douglas Fir or Oak, produced the most energywhen burnt.

Methods/Materials
a full size steam locomitive was used. Douglas Fir and Oak wood were burned seperatley in the fire box of the steam locomotive. The amount of wood of each type was recorded when 50#'s of steam preasure was reached. Each test was timed . Both types of wood reached the 50#'s of pressure. However , the Douglas Fir realsed its energy quicker than the same amount of Oak wood.

Results
both types of wood reached 50 pounds of steam pressure. However, the Douglas Fir released its energy quicker then the same amount of Oak wood.

Conclusions/Discussion
It appears that the energy contained in one pound of each type of wood is nearly identacal. the difference is that the Douglas Fir released its energy quicker then the same amount of Oak wood.

Summary Statement
Burning differnt types of wood in a steam locomitive to determine which wood produced the most energy

Help Received
The San Luis Obispo Railroad Museum loned me the use of their narrow gauge steam locomitive for this experment. My father supervised my use of this locmotive, and helped me acquire the materials for the experiment.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Andy P. McCornack

Project Number
J1121

Project Title
Which Paper Is Better for You and Your Tank?

Abstract

Objectives/Goals
I wanted to determine which toilet paper was best in the areas of 1) strength, 2) softness, 3) septic tank friendliness, and 4) cost effectiveness.

Methods/Materials
I randomly selected 3 brands of toilet paper to use in my experiment. Each sample was subjected to the same criteria. First was a strength test, where a square of paper was put over a cup, secured by a rubber band, a squirt of water was applied, and then pennies were added until the paper collapsed. The number of pennies each sample held was recorded. Softness was determined by asking 3 people to feel the different tissues and giving their opinion on which they thought was the softest. Septic tank friendliness was tested by putting one square of each tissue in 1 liter of water and letting them sit for 4 days. Then I visually observed which paper had deteriorated the most. Cost effectiveness was based on the price of a single roll of each tissue.

Results
In the strength test Soft Choice was 1st, then Value Soft 2nd, and Scott brandcame in 3rd place. The softness test and septic tank friendlines test had the same results as the strength test. The cost/roll had Value Soft in 1st place, followed by Soft Choice in 2nd, and Scott in 3rd place.

Conclusions/Discussion
My hypothesis was that Scott brand toilet paper would be first in all of the tests because of its reputation and TV advertisements. Instead, I found out that Soft Choice was the strongest, the softest, and the most septic tank friendly, while coming in second in terms of cost.

Summary Statement
Because of where I live and having to use septic tanks and infiltrator systems I was curios to see how 3 different types of toilet paper compared in strength, softness, septic tank friendliness and cost.

Help Received
Mrs. Smith helped me to organize my display board. Ms. Baird helped me prepare my display board for the California State Science Fair.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jennifer M. McKnight

Project Number
J1122

Project Title
Hot Stuff

Abstract

Objectives/Goals
The purpose of my project is to find out which substance is the best for filling microwave heated hot packs (bean bags): dried corn, rice, black turtle beans, macaroni, soybeans, calcite, or pinto beans.

Methods/Materials
Six cups of each item was put into identical cloth bags, then put in a bowl and weighed. Then each one was heated in the microwave, by itself, for exactly four minutes. I measured the temperature of each hot pack every 15 minutes (using the same thermometer). When the temperature went down to 125 degrees or below, I was done with the test.

Results
Most of the items tested got up to about 180 degrees (the corn, rice, black turtle beans, macaroni, and pinto beans). I noticed that generally they all retained heat for about the same time except the macaroni, which weighed less. The calcite hardly heated up at all but I found it had burnt my bag. The soybeans did not reach the same temperature as the others (only 151 degrees). I thought that maybe I had done this test wrong so I did it again but got basically the same results.

Conclusions/Discussion
As I was doing my research, I read that water, fats, and sugars absorb radio waves in microwave ovens. So, I soaked some soybeans in water, then measured out six cups and heated them like before. I was surprised that I got basically the same results this time also. I was never able to fully explain why the soybeans did not heat up to nearly 180 degrees like the other items. Overall, the corn and rice seemed to be the best items to use for filling hot packs.

Summary Statement
Which substance has the best heat retention, therefore, is the best for filling hot packs.

Help Received
My mom helped me edit the report and make the project display. My dad helped me set up the experiment and he borrowed a balance from his work.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Rebecca D. Miller

Project Number
J1123

Project Title
What's Collecting in Your Lungs?

Abstract

Objectives/Goals
The objective of this project was to find whether first-hand or second-hand cigarette smoke has more tar and nicotine content as well as to compare filtered, non-filtered, and low tar cigarettes to determine which has the least amount of tar and nicotine residue that collects in peoples# lungs.

Methods/Materials
This experiment was tested by constructing two #mechanical smokers#, one for each smoke test and both measuring the tar and nicotine residue in the same way. These apparatuses artificially drew the residue from the end of the cigarette or from the smoke. For first-hand smoke testing, the cigarette butt was placed inside the rubber tubing and was directly inhaled. For second-hand smoke, the cigarette was placed inside a flask and the bulb pumped in the smoke collecting in the flask. For each piece of filter paper three cigarettes of the same type were used to make results easier to recognize. For both smoke tests, the pieces of filter paper were weighed on a scale and the weight of the filter paper was subtracted, then divided by three to find the result.

