CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Chelsea A. Balikian

Project Number
J1101

Project Title
Perfect Polish

Abstract

Objectives/Goals
To determine how ingredients in nail polish affect the durability or rate at which different nail polishes chip.

Methods/Materials
I chose five different brands of nail polish, four of which advertised as "longwearing". I analyzed the ingredients of each polish and found that one of the longwearing polishes contained Teflon. I then researched Teflon and found that it had unique qualities that could affect durability. From this, I formed the hypothesis that the polish that contained Teflon would not chip as fast as those without Teflon. The independent variable was the ingredient Teflon. The dependent variable was the number of days the polish containing Teflon could be worn without chipping. I applied each of the five polishes to the fingernails of my eight participants. I then observed and recorded the chips/scratches of each polish on each participant, every 24 hours.

Results
The results revealed that the polish containing Teflon, Sally Hansen Teflon Tuff, stayed on nails the longest without chipping or scratching. The one polish that did not advertise as longwearing, "Wet N Wild", chipped the fastest. Despite its relative strengh, the Teflon polish still only lasted on average 2.875 days as opposed to the 10 days it advertised.

Conclusions/Discussion
The unique qualities contained in Teflon actually strengthen nail polish durability.

Summary Statement
Our test showed that nail polishes that include the ingredient "Teflon" will last longer without chipping than those without Teflon.

Help Received
My parents help organize my thoughts

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Faith E. Blake

Project Number
J1102

Project Title
The Toothpaste that Whitens Stains the Best: Aquafresh, Rembrandt, Tom's, or Ultra Brite

Abstract

Objectives/Goals
The purpose of the experiment was to find out of the four whitening toothpastes - Aquafresh, Tom's, Rembrandt, and Ultra Brite - the one that could whiten three distinct stains the best. The toothpastes used different ingredients for whitening. Ultra Brite was predicted to whiten the best, because it used tough abrasives to scrub stains.

Methods/Materials
The materials included each of the four toothpastes, a toothbrush for each, 15 pieces of tile (to test on), 1 8-oz. can of concentrated grape juice, 1 box of tea bags, 3 cups of coffee, and 3 pots for soaking. Stains were applied to separate tiles, and soaked for 8 hours. The procedure consisted of brushing the unpolished sides of the stained tiles for one minute each. They were then compared to one another and ranked by whiteness, and averaged at the end of the ten-day experiment per toothpaste.

Results
The toothpaste with the highest average ranking was Aquafresh. Rembrandt was second, Ultra Brite third, and Tom's last.

Conclusions/Discussion
After the experiment, the author researched to find why exactly the different toothpastes had the results they did. Aquafresh had an ingredient called Triclene that broke up the bonds of stains so they could easily be brushed away. Ultra Brite and Tom's used abrasives, and were the two worst whiteners. Rembrandt used Alumisil, but was not found to break up particle bonds. The experiment proved that abrasives are the least effective method for whitening teeth, and ingredients that break up the bonds of stains are what customers should look for in a whitening toothpaste.

Summary Statement
This experiment was to find the whitening toothpaste that whitened stained teeth the best.

Help Received
Mother helped to time brushing, and proofing logbook. Sister helped time brushing.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Colleen T. Boyd

Project Number
J1103

Project Title
Sound Barrier

Abstract

Objectives/Goals
Which material (paper egg carton, styrofoam egg carton, standard house insulation) absorbs sound more efficiently. I believe the styrofoam egg carton along with the house insulation will be the most efficient.

Methods/Materials
Using boxes measuring 17"x22"x22" I compared each material (paper egg carton, styrofoam egg carton and house insulation) by themselves then added house insulation to the two egg carton boxes. With speakers inside the sealed boxes I played music while recording the highest reading on the decibel meter.

Results
After comparing each material alone and with the added insulation, the styrofoam lined with the insulation gave the lowest reading on the decibel meter.

Conclusions/Discussion
The results supported my hypothesis. Egg cartons have been used for sound barriers because the different angles redirect sound. Styrofoam along with house insulation works better then paper, because the dead air space absorbs sound more efficiently than the more solid materials (like the paper). My prject concludes that if you have a sound problem you should use styrofoam egg cartons along with your house insulation to eat up unwanted sound.

Summary Statement
Which egg carton absorbs sound the best.

Help Received
My Mother helped me type report, and encouraged me. My Teacher gave me support and guidence

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Andrea L. Bunn

Project Number
J1104

Project Title
A Comparison of the Flammabilities of Roofing Materials

Abstract

Objectives/Goals
This project attempted to discover whether or not wood shingles are as flammable as they are said to be. I also wanted to compare the flammability of newer wood shingles to older wood shingles and to other roofing materials. The statement of the problem for the experiment was, Do treated and untreated wood shingles provide less protection to the roof from the fire damage than tile, composite or concrete shingles? How will the age of a wood roofing shingle affect its flammability?

Methods/Materials
I created roof models with the shingles I acquired. I placed an approximately 600 degree Celsius charcoal on the top of each roof model. A fan was positioned to provide increased oxygen to the charcoal to simulate a windy day. Then I let the charcoal burn until it went out.

Results
The concrete and tile shingles were fire-resistant roofing materials and never ignited throughout the testing. The composite shingles melted to the felt under the heat from the charcoal, but did not burn. The aged, untreated wood shingles ignited immediately, and the flames quickly burned completely through these shingles. The charcoal burned through the Class C treated wood shingles to the felt. The treated Class B wood shingles did not produce a flame, when in contact with 600 degree Celsius charcoal for 20 minutes. The burning did not go all the way through the shingles, and the felt was undamaged.

Conclusions/Discussion
The untreated, aged wood shingles and the Class C wood shingles suffered greater fire damage than the concrete, tile or composite shingles. The aged wood shingles were extremely flammable probably due to their exposure to sunlight and other weather conditions. There was a dramatic difference in the fire-resistance between the treated shingles and the aged, untreated wood shingles. The results suggest that if installed properly, Class B wood shingles can be a dependable roofing material

Summary Statement
I compared the flammability of various roofing materials: tile shingles, composite shingles, concrete shingles, Class C treated wood shingles, Class B treated wood shingles, and aged, untreated, wood shingles.

Help Received
Thanks to my father who supervised my project; Urbach Roofing Inc. and Chemco who provided me with various roofing materials, and Mr. Dills who provided me with aged wood shingles for testing.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Ian B. Cawelti

Project Number
J1105

Project Title
Regular Wood vs. Recycled Wood

Abstract

Objectives/Goals
My objective was to test Trex and Evergrain, which is a manufactured wood product that is half plastic and half wood, and Redwood, which is a natural wood product, against Fire, Acid Rain, and Exposure to the elements, to find out which one will be a better building material in the future, when we have less wood.

Methods/Materials
For my experiments, I used Trex, Evergrain, and Redwood samples, vinegar, a timer, spray bottle, a notebook, and materials to make a mini deck.