Results
These tests found that the amount of residue in second-hand smoke is greater than first-hand smoke for all three types of cigarettes. The comparison between the different types of cigarettes for first-hand smoke resulted with filtered cigarettes having the largest quantity of residue, then non-filtered, and low tar with the least amount. For second-hand smoke, filtered cigarettes had the least amount of residue, non-filtered had the second least, and low tar had the greatest amount.

Conclusions/Discussion
My test results of second-hand smoke having a larger amount of tar and nicotine residue than first-hand smoke may not be completely accurate because second-hand smoke contains both the smoke from the end of a burning cigarette and the smoke inhaled by the smoker, and then exhaled. The second part of second-hand smoke could not be tested but then again, this would only add to the amount of residue. Between filtered, non-filtered, and low tar cigarettes, low tar cigarettes have the least amount of residue from first-hand smoke but for second-hand smoke, low tar cigarettes have the greatest amount of residue.

These results show that second-hand cigarette smoke has a worse affect on a human's lungs than first-hand smoke does and may lead to the question of whether smokers have the right to introduce cigarette smoke to the environment.

Summary Statement
My project tests whether first-hand or second-hand cigarette smoke leaves behind more tar and nicotine residue in a person's lungs, as well as a comparison between the tar residue in low tar, filtered, and non-filtered cigarettes.

Help Received
Father helped cut plexi-glass for mechanical smoker; science teacher helped provide materials for part of the second-hand smoke mechanical smoker

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jamie G. Morton

Project Number
J1124

Project Title
The Sun Sets in the Yeast: Comparing the Effectiveness and Cost of Different Sunscreen Brands and SPF Ratings

Abstract

Objectives/Goals
Ultraviolet light can cause sunburns and damage skin cell DNA which may eventually lead to skin cancer. Commercials make claims of the superior effectiveness of their sunscreen brand. This project's objective was to determine whether brand name and cost make a difference in how effective sunscreens are at blocking ultraviolet radiation, and whether the higher the Sun Protection Factor rating, the more effective the sunscreen is in reducing damaging UV effects.

Methods/Materials
A diluted UV-sensitive baker's yeast culture solution was applied to 20 agar plates, and 4 different sunscreens (a SPF 15 and 30 each for a "natural" and 3 "commercial" brands) were spread on the plate lids. Exposed and unexposed controls were made and the entire procedure repeated to give 2 exact replications. Plates covered with sunscreened lids were exposed to a UV light for 10 minutes each. After 4 days of incubation, the number of surviving yeast colonies in each plate were counted.

Results
Results showed unpredicted large differences between sunscreens (with the natural brand performing worst), and predicted differences between SPF ratings (but not a much as expected). The results also showed that price is not a reliable indicator of brand effectiveness.

Conclusions/Discussion
Some practical conclusions follow from the results: "Commercial" brands tend to be more effective than "natural" sunscreen brands. A higher SPF rating is more protective but not by as much as the rating difference implies. Consumers should choose the least expensive commercial brand. Also, since most sunscreens contain the same active ingredients (octyl methoxycinnamate), other "added ingredients" may account for differences in effectiveness and should be isolated and studied.

Summary Statement
This project examined the relationship between sunscreen effectiveness against ultraviolet radiation and brand, SPF rating, and cost.

Help Received
Father helped me get the UV-sensitive baker's yeast and UV lamp and my teacher approved of my design.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Amanda L. Mundell

Project Number
J1125

Project Title
Wetter Water: A Comparison of the Surface Tension Reducing Ability of Shampoos and Dishwashing Detergents

Abstract

Objectives/Goals
My goal was to determine whether shampoos or dishwashing detergents would be more effective at reducing the surface tension of water. My hypothesis was that dishwashing detergents would reduce surface tension more effectively than shampoos.

Methods/Materials
I tested several dishwashing liquids and shampoos to see how much of each it took to sink a needle floating on 500 ml of water. I added the shampoo (or detergent) 0.1 ml at a time until the needle would no longer float. After each 0.1 ml, I stirred the water thoroughly and waited several minutes before trying to float the needle. I washed and dried the needle after each test and made sure to use fresh water at the same temperature for each cleaner tested. I recorded the results in my lab book and figured the averages for shampoos and dishwashing detergents.

Results
On average, it took less dishwashing detergent to reduce the surface tension enough to sink the needle than shampoo. Some shampoos were strong enough to sink the needle at the same concentrations as some dishwashing detergents but on average greater amounts of shampoo were needed.

Conclusions/Discussion
The hypothesis was correct. In general, dishwashing detergents are more effective at reducing the surface tension of water than shampoos. This may be because dishwashing detergents are formulated to "cut grease" and leave dishes "sparkling clean" while shampoos are formulated to be "gentle" and not strip your hair and scalp of "essential oils."

Summary Statement
My project tested and compared the respective surface tension reducing abilities of several shampoos and dishwashing detergents.

Help Received
My mom drove me to the library to do research. My dad bought shampoos and detergents and loaned me his old college chemistry texts. He also answered my questions about chemical bonds, surface tension, hydrogen bonding, polar and nonpolar molecules, and surfactants.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Oanh K. Nguyen

Project Number
J1126

Project Title
Bacteria Killer

Abstract

Objectives/Goals
My objective is to find out which kind of anti-bacterial soap would kill the most bacteria. My hypothesis is that Ajax will be the most affective.

Methods/Materials
I asked the volunteers to put their hands in the dirt behind the classroom for 30 second. I use a sterile swab and streak it across their hand then onto a plate of nutrient agar. I gave each volunteer a different brand of soap with a certain amount. I use 5 different brands of soap, Ajax, Equate, Dial, Softsoap, and Ivory. For three volunteers I asked them to wash their hands with just water. The volunteers washed their hands for one minute. After one minute, I use a sterile swab and streak it across their hands then onto a plate of nutrient agar. I let the bacteria on the agar to grow for two days. After two days, I counted the bacteria colonies on the agar plates and recorded my data. In the end, I gram stained the different color of bacteria colonies, to see if they are gram negative or positive. I followed the instructions on the gram staining kit.

Results
After comparing the results, all the data varied. Ajax had the lowest amount of bacteria colonies after handwashing. The one with the most bacteria colonies was Ivory. While the controls of the three volunteers varied from 0-18.

Conclusions/Discussion
My conclusion supported my hypothesis, and Ajax was the most affective in reducing hand bacteria. Although, the low bacterial counts from the control plates suggest that just using water and vigorously rubbing the hands is as affective as using the soap. So it is difficult to really conclude which brand of soap is the most affective, because each person has a different style of rubbing their hands and that could affect the results.

Summary Statement
I want to find out which kind of soap would be most the affective for destroying bacteria.

Help Received
I use the microscope at Fresno State University to take pictures of my gram stained slides of bacteria colonies with Dr. Wright .

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Howard C. Noz

Project Number
J1127

Project Title
The Right Price for Light

Abstract

Objectives/Goals
Replacement of incandescent lamps (IL) with high efficiency lamps (HEL) should prove to be expensive because of higher costs of HELs, higher electricity prices and surcharges and the possible extra costs to accept the heavier and bigger HELs with byproducts like sound and electro-magnetic disturbances. Is the consumer paying a high price for keeping the lights on in his house?

Methods/Materials
In a box with 6 black cubby holes are placed 5 HELs, being advertised as 60W equivalent light sources, and 1 IL of 60W, being the Control. Prices, dimensions and weights were determined. 23 days light, temperature, sound, electro-magnetic radiation, current, and voltage were measured. The possible savings were calculated and compared against costs HEL bring to the consumer.

Results
The findings were placed in charts and graphs. The HEL compared to IL show:
4 HEL produced 149-173 % more light using 460-500% less energy. 1 HEL failed to produce same light level. Small sound at levels 0.1-0.8 dBA above ambient noise. Electro-magnetic levels of 0.8 - 5.2 mV(RMS) and peaks of 20mV (RMS) at 30 cm from source. Temperatures at 60 cm are 149-173% less. HEL are 30-85 grams heavier. 4 HEL were 0-2 cm larger in diameter or height. Large cost savings were calculated over 23 days and increase if electrical prices rise.

Conclusions/Discussion
The hypothesis is wrong for the lamps tested. The price for HEL is higher than IL. Sound, EMR, and extra weight are insignificant at this size of lamp to increase costs much. The energy savings justifies the replacement of the lamps.
Certain applications appear not possible or difficult like dimming lights to a candle strength, changing color, and putting lights in series.
The small detected sound and EMR levels and the weight may be important when this experiment is expanded to include lights that are much bigger than the 60W lamp. It would require a much bigger test box and the electricity cost for such an experiment will be high. It may prove however that consumers will have to pay extra for reducing the sound and EMR levels and the heavier ballast for the HEL need heavier more expensive fixtures. Lighting in theaters is very bright and there is a need for dimming. There it may prove difficult to apply HELs.

Summary Statement
Do consumers enjoy the same properties from HEL as from IL and is it really reducing costs?

Help Received
Dad assisted in borrowing instruments, laptop, and getting box material, teached wiring the lamps and using the instruments. Friend, Eugene Shin, helped with initial project thoughts. Teacher helped in project planning and display board requirements. Mom helped in reviewing text.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Tina M. Oliver

Project Number
J1128

Project Title
What Cereal Absorbs the Most Milk?

Abstract

Objectives/Goals
To determine what cereal absorbs the most milk out of Grape Nuts Flakes, Special K, Total and Wheaties.