The method for the Fire test: I built a mini deck and lit that along with the samples on fire, and I let it burn for 10 minutes, and I recorded what happened.

The method for the Acid Rain test:I put vinegar in a spray bottle, then I sprayed the samples for 30 seconds every 5 minutes for 30 minutes. Then I observed what happened and took pictures every 10 minutes.

The method for the Exposure to the Elements test: I put the samples outside, then I left them there from December 28,2003 to January 19,2004, and I recorded my results every day.

Results
The results for the Fire test: Trex and Evergrain were totally destroyed, Redwood was damaged, but not destroyed.

The results for the Acid Rain Test: Trex was affected most by the acid, followed by Redwood, Evergrain was not affected at all.

The results for the Exposure to the Elements Test: Redwood darkened, then came Trex which bleached moderatly,then came Evergrain which changed slightly if anything at all.

Conclusions/Discussion
In conclusion, Several conclusion can be reached from my experiments. Looking from the Environmental side, Redwood and Trex would be the best because they are quicker to decompose if natural disasters occur.Redwood being natural wood and Trex being more wood than plastic, they leave less plastic residue than Evergrain. Looking at a long lasting building material, Evergrain is best because of its ability to withstand weathering and chemical exposure. My conclusion would have to be Trex because even though it turned to dust in the fire test, it was in the middle in the Element and Acid Rain Tests. It even looked better when it turned to its final color in the Elements test.

Summary Statement
My Project is about what will happen in the future when we run out of wood, what material will we build with.

Help Received
My dad helped me the most whith this project, Page Kinkade:Materials Purchasing Agent of Hayward Lumber in Pacific Grove, and Hayward Lumber of Pacific Grove for giving me samples of Trex and Evergrain.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Rachel A. Cleary

Project Number
J1106

Project Title
Which Hand Cleanser Has the Most Antibacterial Effect?

Abstract

Objectives/Goals
My objective of this project is to find out which hand cleanser has the most anti-bacterial effect.

Methods/Materials
11mL of Dial Anti-Bacterial hand soap,11mL Hibiclens antiseptic/antimicrobial skin cleanser,11mL Purell Hand Sanitizer,11mL BD E-Z Scrub,11mL Episoft,11mL Ivory Pure Soap Bar,11mL Vionex Healthcare Personal Hand Wash,11mL Norisc Antimicrobial Liquid Soap,Sterile Water (Control),99 Sterile Applicators,198 Test Tubes,99 Petri Dishes(LB Agar)

Results
For each test(11 Total) record bacterial growth as a percentage to the control:
Control: 100% for each test
Purell: 80%,40%,16%,100%,100%,0%,0%,100%,200%,0%,40%
BD EZ Scrub:.5%,0%,0%,5%,0%,0%,0%,0%,0%,10%,10%
Ivory:40%,100%,200%,50%,0%,0%,10%,5%,0%,.3%,30%
Norisc:33%,33%,0%,5%,0%,0%,0%,0%,0%,0%,0%
Vionex:1%,3%,0%,0%,0%,0%,0%,0%,0%,.3%,0%
Hibiclens:2%,0%,0%,0%,0%,0%,0%,0%,0%,0%,0%
Episoft:.5%,0%,0%,0%,0%,0%,0%,0%,0%,0%,0%
Dial:2%,2%,50%,0%,0%,0%,0%,0%,0%,0%,0%
Average All Test Results for each product:
Control 100%,Purell 61.45%,BD EZ Scrub 2.32%,Ivory 40.48%,Norisc 6.45%, Vionex .39%,Hibiclens .27%,Episoft .05%,Dial 4.91%

Conclusions/Discussion
This experiment did not completely support the hypothesis. However, the data suggests that several of the hand cleansers had relatively the same amount of bacteria growth. Episoft had the best results, but Hibiclens had only a little more growth. Vionex was a close third. The Ivory Soap had a significant difference in growth in the tests. The experimenter believes this is because Ivory may work differently with different types of bacteria. Dial did well other than in the third test. The experimenter is not sure why but believes that this difference in growth may have been caused by having more bacteria on that sterile applicator than on the others. The experimenter believes that Purell may have done so poorly because it was mixed with water, and is not meant to be. Purell is a hand cleanser that contains water, but is not supposed to be used with it. One would simply poor it on their hands and it would dry right up. My

Summary Statement
My project tests different types of hand cleansers on killing hand bacteria in order to identify which is the most effective.

Help Received
Mother helped arrange backboard; Used lab equipment at Invitrogen under the supervision of Laura Vozza-Brown Scientist.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Shelby L. Constance

Project Number
J1107

Project Title
Determining if the Application of a Sun Protection Factor to Fabric Can Increase Its Ability to Block UV Radiation

Abstract

Objectives/Goals
My goal was to try to find a way to make my fathers work clothing safer. My father is a farmer who spends a lot of time in the sun, and has already been a victim of skin cancer. My hypothesis was that a natural fiber fabric treated with a SPF would provide a better barrier against UVR than a SPF treated man-made fiber fabric.

Methods/Materials
I used a total of 13 different fabric samples. Fabric content and weight were recorded for each sample. Each test trial required 27 - 30ml test tubes (TT). Thirteen TTs were wrapped with one sample each of untreated fabric, and 13 wrapped with SPF 30 treated fabric. The last TT was left unwrapped for my control. Each TT was filled with 15ml of apple juice and 2 drops of active yeast. All TT#s were exposed to direct sunlight for 5 hours. My control TT was boiled for 10 minutes to kill the active yeast. After exposure each TT was unwrapped, gently shaken and placed into a spectrometer to measure its light transmission % against the control blank. The greater the yeast growth, the greater the protection from UVR. Test results were recorded for each trial, and a total of 4 trials were conducted

Results
All natural fiber fabrics treated with a SPF showed an increase in UVR protection. The 100% wool provided the best UVR protection of all natural fiber fabrics tested. The man-made fiber fabric samples showed little difference between the SPF treated and untreated samples. The 100% polyester fleece fabric provided the best UVR blocking of all samples tested. The man-made and natural fiber blends tested all showed an increase in UVR blocking with the application of a SPF. An overall observation was that the greater the fabrics weight, the greater its ability to block UVR.

Conclusions/Discussion
In conclusion I have learned that a heavier weighted natural fiber fabric treated with a SPF 30 will increase that fabrics ability to block UVR. My hypothesis was correct. The natural fiber fabrics treated with a SPF did provide a greater increase in UVR protection over the man-made fiber fabrics. My results would suggest that I could make my fathers work clothes safer by the application of a SPF.

Summary Statement
My project was done to determine if the application of a Sun Protection Factor to fabric could increase its ability to block harmful ultraviolet radiation.