Methods/Materials
1.Measure 8 oz. of Wheaties and poor it into a bowl.
2.Measure 7 oz. of 2% milk and poor it into the bowl with the cereal and let it sit for 3 minutes.
3.After 3 minutes, sift the rest of the milk into the measuring cup and see how much milk is left.(while sifting, do not shake or stir, just let sit)
4.Subtract the amount of milk ended with from the amount of milk started with which will equal how much milk the cereal absorbed.
5.Repeat this procedure 14 more times, so you have done the experiment 15 times for each cereal.(Grape Nuts Flakes, Special K and Total)which is a total of 60 trials.
MATERIALS: 18 oz. of Grape Nuts Flakes, Special K, Total and Wheaties
3 gallons of milk
1 bowl
1 Stopwatch

Results
Grape Nuts Flakes absorbs the most milk and Total absorbs the least amount of milk. These results tell me that Total is the cereal that will stay the crunchiest the longest out of all the cereals I tested.

Conclusions/Discussion
The purpose of this experiment was to determine if Wheaties, Total, Special K, or Grape Nuts Flakes would absorb the most milk. My hypothesis was correct when I said that Grape Nuts Flakes would absorb the most milk. The average milk absorption for Grape Nuts Flakes was 2.42 oz., Wheaties was 2 oz., Special K was 1.9 oz. and Total was 1.66 oz. Therefore, Grape Nuts Flakes gets the soggiest faster and Total is the cereal that will stay crunchier longer.

Summary Statement
I tested the milk absorbtion in cereal and Total came out to be the least absorbant and Grape Nuts Flakes was the most absorbant.

Help Received
no one helped me with this project

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Steven A. Paletz

Project Number
J1129

Project Title
Anti-Bacterial Hand Sanitizers: Hype or Help?

Abstract

Objectives/Goals
Hand washing may seem trivial, but failing to do it may have tragic even deadly consequences. By not washing our hands regularly we may be causing our own poor health and spreading germs to others. This project was done to test the effectiveness and claims of waterless anti-bacterial hand sanitizers against the XL1 blue E Coli bacteria.

Methods/Materials
The testing was done by combining a dilution of each product (Purell, Aloeguard, Alcare Plus, 6.2% ethyl alcohol, 62% ethyl alcohol and Bath & Body works) with the XL1 blue E Coli bacteria and plating 50-ml. of the mixture onto a nutrient agar petri dish. Controls were run. Three trials were conducted on each dilution of product to bacteria. Dilutions of both 1:1 and 2:1 of product to bacteria were tested. This was allowed to incubate for a period of 24 hours at 37 degrees Celsius. Following the incubation period, the bacteria were counted and the results were documented and graphed.

Results
The results indicated that Purell, Bath and Body works, Alcare Plus and 6.2 % ethyl alcohol were not effective in killing the bacteria tested. They did not live up to the claims made on each product. Aloeguard, a widely used hospital product, did effectively kill all of the bacteria tested. Ethyl alcohol 62% also worked well to kill the bacteria.

Conclusions/Discussion
Concluding the testing, it was discovered that the antibacterial hand sanitizers were not as effective in killing bacteria as they claim to be. The original hypothesis was partially correct in that the chloroxylenol, found in Aloeguard, as originally suspected, was very effective in killing the bacteria tested, as was the 62% ethyl alcohol. After 24 hours, these products killed 100% of the bacteria colonies tested. The other products simply did not work.

Summary Statement
This project was done to determine the effectivness or lack there of, of waterless anti-bacterial handsanitizers against the E Coli bacteria.

Help Received
Main assistance came from Dr. Benjamin Cravatt at the UCSD research institute, utilizing lab equipment under his supervision. My Father instructed me in the use on Excel enabling me to graph my results. My Mother and a friend assisted me in selecting the color scheme for my display board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

Morgan T. Pedersen

Project Number

J1130

Project Title

Pesticides: What Cleans the Most Pesticides off of Fruit?

Abstract

Objectives/Goals

What cleans the most pesticide residue off of fruit? Cold tap water, hot tap water, cold tap water with soap, or hot tap water with soap?

Methods/Materials

Thirty-six test apples of same size and shape were dipped in a Tartrazine Dipping Solution, which is an orange-yellow dye used as a substitute for pesticide residue. After 24 hours, the apples were shaken vigorously for 15 seconds in a plastic ziploc bag containing one of the four test samples (cold tap water, hot tap water, cold tap water with soap, or hot tap water with soap). The liquid from the bag was then poured into a vial and the color of the liquid determined the amount of Tartrazine Dipping Solution removed from the apple. A colormetric system was created to determine the amount of Tartrazine Dipping Solution removed.

Results

All of the test results fell into the same range, so further serial dilutions had to be done to the Tartrazine Unit 1/32. The control group was cold tap water, and cold tap water removed more pesticide residue from the apples than any of the other test samples; hot tap water came in second place, cold tap water with soap came in third, and hot tap water with soap came in fourth.

Conclusions/Discussion

Cold tap water proved to be the best in removing the most pesticide residue, therefore, the hypothesis was not supported. Cold tap water took off 1/64 of the Tartrazine Unit, while the other tests took off 1/64 < 1/256 of the Tartrazine Unit.

Summary Statement

What cleans the most pesticide residue off of fruit?

Help Received

Used lab materials (Tartrazine, vials) provided by Dr. Robert Krieger, University of California at Riverside.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christian M. Pollock

Project Number
J1131

Project Title
Will the Clothes You Have on Engulf You in Flames?

Abstract

Objectives/Goals
The objective is to find out if there are fabrics worn in everyday clothing one would not want to wear due to their reaction to flame. If the composition of a fabric is related to burn speed (ignitability) then fabrics with artificial blends will have the fastest burn speed or ignitability.

Methods/Materials
A small light back-packing stove with a compressed fuel canister containing a mixture of propane and butane was placed in the center of an upside-down aluminum cake bundt pan to create a stable source of flame. A #10 coffee can with both ends removed was used as the testing chamber with a fabric swatch cut from a garment, stretched and fastened with a clamp over one end of the can. The flame was set to a specific level and the can was lowered and left to sit for 3 minutes on top of two spacers between the can and the bundt pan to provide oxygen flow. Observations were carefully noted. Although the test design doesn't take into account or simulate skin tissue or body mass it provided a method to observe the reaction of fabric to flame.

Results
Upon averaging the several properties of reaction measured in each fabric garment sample, one fabric sample rated near 100% in its' ignitability, disintegrative property and quick reaction to flame and three more rated in the 75% range or higher. These top four were comprised of synthetic or synthetic blends.

Conclusions/Discussion
Tests conclusively show that fabrics composed of artificial materials reacted the most to flame. The tests show that artificial or synthetic blends are worse with regards to fire safety compared to natural blends. Currently extremely flammable fabrics need no labeling or warning of any kind with the exception of children's sleepwear from size nine months to size 14 to be in compliance with the current Flammability Standards Act of 1953, however Congress most recently repealed that labeling requirement. Technology and chemicals exist to make garments safer at the cost of a few pennies per item. Manufacturer's should be encouraged to exceed the minimal requirements of the Flammability Standards Act and use the advantage of reducing the risk of burn injuries in their marketing techniques. Consequently, future action should be directed to the public by labeling and warning of all flammable fabrics for any age, gender or size to improve the safety of garments for all human beings.

Summary Statement
Determining the ignitability and reaction of different fabric samples from garments when exposed to flame.

Help Received
My mom took down my dictation while I was observing the fabric to the flame on all 14 samples, she also brought me to Goodwill so I could purchase a few more garments and took me to the sporting goods store so I could purchase new fuel cannisters for my back-packing stove.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Louise Qu

Project Number
J1132

Project Title
Save Electricity and the Environment

Abstract

Objectives/Goals
The objective of my project was to find out how much electricity could be saved by switching from a 60-watt light bulb to a 13-watt energy-saving bulb with a similar light output and what would be the environmental benefit of this. I think that the savings in my household may not be significant but if I were to extend my results to Ventura County, California, or the U.S., the results would be much more significant.

Methods/Materials
8 Soft White light bulbs, 60-watt incandescent and 8 Eco-bulb Electronic Energy Saving bulbs, 13-watt fluorescent were used in the experiment. The 60-watt bulbs were placed into eight sockets and turned on for 2 hours. The same was done for the 13-watt bulbs. The reading on the electrical meter was recorded before and after each test. On the second and third tests, the lights were turned on for 3 hours and 4 hours.

Results
The results showed consistently that the fluorescent bulb saved about 75% of electricity used by an equivalent incandescent bulb. On average, the fluorescent bulb saved about 0.05 kilowatt-hours, per hour per bulb. The environmental benefit and electricity savings are very significant when the results are extended to Ventura County, California, and the United States.

Conclusions/Discussion
My conclusion is that I may not save a whole lot of electricity on a micro-scale (single household) but if I were to extend my results, the amount saved would be a lot more significant on a macro-scale.(county, state, and country wide)

Summary Statement
My project is about how much electricity can be saved by switching to fluorescent (energy saving) bulbs and what the environmental benefit can be resulted from this.

Help Received
My dad took pictures with his digital camera.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Stephanie M. Rowe

Project Number
J1133

Project Title
The Best Alkaline Battery for Mechanical Energy

Abstract

Objectives/Goals
The purpose of the experiment was to determine which medium priced, non-rechargeable, D cell alkaline battery made the most mechanical energy. Based on my study of battery advertisements, my hypothesis was that the Energizer battery would make the most mechanical energy.

Methods/Materials
The experiment involved testing six medium priced batteries. A motor was made to raise a one gram weight. The time and distance the weight was raised were measured. The test was repeated five times for each battery. The power and value of each battery was calculated.

Results
The average power ranged from 0.071 ftlb/min to 0.083 ftlb/min. The average value of power generated ranged from 0.038 ftlb/min$ to 0.083 ftlb/min$.

Conclusions/Discussion
The data proved my hypothesis was correct, the Energizer battery made the most power at 0.083 ftlb/min. The Eveready battery was the best value at 0.083 ftlb/min$. To make the most power for an appliance or a toy, the Energizer battery should be purchased. A thrifty consumer would buy an Eveready battery since it made the second highest amount of power, but was the best value based on its lower cost.