Help Received
My mother took pictures and helped with proof reading and the layout of my board. Mr. Nathen Wittington (H.S. Science Teacher) allowed me to borrow a spectrometer and test tubes to conduct my experiment.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)

Jim A. Curry

Project Number

J1108

Project Title

A Comparison of Cost, Heat Output, and Particulate Emissions in Artificial Logs vs. Ordinary Wood

Abstract

Objectives/Goals

In my project I attempted to answer whether artificial fire logs or ordinary wood logs would produce any significant differences in their particulate emissions (during burning) at < or = 2.5 micrometer particle size. I also evaluated which log heated the room most effectively, and which type of log was the best value (per hour of burn time). Ordinary wood logs and seven different types of artificial logs were purchased and compared.

Methods/Materials

All of the samples were tested in both a two-story chimney setting and a one-story chimney setting in the same house. A PersonalDataRAM was used to assess particulate emissions of < or =2.5µm (micrometers) in diameter. Two digital thermometers were monitored every half hour and temperatures at 1m and 2m were recorded and averaged. The cost of each log and the amount of time each log burned was recorded.

Results

The log that heated the room most effectively was the "Duraflame Crackleflame" (2.72 kg) log. It raised the temperature of the room an average of 8.25° C! The next closest in heat production was the large "Stater Bros. Firelog" which raised the temperature of the room 5.95º C.

With a shorter flue length, the logs burned much more rapidly than in a two-story setting. The logs burned for 1-3 hours in the one-story setting, and 2.5-5.5 hours in the two-story fireplace setting. The large "Stater Bros. Firelog" (2.72 kg), the "Pine Mountain Giant Size" (2.27 kg), and the "Duraflame Crackleflame" (2.72 kg) logs were the best values.

The log that had the most particulate emissions at the < or =2.5µm size was the large "Stater Bros. Firelog." It had a maximum of 373µg/m^3 of < or =2.5µm particulates. The standard safe level for 24-hour exposure is only 65µg/m^3 < or =2.5µm particulates!

Conclusions/Discussion

Ordinary wood was by far most expensive log to burn. The artificial logs "Duraflame Crackleflame" (2.72 kg), the large "Stater Bros. Firelog" (2.72 kg), and "Pine Mountain Giant Size" (2.27 kg) were the best values. The "Duraflame Crackleflame" (2.72 kg) produced the greatest amount of heat during the time it burned. Surprisingly, the large "Stater Bros. Firelog" (2.72 kg) emitted significantly more particulates (373µg/m^3) at < or =2.5 micrometers than any other log tested. No other log exceeded 150µg/m^3 of < or =2.5µm particulates at any time.

Summary Statement

This project attempted to discover if significant differences exist between artificial fire logs and ordinary wood in their particulate emissions (of < or =2.5 micrometers), heat output, and cost (per hour of burn time).

Help Received

Dr. Jenny Quintana for allowing me to borrow the PersonalDataRAM for the particulate emissions testing for my report; My science teacher for helping to edit my report; My parents for purchasing the logs.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Nicholas Jon David; Brendan Eggen

Project Number
J1109

Project Title
Mouthwash and Halitosis: Do Mouthwashes Really Work as Advertised?

Abstract

Objectives/Goals
Our objective for this experiment is to find out if antiseptic mouthwash kills germs that cause bad breath. We also want to find out which mouthwash will kill the most germs.

Methods/Materials
Five types of mouthwash: Scope Mouthwash, Listerine Mouthwash, Cepacol Mouthwash, Rite Aid Mouthwash, and Albertsons Mouthwash. We had seven sterile dishes, five of them corresponding to each mouthwash, one control, and one that we would not apply mouthwash to. Five sterile cotton swabs for inoculating the dishes, five medicine droppers for dropping the correct amount of mouthwash to the sterile dishes, and a subject or person to provide samples from the mouth.

Results
Results show that out of the five mouthwashes, the Albertson#s brand and Listerine showed some bacteriocidal properties. The two brands exhibit bacteriostatic effect, because colonies of bacteria seemed to stop growing for a day; but continued to grow after. The other three brands did not kill any bacteria. The colonies in the three dishes continued to grow.

Conclusions/Discussion
The five brands we used in this experiment all had #antiseptic# or #kills germs# on their labels. Initially, we thought maybe 30 seconds of gargling as recommended directions by all five brands was too short. Maybe it takes longer gargling times to kill the bacteria. Then we looked at the ingredients. Listerine and Albertson#s which seemed to have worked have the same active ingredients. These ingredients are Methyl Salicylate, Thymol, Eucalyptol and alcohol. Eucalyptol comes from the Eucalyptus plant. This plant is a cockroach repellent. This plant is bad for our mouth because it is toxic. In our research we found that Thymol has some antibacterial quality. Cepacol, Scope and Rite Aid contain Cetylpyridinium which is suppose to have antibacterial quality did not kill the germs. Many of the ingredients as we discovered are acids which may not be good for your mouth in the long run.

Summary Statement
An experiment that tests the effectiveness of mouthwash in killing bacteria that causes bad breath (halitosis).

Help Received
Mother helped with the board layout; Father helped in refining the procedure, and edited the report.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Katherine S. DePonte

Project Number
J1110

Project Title
Which Keeps Food Coldest: Ice Cubes, Blocks, or Ice Substitutes?

Abstract

Objectives/Goals
The purpose of this project was to see if one type of ice in a lunch box had any advantage over other types of ice. Ice cubes, a block of ice and blue ice substitutes were tested.

Methods/Materials
To conduct this experiment these materials were used: a lunch pail, block ice, ice cubes and ice substitutes, a digital thermometer, apples, mayonnaise for the sandwich, turkey for the sandwich and bread for the sandwich. Each of the following steps was performed twenty times. A digital thermometer was used to check a lunch pail's temperature. A refrigerated apple was tested with the thermometer in four different places. The temperature of the mayonnaise and the temperature of the whole sandwich were also recorded. After six hours the temperature of the sandwich, mayonnaise, the apple and the inside of the lunch pail were again recorded.

Results
In general, the lunch pail, mayonnaise and apple were kept coolest by the "Freez Pak" and "Coleman" ice substitutes. The sandwich was kept coolest by the ice cubes, but with the ice cubes, the sandwich became soggy through excess condensation. The least average change in temperature after six hours when taking into account all the items was with the ice substitutes.

Conclusions/Discussion
All of the cooling agents were effective in keeping the lunch pail and its contents cool. Although the differences were not great, the "Freez Pak" ice substitute was most effective, followed by the "Coleman" blue ice, next came the ice cubes. Less effective in keeping the items cool was the Rubbermaid blue ice. The ice block was the least effective cooling agent.

Summary Statement
The purpose of this project was to determine if one type of ice in a lunch box had any advantage over other types: a block of ice, ice cubes and "blue ice" substitutes were compared.

Help Received
My teacher, Mrs. Hunker, for allowing me to borrow the school's digital thermometers.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Brice W. Ezell

Project Number
J1111

Project Title
What Substance Melts Ice Most Efficiently?

Abstract

Objectives/Goals
The objective of this experiment was to determine which substance is the most efficient in melting ice.