Summary Statement
The project tested medium priced, non-rechargeable, D cell alkaline batteries to determine which one made the most mechanical energy.

Help Received
Greg Rowe (father) helped building display, bending wires for motor, starting and stopping the motor for the tests, using Word and Excel, and explaining research material.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Alisha M. Sanders

Project Number
J1134

Project Title
Which Product Removes the Most Oil from Oil Soaked Feathers?

Abstract

Objectives/Goals
The objective was to determine does Soft Soap, Johnson's Baby Shampoo, Dawn dish washing detergent, or plain tap water remove the most oil from oil soaked feathers? I thought that Dawn dish washing detergent would remove the most oil from the feathers because Dawn is advertised as an oil remover for dishes.

Methods/Materials
I first carefully controlled the weight and oiling of the feathers that were placed in groups of five feathers. I cleaned each group of feathers by shaking them in a jar of a solution for 30 seconds. I rinsed each feather in tap water and allowed them to dry for 12 hours. I repeated this process for the other three solutions(each solution had four trials). I compared the weight of the oiled feathers before and after cleaning to determine the amount of oil removed.

Results
In doing this experiment, I found that Dawn dishwashing detergent cleaned the most oil from the feathers. Johnson's Baby Shampoo worked second best, and Soft Soap only removed one tenth of a gram of oil more than plain tap water.

Conclusions/Discussion
In conclusion, I found that my hypothesis was correct, the Dawn dish washing detergent cleaned the most oil from the feathers. I think that these results will be able to help our environment. I recommend that environmentalists use Dawn dish washing detergent to help clean birds that are caught in oil spills.

Summary Statement
I wanted to find which of four cleaning soutions would clean the most oil from oil soaked feathers.

Help Received
Parents for materials, grandparents for equipment and computer

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Trevor H. Scheck

Project Number
J1135

Project Title
Safer Eating Environments for People Who Have Peanut Allergy

Abstract

Objectives/Goals
Probably the most common and most dangerous food allergy is Peanut Allergy. My excperiment was to find which counter surfaes are the most resistant to peanut oil and which cleaning methods best remove peanut oil.

Methods/Materials
I obtained Formica and ceramic tile squares to test on. I cleaned both groups and tested for the protein quantity, then contaminated the surfaces with peanut butter. I then tested for protein again and cleaned with several cleaning methods. Afterwards, I tested for protein and compared the results with the other tests.

Results
The data show that Formica had a higher resistance to peanut oil penatration, and that powdered chlorine bleach was better at cleaning off the peanut oil residue.

Conclusions/Discussion
I believe powered chlorine bleach was the best at removing peanut residue because it had the highest dosage of cleanser per area. Wiping was not effective because it did not chemically remove the residue.

Summary Statement
The search for a surface that resists peanut protein penetration most effectively and a cleaning method to clean the surface effectively.

Help Received
Father helped obtain supplies.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Tia J. Stone

Project Number
J1136

Project Title
Pants on Fire?

Abstract

Objectives/Goals
My objective was to determine what is the safest fabric to wear if exposed to fire.

Methods/Materials
Looking at natural and synthetic fibers, one 8cm x 6cm piece of the following types of fabric; cotton, modacrylic, silk, nylon, polyester, rayon and wool, were collected. Using a pair of tongs, each piece was held over the flame of a candle and timed to compare the length of time it took to catch fire as well as total time of self exstinguishment.

Results
Most synthetic fibers caught fire and melted rapidly with the exception of modacrylic which was slow to burn. Other than wool all of the natural fibers burned to some extent. Burning was not sustained, on the wool sample, when removed from the heat source.

Conclusions/Discussion
Modacrylic, which is used in children's sleepware is the safest synthetic fiber. It is slow to burn and does not melt. Wool is the safest fabric of all that I tested. It only charred when held over the flame and burning did not contiune when removed from the flame source. This data suggests that in the event of clothing exposure to fire, wool would be the safest material to be wearing.

Summary Statement
Comparing flame spread of natural and synthetic fabric used in clothing.

Help Received
Older sister helped with writing down timed results as I did them.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Caroline Y. Suen

Project Number
J1137

Project Title
What Is the Best Way to Store Vegetables in the Refrigerator?

Abstract

Objectives/Goals
The objective of this experiment is to find out which type of container works the best for storing vegetables in the refrigerator.

Methods/Materials
Materials # 3 plastic containers without lids(control)
3 Tupperware containers (same size)
3 porcelain bowls with covers (same size)
3 plastic bags (same size)
a roll of Saran Wrap
refrigerator
romaine lettuce and cauliflower

1) Cut the vegetables and place a certain amount of vegetable determined by weight into each of the containers.
2) Place all of the above in a refrigerator. Observe them once every 3 days and record in a notebook.
3) Determine the freshness of the vegetable by the designated #number# values.
4) After about 19 days I took the #vegetable scores# and analyzed them using mathematical formulas.

Results
Both types of vegetables had about the same results. The porcelain bowls kept the vegetables fresh the longest. The order of the vegetable freshness of the containers from the freshest to the least fresh was porcelain bowls, Tupperware containers, Ziplock bags, Saran Wrap, and the control(plastic cups). Overall, the cauliflower stayed fresher longer than the Romaine lettuce.