Methods/Materials
The materials used were: One cup of rock salt, one cup of salt, one cup of rubbing alcohol, one cup of cat litter, and 1/2 cup of calcium cholride. I also used eight by eight metal baking pans to freeze the water and substances. I put five pans in group A and four in group B. I took group A's pans, poured water into them and froze them in a freezer. I gathered group B's pans, poured 1/2 cup of the substances in the bottom, poured water over the substances and froze them in a freezer. After two days, I brought out all the pans to test. I took the five pans of group A and poured each substance onto the top of it's individual pan. I observed the melting process at half hour intervals.

Results
The results are as follows: Rock Salt in Group B melted the most efficiently in five hours. Table Salt in Group B took seven hours. Rock Salt in Group A melted in eight hours. Alcohol in Group B melted in nine hours. Salt in Group A melted in ten hours. Alcohol in Group A melted approximately eleven hours. Cat litter in Group B and Calcium Chloride in Group a took twelve hours. Cat litter in Group A took fourteen hours.

Conclusions/Discussion
My conclusion is that rock salt in the most efficient in melting ice. I also found out that it is very efficient in lowering the freezing point of water because when I took the pans with rock salt out of the freezer, they had not fully melted. This experiment is very practical and can be used for everyday life.

Summary Statement
To Test What Substance Is Most Efficient For Melting Ice

Help Received
Mother helped with Abstract and Father helped with writing clear observations.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Christopher J. Fieschko

Project Number
J1112

Project Title
Effect of Disinfectants on the Growth of Soil Microorganisms

Abstract

Objectives/Goals
The purpose of this study was to examine the inhibitory effect of different commonly used household disinfectants on the growth of soil microorganisms. The household disinfectants used in the study included gin (approximately 50% ethyl alcohol), rubbing alcohol (70% isopropyl alcohol), Equate mouthwash, hydrogen peroxide, and Lysol disinfectant.

Methods/Materials
The inoculum for the study was prepared by incubating a small amount of backyard soil in a tube containing a clear sterile nutrient solution for several days. After the solution became turbid, three milliliters of this inoculum were then transferred to approximately one hundred milliliters of sterile clear nutrient solution and mixed. This inoculated solution was then evenly distributed into a twenty-four well clear plastic container. Four concentrations of each of the five disinfectants were added to the wells containing the inoculated nutrient solution, and four wells were used as a control without any added disinfectant. Growth of the microorganisms in the wells was monitored over time by visually observing the turbidity of the solutions and comparing them to the control wells.

Results
After 12 hours of incubation, all of the control wells, most of wells containing gin and some of the wells containing isopropyl alcohol became turbid. After 23 hours of incubation, the well with the most dilute concentration of Lysol also became turbid. Throughout the study, all wells containing either Equate mouthwash or hydrogen peroxide remained clear.

Conclusions/Discussion
The results demonstrate that Equate mouthwash and hydrogen peroxide are the disinfectants most effective at inhibiting the growth of soil microorganisms. Lysol is slightly less effective, and gin (ethyl alcohol) and isopropyl alcohol are much less effective.

Summary Statement
The study compared the inhibition of growth of soil microorganisms by Lysol disinfectant to other disinfectants.

Help Received
Father helped type report and use Microsoft Excel, neighbor provided sterile nutrient solution.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Abby S. Fisher

Project Number
J1113

Project Title
The Hair Pull

Abstract

Objectives/Goals
To determine what substance makes hair stretch the longest before breaking.

Methods/Materials
I tested my hair in six different substances to determine what one helped the hair stretch the longest. I used for my liquids kirkland shampoo and conditioner, water from the tap, hydrogen peroxide, bleach, and a strand completly dry.

Results
The results were that the shampoo helped the hair stretch the most and the conditioner helped it the least.

Conclusions/Discussion
My hypothesis was correct the shampoo indeed helped the hair the most but i was wrong about the conditioner.

Summary Statement
I tested the effect of differently treated hair on the lenght it will stretch before it snaps.

Help Received
Dad helped make board with me and supervised me.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Ryan L. Folli

Project Number
J1114

Project Title
Indigestion: Choosing an Antacid Based on Strength

Abstract

Objectives/Goals
Which antacid formulation neutralizes stomach acid most effectively?

Methods/Materials
Materials
a. antacid formulations: 15 Tums Tablets, 15 Alka Seltzer Tablets, 1 bottle of Mylanta liquid. b. 1 roll of pH paper c. 200 ml of Hydrochloric acid d. 1000 ml of water e. 3 droppers f. 3 flasks g. 3 test tubes h. 1 pair of safety goggles.

Methods
a. Place normal recommended dose of each antacid in flasks and dissolve in 50 ml of water b. Measure pH of each solution c. Add increments of 1 ml of hydrochloric acid to solutions until pH reaches 5.0 d. Add up all amounts of acid added e. repeat 3 times for each antacid f. compare data

Results
From my experiment I found that Alka Seltzer was the most effective antacid and was able to neutralize the most acid (7.5 ml per dose), Mylanta neutralized the second most (5 ml) and Tums the least (2.5 ml).

Conclusions/Discussion
My conclusion, based on my data, is that the antacid that works best is Alka Seltzer. Alka Seltzer contains a bicarbonte of soda, a known base, which none of the other formulas had. This may have been a key factor in its effectiveness.

Summary Statement
I investigated which antacid product would neutralize the most acid, therefore proving to be the most effective.

Help Received
Mom helped buy materials, Dad helped with the preliminary research, and supervised my use of acid when conducting my experiment.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Fritz Foo

Project Number
J1115

Project Title
Project S.T.A.T: Scotch Tape, Adhesion, and Temperature

Abstract

Objectives/Goals
My goal from this project is to determine if there are differences between 3M tapes and to understand the affect of temperature on adhesives. The purpose for undertaking this study is to prove a tip from my mother for removing adhesives using heat and for pure curiosity.

Methods/Materials
To execute my objectives and goals, I made two procedures. One tested difference of tape types, by letting 3cm x 2cm tape strips from each sort hang from a certain height with a 300 gram weight attached and timing the duration held. A second set of directions uses a blowdryer and icepacks to influence heat on adhesives. Materials, specifically, are as follows: a 300 gram weight; Satin, Magic, and Transparent Tape; a thermometer; a watch; icepacks; and a blowdryer.

Results
Satin tape held longer than both Magic and Transparent tape. Magic tape was considerably stronger than Transparent, placing it second in length time and Transparent third. Furthermore, heat shortens the time an adhesive can hold dramatically, cold slightly, but room temperature leaves things hanging the longest.

Conclusions/Discussion
After completing my project and analyzing the results, I have concluded that heat concentration decreases the time held; the more heat the less time. Also, cold has the same affect; the colder from room temperature, the lower the duration. Finally, there is inequality among tapes; Satin holds best, then Magic Tape, and the weakest tape is the Transparent type.

Summary Statement
My project is about temperature and its effect on adhesives, in addition to the discovery of the differences between varying tapes.

Help Received
My brother helped me with the display of my project and my dad assisted me with making the line graph.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Samuel E. Gibbs

Project Number
J1116

Project Title
Investigating How Different Fibers Will Inhibit Bacterial Growth

Abstract

Objectives/Goals
I want to find out which materials will inhibit bacteria from passing through onto someone's skin. My hypothesis sated that Linen would be the most effective in blocking bacteria

Methods/Materials
I will make a baterial solution using bacillus substills. I will take this solution and spray from 6 inches away onto different materials that are placed over a petri dish. I will have different trials for each material. For my control I will simply spray from 6 inches directly onto the petri dish. The materials are linen, silk, cotton, and wool.
After 10 days I will count how many colonies have grown onto the petri dish. This will be done in a scientfic order.

Results
I found that silk had the best effect in blocking bacteria from pasing through the material.
This wasn't what my hypothesis stated.
Linen was the least effective material.

Conclusions/Discussion
I learned that if you are wearing silk, although not foolproof, silk does help block bacteria from reaching your skin. Linen is very ineffective at protecting you.

Summary Statement
Can different materials help block the passing of airborne bacteria from reaching your skin

Help Received
Mr. Russell (teacher)

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Tyler R. Harp

Project Number
J1117

Project Title
The Effects of Laundry Products on Flame-Retardant Sleepwear

Abstract

Objectives/Goals
The purpose of my project was to find out if flame- retardant sleepwear would lose its effectiveness after washing with different laundry products, such as: fabric softeners, liquid bleach, stain removers and powder detergents.

Methods/Materials
I gathered five one meter pieces of flame- retardant sleepwear and five pieces of flammable sleepwear. I washed all the flame- retardant sleepwear in Gain detergent, Tide detergent, liquid chlorine bleach, Downy liquid fabric softener, Bounce fabric softener sheets, Spray n' Wash stain remover, Borax, Shout stain remover and baking soda. After washings and dryings, I tested each fabric's flammability by lighting it on fire. The fabrics were tested before and after testing.

Results
After testing each fabric, the only laundry products that affected the flammability were: ten washings with Gain detergent, ten washings with Tide detergent, one rinse of liquid fabric softener, and one rinse of diluted bleach.

Conclusions/Discussion
My hypothesis was partially supported. I thought that the only two products that would affect the flame-retardant fabrics would be the liquid bleach and stain removers. After ten washings with both detergents, a rinse in diluted liquid bleach and a rinse in fabric softener, I concluded that the fabrics became slightly flammable. General rules of laundering can be applied to prevent and minimize injury to infants, children, and also adults.

Summary Statement
My project is about the effects of laundry products on flame- retardant sleepwear.

Help Received
Mother showed me how to operate the washing machine and helped launder the fabrics

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Travis J. Henderson

Project Number
J1118

Project Title
Air Filtration HEPA Filter: Is It Worth It?

Abstract

Objectives/Goals
The Enviromental Protection Agency has listed indoor air pollution as a major concern in the United States. They have determined that on average people spend 90% of their time indoors, so air quality indoors is much more important than that of outdoors. With that information in mind, this study was conducted to test four filter types of commercially available home air filters to see which would do the best job at removing particles from the air.

Methods/Materials
The filter types that were chosen for the experiments were: Economy, Washable, Natural Aire Pleated, and Filtrete Micro Allergen. Filters were cut to a dimension of 80mm by 80mm so that they would fit in a specially designed filter test box. The particulates chosen for the expiement were: Carpet dust, Sawdust, Volcanic Ash, and Burned Wood Ash. A 1.25ml quantity of each particulate were blown through the test box without a filter in place to set a control. The particulates were captured on prepared slides that were placed at the end of the test box. After controls were established, a filter was placed into the test box and the experiment was repeated. There were 5 trials with each filter and each particulate for a total of 80 trials. All slides were digitally photographed through a microscope with a power of 450x and compared to each other.

Results
Slides were compared by particulate, and were grouped by filter type. It was determined that a lower amount of particulate matter captured on the slides would indicate better filtration. The Economy and Washable filters showed no significant difference when compared to the controls. The Natural Aire Pleated slides had significantly less particulates that the control. Finally, the Filtrete Micro Allergen slides represented the lowest amount of particulates by far.

Conclusions/Discussion
Based on the results of the data that was gathered, the Filtrete Micro Allergen filter removed the most particulates from the air. This would mean that my hypothesis was correct; the Filtrete filter was the best. It is evident that HEPA filters, like the Filtrete Micro Allergen, should be used to reduce indoor air pollution and increase the quality of life for everyone, especially allergy and asthma sufferers.

Summary Statement
The purpose of this project was to compare the efficiency of commercially available home air filters in order to determine the best filter to use for reducing indoor air pollution.

Help Received
My father took pictures of the process and my mother allowed me to use the equipment in her high school science lab.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Taylor A. Herndon

Project Number
J1119

Project Title
How Well Is Your Water?

Abstract

Objectives/Goals
To test and rate the quality of common sources of drinking water: bottled water, city or municipal water, Wegis mutual water system (24 users) and a private well. My objective was to prove or disprove my hypothesis suggesting the bottled water would show the best overall quality. This project was of special interest to my because one of the sources tested, the Wegis water system, services my home

Methods/Materials
Materials: water samples, testing glasses/bag, test strips, color charts
Method: step 1- collect samples to be tested
step 2- place in test glass, except bacteria sample in sealed bag
step 3- dip test strip and compare with test chart
step 4- record and evaluate results

Results
The data collected showed: a close ph range (7.0 to 8.0) among the samples tested, nitrates were detected in the municipal water with low level nitrites in the Wegis mutual water system and higher levels in the private well, which also recorded the only bacteria. No chlorine was detected in any sample and hardness showed a wide range- with the private well again scoring the highest.

Conclusions/Discussion
My hypothesis was proven accurate-the bottled water was the best quality as determined by the tests used. Wegis mutual system (my home water) also had very good results, followed by the municipal water supply. The private well performed the worst and had several tests with possible problems as mentioned: nitrites, hardness and bacteria. I would recommend retesting and close monitoring to confirm whether this is a continuing problem.

Summary Statement
I Compared the quality of common sources of drinking water.

Help Received
My dad purchased the test strips and helped read results. My Mom helped with board layout & pictures.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Mahdi I. Hussein, Jr.

Project Number
J1120

Project Title
Economic Wax

Abstract

Objectives/Goals
This project determine which wax would last longer and to test the affect of using different kinds of wax. It also studied the effciency of re-using the burned wax. It was hypothesized that beeswax will lat longer because it has slightly higher melting point than paraffin wax. On the other, it was exected that candles made out of burned wax will burn slower than the frist time because the carbon chain gets shortened after burning which will make it harder to oxidize it.

Methods/Materials
To test the hypothesis, equal mass of each kind of wax was used. Molds with the same volume and shapes were prepared and candles were burned with both kinds of wick. The left over wax from each candle was re-used in preparing the next burning stage for each kind of wax. The burning took three stages until the left over was not enough to from two candles as well as its mass before and after burning. Flat wick in beeswax didn't burn as fast as square wicks in beeswax.