Conclusions/Discussion
The porcelain bowls kept the vegetables fresh the longest. The control was the worst. If I had to repeat this experiment, I would not use porcelain bowls. I might try Pyrex containers instead, because they are see#through, like all the other containers I used. If I don#t need to open the lid, new air cannot enter to accelerate the process of drying vegetables, so the vegetables that I put in the containers might stay fresh longer.

Summary Statement
My project is to discover the best container for storing cut vegetables in the refrigerator.

Help Received
Mother helped purchase materials; Mr. Lee taught how to analyze the data.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Alyse L. Tejeda

Project Number
J1138

Project Title
Product Label Truthfulness: The Difference between Canned Whole Kernel Corn

Abstract

Objectives/Goals
To find out if the labels on cans of whole kernel corn are all telling us the truth.

Methods/Materials
First I washed off the scale, dried it thoroughly and set it to zero.I carefully opened the can,removed the lid and placed it in the can.I pressed down on the lid as hard as I could so that all the liquid came to the surface.I poured the liquid from the can into the bowl on the scale and the measured it in grams.I tested the liquid from the can of corn with my pH test kit.I then filled the clean and dry test tube with 5 ml of corn liquid.I followed the directions to the kit by dropping three drops of the Indicator solution into the test tube.I put the lid on the test tube because if I had placed my finger over it to shake it my body acid could have affected the pH level of the corn liquid.I figured out the reading by using the color chart included in the kit.Then I cleaned the bowl and set the scale to zero.I used my spatula to carefully scoop out the dry corn kernels into the scale bowl and measured it in grams.I used random sampling to pick out 10 kernels of corn and using my metric ruler I placed the flat tip of the kernel on 0 and the rounded tip is where I measured.I filled out my chart using the numbers above and reading the nutrition facts off the backs of the label of the can.

Results
When I compare the Nutrition Facts from the labels on each can I noticed several interesting things.In the ingredients, corn, water and salt were listed on all 12 cans.10 out of the 12 cans also listed sugar.Only 2 out of the 12 cans measured exactly.The average kernel size ranged from 5.9 mm to 9.2 mm.All of the corn tested in about the same pH range.Out of the 12 cans,only two were clear in color.For the most part all of the cans had crushed corn with a few having seed floating in the liquid.

Conclusions/Discussion
I was wrong in my hypothesis.The winner was S&W when comparing nutrition facts.S&W had the least amount of calories and carbohydrates and also did not add extra sugar.This made it the best for you overall.In corn comparison,only FMV and Heritage brands correctly weighed what was printed on the label of the can.For the taste test,Del Monte was the winner.I can honestly say that choosing the best corn for your family varies depending upon what is important to the individual consumer.There are many variables involved:cost,kernel size,appearance,calories,nutritional values,added sugars,and personal taste.

Summary Statement
The differences between 12 varieties of whole kernel canned corn in nutrition, lable truthfulness and taste.

Help Received
My mother helped me type the report, do research on the internet and put the board together. My friends helped with the taste testing.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ashley A. Thompson

Project Number
J1139

Project Title
The Effect of a Chemical on a Pipe Clog

Abstract

Objectives/Goals
The objective is to learn which chemical will work best at eating away at lard in clogged household drains.

Methods/Materials
The procedures included the testing of four drain chemicals in order to determine which chemical best broke down one cup of lard in a ten minute time period. The lard was compacted in four individual pipes to represent a blocked household drain. Water was then poured into each of the pipes through a funnel. Once the blockage was confirmed, the four chemicals were poured separately into each of the pipes to determine which would clear the blockage first. The results were measured in millimeters.

Results
Each of the chemical's result numbers, from start to finish, ranged from one to nineteen millimeters. Only one chemical, Pro Liquid Drain Opener, broke through the blockage before the ten minute time period. Zep Drain Opener came in second followed by Drano Max. Liquid Plumber proved to be the least effective.

Conclusions/Discussion
These results indicate that they support my hypothesis, if Pro Liquid Drain Opener broke through first, then it would be the most effective chemical. The testing proved that Pro Liquid Drain Opener containing sulfuric acid cleared a clogged drain the fastest. These results tell us which chemical will work the best at clearing a clogged drain and why.

Summary Statement
My project tests four different drain chemicals to see which is the most effective in clearing a pipe clog in ten minutes.

Help Received
Teacher helped with results; Mother helped improve writing; Father helped build/construct this project and monitored me during the testing; Santee Public Library reference workers assisted in locating books/ information.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jade C. Wang

Project Number
J1140

Project Title
Energy Efficiency while Popping Popcorn

Abstract

Objectives/Goals
My goal was to determine which method of popping popcorn was the most energy-efficient: Jolly Time microwave, Orville Redenbacher#s microwave, Jolly Time stove, or Orville Redenbacher#s stove. I hypothesized that Orville Redenbacher#s stove would be the most energy-efficient.