Results
Flat wick was better with beeswax than square wick while the last was better with paraffin wax. The difference in burning time between the two kinds of wick was big in beeswax companied to it paraffin wax.

Conclusions/Discussion
It was concluded that re-using the left over wax from burned candles regardless of the wax type is an economical way because the more the wax is re-used, the longer time it lasts to burn.

Summary Statement
It is about which wax lasts longer icase of a blackout.

Help Received
My teacher helped me for the final check of my project.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
David Ilitzky

Project Number
J1121

Project Title
Sunblocked?

Abstract

Objectives/Goals
The purpose of this project was to see which sunblock would withstand various temperatures and water at various temperatures the best without losing effectiveness. The data gathered also showed whether there was an effect when sunblock was exposed to temperature and water.

Methods/Materials
During this project, the sunblock brands, "Water Babies", "Shade", "Banana Boat", and "Neutrogena" were submitted to different tests using a UV card to measure UV strength. These sunblock brands were exposed to 12 different conditions each for a total of 5 trials. The different conditions were made up of combinations of three sunblock temperatures and three water temperatures. These mixtures of sunblock and water were wiped on a transparent overhead projector sheet, then placed on top of the UV card and exposed to the sun. The results for each day were recorded.

Results
When comparing all sunblock brands, "Neutrogena" worked the best with an average UV blockage rating of 4.18 out of a possible 5. Following it was "Shade" with an average of 3.98 followed by "Banana Boat" with an average of 3.82. Last but not least was "Water Babies" with an average of 3.75.

Conclusions/Discussion
The results show that any sunblock in any condition is better than no sunblock. They show that "Neutrogena" is the best followed by "Shade" then "Banana Boat" and last "Water Babies". The results also show that hot temperature, wether it is on the actual sunblock or on water exposed to it, affects the sunblocks effectiveness. All variables either helped or affected the sunblock's effectiveness but in an insignificant amount except warm temperature.

Summary Statement
Which sunblock brand will withstand different temperatures as well as water at different temperatures without losing its effectiveness?

Help Received
Mom and dad for all support and help; Dr. Peter Paul Rullan for interview and information; Mr. and Mrs. Levy for helping gather materials; Sandy Goldstein for helping decorate board; Ms. Reynolds and Ms. Young {teachers} for everything.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Ari A. Injeyan

Project Number
J1122

Project Title
Controlling Properties of Composite Materials Using Nanoparticles

Abstract

Objectives/Goals
The purpose of my experiment is to learn about the properties of composite materials and how nanoparticles effect their properties. The property I am studying is the coefficient of thermal expansion. Based on research, I hypothesized that the coefficient of thermal expansion (CTE) of a composite material is based on the volume ratio of the filler (in my case aluminum) to the matrix (in my case an epoxy). I also hypothesized that if the filler particle size is reduced to a few micrometers or less (nanoparticles) then the influence of the filler is enhanced.

Methods/Materials
I used a Michelson interferometer to measure the coefficient of expansion of composites with various volume ratios and particle sizes. The Michelson interferometer can measure very small changes in distance using interference properties of light. The composite material was placed behind one of the mirrors of the interferometer and heated by a small resistor. As the composite expanded it pushed the mirror forward and the amount of expansion was measured by counting the number of fringes displayed by the interferometer. This process was repeated for three volume ratios and three different filler sizes.

Results
My hypothesis was verified. At constant volume ratio, the CTE of the composite material changed with particle size and the effect of the filler was enhanced. For aluminum to epoxy volume ratio of 0.20 the composite CTE went from the value of 636 ppm for 20 µm partivles to 590 ppm and 459 ppm for 4 µm and 50 nm particles respectively. Similar results were obtained for a volume ratio of 0.4 where the CTE was reduced from 501 ppm to 455 ppm for 20 µm and 4 µm particles respectively.

Conclusions/Discussion
The effect of the filler on the composite was enhanced when the particle size was reduced because of an increase in the relative volume of the inter-phase layer in the composite. The interphase layer is a thin layer of epoxy that surrounds the filler particles and has properties between that of the matrix and the filler even though it is chemically identical to the matrix. The interphase layer properties are different than the bulk matrix becasue they are attached to the filler particles and are constrained by the filler particle molecules.

Summary Statement
My project demonstrates that that the effect of filler particles on the coefficient of thermal expansion (CTE) of a composite material is enhanced when the filler partices become nanoparticles

Help Received
Father helped with identifying project, getting equipment for experiment and collecting data

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Kristen J. Jundt

Project Number
J1123

Project Title
Concrete Moisture Migration

Abstract

Objectives/Goals
To test which subgrade best resists water vapor migration through a concrete floor?

Methods/Materials
Concrete test specimens of the same type mix were cast to model a floor slab. The concrete was sealed to the top of 12 vented buckets containing four subgrades (water, sand, soil and gravel). All of the buckets contained a specified amount of water to simulate moisture below the concrete floor. The concrete vapor emissions were measured using covered anhydrous calcium chloride test kits.

Results
The tests revealed vapor emission of 6.3 grams for water only, 4.37 grams of water with a gravel subgrade, 3.83 grams of water with a soil subgrade and 3.77 grams of water with the sand subgrade.

Conclusions/Discussion
The test results demonstrate that while many Engineer's recommend gravel as a capillary break to resist moisture migration through a slab, gravel actually causes more moisture problems because the effects of water vapor are ignored. This experiment's results are similar to a separate study completed in the 1960's. The gravel is worse because the larger voids allow water to easily convert to vapor and vapor passes through concrete faster.

Summary Statement
This Project shows that gravel used by many Engineers as a subgrade to resist moisture migration actually promotes more vapor emissions than does other subgrades.

Help Received
Dad helped make forms and helped me get the materials. Quick Signs helped make the display sign. Hugo Kevorkian, P.E. and Terry Tuell helped advise me on the technical parts of my experiment.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Zachary J. Kadar

Project Number
J1124

Project Title
Biodegradable Plastic

Abstract

Objectives/Goals
I did my experiment on biodegradable plastic. I picked this experiment because I thought it would be interesting to make my own type of plastic and learn about how plastic is made. I think it is important to find ways to protect our environment.

Methods/Materials
I found information about making biodegradable plastic in a project book. It explained how to make plastic using whole milk and vinegar. The fat, minerals, and protein (casein) is what is left after heating the milk and that is the part that becomes the biodegradable plastic. I buried both, the plastics I made and the petroleum based plastic to test how they would dissolve in soil. I weighed both types before and after they were buried to measure the decomposition.

Results
The plastic I made began to dissolve very quickly in soil. After 1 week it lost 50% or more of the original mass. The petroleum based plastic did not change.

Conclusions/Discussion
There are many different ways to make biodegradable plastic from organic products. I was able to show how quickly the samples I made dissolved in soil. My research points out the advantages and some of the problems with using biodegradable plastic.

Summary Statement
Making and testing biodegradable plastic and learning about how it compares to petroleum based plastic.

Help Received
My parents watched over the experiments and helped me learn.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Kevin R. Kocher

Project Number
J1125

Project Title
Radiation Resistance

Abstract

Objectives/Goals
My objective is to determine which material will block the most x-rays.

Methods/Materials
Sixteen different materials were collected: lead sheeting, which was used as a control for full blockage of x-rays, lead foil, iron, rock, 3/4 inch thick plywood, 2x4 lumber, 4x4 lumber, a two-inch-thick paperback book, a two-inch-thick hardcover book, sheet metal, aluminum foil, glass, plexiglass, sheet rock, leather, and a paper cup of water. I also used nothing, or "air" as a control for no blockage of x-rays. Each variable was then placed on a quarter that was on top of an x-ray film packet. The quarter was there because it could block all of the x-rays and I could have a visual comparison when the films developed. I then took the x-rays and developed them in an x-ray processor. I did this with each variable and ran the experiment two more times, using a paper clip instead of a quarter on the second trial and a dime on the third.

Results
I will arrange my results in order from most blockage to least blockage. The rock and the lead foil blocked the most x-rays, followed by iron, water, the hardcover book, 4x4 lumber, sheet metal, 2x4 lumber, glass, sheetrock, 3/4 inch thick plywood, the paperback book, leather, aluminum, and plexiglass.

Conclusions/Discussion
In conclusion, the most effective materials for blocking x-rays are rock and lead.

Summary Statement
In this project, I tested materials to see which ones blocked the most x-rays

Help Received
My mother helped process x-rays and glue board

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Nathaniel J. Magill

Project Number
J1126

Project Title
Quality of Packing Material

Abstract

Objectives/Goals
My objective was to study, test and determine the quality of packing materials to best protect fragile merchandise when shipping. My hypothesis was that the plactic bubble wrap would provide the best protection.

Methods/Materials
Raw eggs were packaged in three types of packing materials in three equal size and strength boxes. The packing materials used were: foam peanuts, plastic buble wrap, and newspaper. Each box was dropped from heights beginning at three feet, extending up to fifteen feet (at two foot intervals) until each egg was broken.

Results
The egg wrapped in plastic bubble wrap broke at three feet, the egg in newspaper broke at seven feet, and the egg packaged in foam peanuts broke at fifteen feet.

Conclusions/Discussion
Although my hypothesis was that the plastic bubble wrap would be the best protection, the outcome indicated that the best protection for fragile items is the use of foam peanuts.

Summary Statement
To determine which packing material will best protect fragile items when shipped.

Help Received
My mother helped type the report and my mother and sister assisted in the experimentation.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jayne S.L. McCauley

Project Number
J1127

Project Title
Do Four 25 Watt Light Bulbs = One 100 Watt Light Bulb?

Abstract

Objectives/Goals
My objective was to determine whether four 25 watt light bulbs create more heat than one 100 watt light bulb, and, if so, is it the case that they produce more heat because they produce less light.

Methods/Materials
I took three steps. First, I measured the heat produced by the two different light sources by placing each in turn in a closed oven, with a thermometer, and noting the difference in temperature produced by each light source in fifteen minutes.

Next, I measured the light by placing first the 100 watt light bulb, and then the four 25 watt light bulbs, exactly three feet from a photographic light meter placed in a large dark closet, and took note of where the needle on the light meter registered in response to the two different sets of bulbs.

Finally, I determined the ratio of light produced by the two light sources in the following way:
1. Because I only had a photographic light meter, the needle told me the different "f-stops" to use on a camera, not the amount of light (lumens) it was receiving. I could not use it, by itself, therefore, to tell me the ratio of light output between the two light sources.
2. To find that ratio, I determined how close the light meter needs to be to the four 25 watt light bulbs for the needle to reach the same position it had reached when it was 36 inches from the 100 watt light bulb. That distance turns out to be 17 inches. I then applied, from my research, the formula that states the relationship between light and distance from the light source. That formula is E=L/d^2. So the ratio of light as between these two light sources is 36^2 /17^2 (or about 4.5).

Results
A single 100 watt bulb produces much less heat than four 25 watt light bulbs (93 degrees 112 versus degrees). Furthermore, a 100 watt light bulb produces much more light (4.5 times more light) than four 25 watt light bulbs altogether.

Conclusions/Discussion
When 100 watts of electrical energy is used on four 25 watt light bulbs, much more of that energy goes to heat than when that same 100 watts of energy is used on a single 100 watt light bulb. The energy not used up on heat goes instead to light, which is why a 100 watt light bulb is so much brighter than four 25 watt light bulbs.

Summary Statement
Does a person get the same results from using four 25 watt light bulbs as that person gets from using one 100 watt light bulb, and, if not, why not?

Help Received
At the end of my project I had my father review my written work for grammatical mistakes, and my algebra for possible mistakes in my calculations.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Aaron M. Mendoza

Project Number
J1128

Project Title
The Effectiveness of Different Fabric Materials in Preventing the Passage of Micro-particles?

Abstract

Objectives/Goals
The objective of my project is to determine which fabric material (cotton,wool,polyester,and rayon) will best withstand against harmful micro particles such as anthrax.

Methods/Materials
In my project I used several matrials such as cotton,wool,rayon,and polyester. I also used black construction paper,labels,flour(micro-particles),2 ring stands,fabric loop,plexi tube,funnel,clamps,plastic cup,measuring spoon,ruler,and a calculator.
I used four different materials. Each material material was tested twenty to insurebetter quality in the results. I then measured the diameter of the pattern which passed through the material.

Results
After my testing I found that wool held the best against the passage of micro particles, while polyester was the least effective in peventing the passage of micro particles.

Conclusions/Discussion
My results supported my hypothesis because I hypothesized that wool would hold the best against the micro particles.
I beleive my experiment will give knowledge to those who want to be secure against harmful micro-prticles that carry diseases such as anthrax.

Summary Statement
My project focuses on seeing out of four fabric materials which will end up withstanding the most against micro particles.

Help Received
Mom helped put informatio on board,Dad helped construct experimental device,gather information on micro particles,help put up information on board,and helped all around. Ms. Young, provided equipment.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Daniel W. Morgan

Project Number
J1129

Project Title
Which Wood Burns the Longest?

Abstract

Objectives/Goals

In my science fair experiment I tested nine pieces of wood to see what wood lasted the longest on an even bed of charcoal. I tested mahogany, douglas fir, lodgepole pine, juniper, oak, alder, western cedar, poplar, and redwood. I did this experiment because my family burns wood to heat our home in the winter, and I would like to know which wood will last the longest so that we could save on wood.