Methods/Materials
I found the energy use of our microwave and stove using Btu, the amount of energy needed to raise one pound of water one degree Fahrenheit by massing a pound of water, then heating it up for a given time. Using both cooking methods, (microwave and stove), I could find the energy use for each. Then, I popped both brands of popcorn using both cooking methods, seeing how long the energy would have to sustain to get the job done. Last, working with the numbers I collected, I found how much energy it took to pop each brand using each cooking method.

Results
My results showed that using a microwave to pop popcorn is more energy-efficient than a stove. Orville Redenbacher#s popcorn uses less energy than Jolly Time. The most energy-efficient popcorn was Orville Redenbacher#s popcorn, at 83.9 Btu per bag. Next was Jolly Time microwave at 102.22 Btu per bag, then Orville Redenbacher#s stove with 183.37 Btu. Trailing close behind was Jolly Time#s stove at 188.7 Btu. My project shows that the most energy-efficient popcorn uses less than 1/2 of the energy the least energy-efficient popcorn uses.

Conclusions/Discussion
My findings proved that my hypothesis was incorrect. I did, however, attain my objective and discovered which popcorn was the most energy-efficient out of my four choices. The microwave used more energy than the stove per second, but microwaving popcorn was much faster. Orville Redenbacher#s popcorn simply popped faster than Jolly Time. The information I gathered from this project expanded at least my knowledge about energy. I learned about Btu and how to measure it. I think that people could use my project#s procedure as a basis of testing many different types of food with a variety of cooking methods. By determining the most energy-efficient way to cook a diversity of foods, people will have even more options to save energy.

Summary Statement
My project determined which method of popping popcorn was the most energy-efficient out of four methods.

Help Received
I thank Mr. Labnow and Mr. Newell for answering numerous questions from me, and my family for helping with Excel and eating all that popcorn. Thanks to my friends for all their support.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Mandy V. Wong

Project Number
J1141

Project Title
An Oily Situation

Abstract

Objectives/Goals
My project is to determine which lubricant has the lowest friction by measuring what angle does the test block starts to slip.

Methods/Materials
A total of two drops of oil from seven different lubricants were applied to a glass test block and to a glass ramp. The eighth test was air only. It was used as a standard to compare against the oil test results. The test block was gently squeezed against the glass ramp for the air test and the oil tests. A protractor was used to measure the angle during all the test runs. Each oil sample and air was evaluated five times.

Results
The WD-40 and the corn oil consistently had the lowest friction when compared to the other lubricant that was tested.

Conclusions/Discussion
The WD-40 and the corn oil had the lowest friction from the test data which results in lower energy needed for motion.

Summary Statement
My oil lubricant experiment was to measure which lubricant had the least friction in terms at what angle it started to slip on my test apparatus.

Help Received
Father assisted me with building the test set-up and purchasing the supplies; Mr. Balderston advised me on the science fair board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Ashley N. Muirheid

Project Number
J1199

Project Title
How Do Various Fabrics Compare as Barriers Against Ultraviolet Radiation?

Abstract

Objectives/Goals
The objective of my experiment was to compare the effectiveness of various common clothing fabrics as barriers against UV radiation. My hypothesis was that the thickest, most tightly woven fabrics, as determined by visual examination when held up to indirect light, would provide the greatest protection against UV rays. In my experiment, Sample #5 (100% cotton interlock) appeared to best meet this criteria.

Methods/Materials
Fabric-covered petri dishes containing YED agar and UV-sensitive yeast (saccharomyces cerevisiae) were exposed to sunlight for 6 hours. Three samples each of 11 different common clothing fabrics were tested, plus uncovered controls. Yeast growth was compared at 48 and 72 hours. Fabric weight, thread count, and the closeness of the weave were recorded as a means to analyze the yeast growth results. (The greater the yeast growth, the more effective the barrier performs at blocking UV radiation.)

Results
There were obvious differences in the effectiveness of the various fabrics. My hypothesis was supported, but not by the reasons I predicted. The fabric with the loosest weave and lowest thread count performed equally to Sample #5 (my hypothesis). In addition, fabric weight was not a significant factor by itself. The lightest fabric, 100% nylon, performed very well. The factor that was significant was the total area of the air spaces, or holes, between the threads.

Conclusions/Discussion
The effectiveness of a fabric as a barrier to ultraviolet radiation was dependent on the total area of air spaces (or holes)within the weave of the fabric. Weight, thread count, and fiber content were disproved as significant factors. 100% cotton interlock and 100% polyester fleece were the most effective at blocking UVR, as determined by the proliferation of yeast growth for these two samples. These results suggest that people who wish to protect themselves from UV rays, such as those at risk for skin cancer or burn victims, should consider wearing 100% cotton interlock or 100% polyester fleece versus other fabrics for the greatest UVR protection.

Summary Statement
My project compares the effectiveness of various clothing fabrics at blocking the UV rays of the sun.

Help Received
My father taught me how to work with digital photos on the computer. He also took a few of the pictures where my hands needed to be shown. I used the lab equipment and supplies at Reedley Junior College under the supervision of Mrs. Rose Elizondo, My mother chaperoned me to the various places I needed