Methods/Materials

1. Clean out fire place and spread briquettes out across the fire place
2. Ignite briquettes and let them heat until slightly whitened
3. Place wood on top of briquettes
4. Start the stopwatch when all pieces of wood are laid out evenly on the briquettes
5. Stop timer when wood falls apart or crumbles
6. Record all of the burning times in a data table in the journal

Note: Clean the fireplace after each round is finished.

Materials
5 5in. x 1in. square pieces of mahogany, douglas fir, lodgepole pine, juniper, oak, alder, western cedar, poplar, and redwood.
4ft. x 4ft. fireplace
5 bags of charcoal briquettes
1 stopwatch

Results

Mahogany had a time of 34:55, douglas fir 36:18, western cedar 16:56, lodgepole pine 16:30, redwood 29:25, oak 40:03, poplar 24:22, alder 19:13, and juniper with 24:04. Oak turned out to last the longest and lodgepole pine burned out the fastest.

Conclusions/Discussion

In my experiment I saw that all of the woods ignited in the same fashion, but that some of them hold a flame longer than others. Some of the woods would catch flame for a while and then go out while others would be doing the same thing but at different times. Also, I found out that some woods burn longer than others even if they are the same exact size. My experiment went very good without any problems. Sometimes, though, the wood looked like it wasn#t burning at all, but I later found out that they were burning very rapidly. My hypothesis was correct that the oak did outlast all of the other woods.

Summary Statement

My project is about the length of time that is takes for nine different types of wood to burn on an open flame.

Help Received

Mr. Gene Hess, the woodshop teacher, helped me cut the wood; dad supervised me while I burned the wood.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Marcus L. Nelson

Project Number
J1130

Project Title
Does Hair Type Affect Hair Hygrometer Results?

Abstract

Objectives/Goals
The purpose of this project was to find out which type of hair responds quicker to a hair hygrometer. A hair hygrometer is an instrument used to find the humidity in the air.

Methods/Materials
The main structures of the hygrometer were built. Next the hairs had to be connected (that have already been boiled for five minutes) to the nails and to the arrow. It would point to wet or dry depending on what stage of the procedure it was on. I then tested the hair in the chamber (Tupperware) with two cups of water. I waited for the humidity to rise for thirty minutes and to move the arrow to the wet mark on the face of the hygrometer. Next, I took out the water, dried the chamber, and then added half a cup of calcium sulphate (a.k.a. desiccant). At this time I started my stopwatch. The desiccant was used to absorb the moisture and dry the hair, which would move the arrow to the dry mark on the face of the hygrometer. This was the drying time or response time.

Results
It was found that all of the non-dyed hair samples dried out at an average of 22 minutes 18 seconds. The dyed hair samples dried out at an average of 41 minutes 15 seconds.

Conclusions/Discussion
The hypothesis was incorrect. It was believed that the dyed hair would dry faster. The dyed hairs took longer to dry because they absorbed more water than the non-dyed hairs.
There were a few problems. A hygrometer was broken. The procedure needed sunlight and the project was tested during the winter months so I ran out of light on several occasions.
I learned that the process of dying hair may dry it out.
I will isolate natural hair color to determine if color is a factor in dry time.

Summary Statement
My project is to determine if non-dyed or dyed hair will dry faster.

Help Received
Leif Cadenhead assisted in the chemical preparation. My teacher helped me get all of the hair samples. My mother helped me get all of the materials.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Katherine M. Neuhaus

Project Number
J1131

Project Title
Naturally Colorful

Abstract

Objectives/Goals
The objective of my science fair project was to learn which fruits and vegetables produce the deepest hues. My hypothesis was that the deepest colored hues of raw fruits or vegetables would produce the deepest hue of dyed cloth.

Methods/Materials
I have tested four fruits (strawberries, oranges pomegranates, olallieberries) and five vegetables (beets, carrots, red cabbage, onions) and chose them becasue of their availability. One cup of each fruit or vegetable was chopped and boiled for 10 minutes with one teaspoon of alum and four cups of water. The liquid was strained and cooled to room temperature. One 4x4 inch muslin swatch was placed in the dye bath for 24 hours, then removed to air-dry. This experiment was conducted one time. Each swatch was compared to a chart which is on my display board. This shows the data colleted in my experiment. It shows the color of each raw fruit and vegetable and the dyed cloth. The raw material was assigned at a 100% color value. These 100% color values were based on the Pantone Matching System normally used in the graphic arts industry. The dyed cloth row may show a different hue and a different percentage of color value.

Results
The dyed cloth from beets, onion skins, red cabbage, carrots, olallieberries, and oranges all changed hues. The dyed cloth from pomegranates and strawberries stayed within the same hue. The cloth from pomegranates registered at 40% thereby showing a 60% change in value. The dyed cloth from strawberries registered at 30%. The other materials cannot be compared in this fashion due to their change in hue.

Conclusions/Discussion
I predicted that the deepest hues of raw fruits or vegetables would produce the deepest fabric hues. Results show that only two of the materials stayed within the same color hue. The others changed from one hue to another so it is impossible to judge according to my measurement scale. I also measured the color value changes. Because of the setup of my experiment I was only able to measure the value changes of pomegranates and strawberries.

I was surprised at the data I collected because I assumed that all of the dyes produced, would stay within the same color hue as the raw fruit or vegetable. According to the data that I collected, my hypothesis is not supported. In order to better my understanding of this subject, I could set up my experiment to include measurement devices that include changes in hues as well as values.

Summary Statement
The purpose of my project is to determine which fruits and vegetables produce the deepest colored dyes.

Help Received
My mother helped me type up my report and my father lent his expertise in color analysis.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Ernesto Ochoa; Edgar Reyes

Project Number
J1132

Project Title
Viscosity of Oil

Abstract

Objectives/Goals
The objective of our project is to determine witch oil brand has the highest viscosity.

Methods/Materials
We used three different brands of motor oil of different grades for testing which included: Castrol 20w-50, Castrol 10w-40, Pennzoil 20w-50, Pennzoil 10w-40, Valvoline 20w-50, Valvoline 10w-40, and Castrol Syntec Blend 20w/50; pipettes, test tubes, test tube racks, beakers, thermometers, ring stands, and a Bunsen Burner; wood and aluminum stripping to construct our testing ramp; and a stop clock.

Results
After testing our oils for their viscosity, we learned that the Castrol 20w-50 had the highest viscosity. This oil also had the hightest viscosity after we heated it to 90 centigrate. We will have more and possibly different resutls for the State Science Fair since we plan to do more testing and possibly modify our testing ramp.

Conclusions/Discussion
Our conclusion is that the Castrol 20w-50 is a better lubricant than the other oils. What we mean by it being a better lubricant is that it does not have the tendency to run; in other words, its molecules tend to stick together and resist flow. It is extremely important that as a consumer, a person knows which oil brand is best for lubricating thier car engines at different times of the year, example winter verses summer.

Summary Statement
Our science project examines the viscosity of oil to see which is a better lubricant in different conditions.

Help Received
Mr.Gutierrez helped construct our 1st testing ramp, Mr. Martinez helped us with our testing procedure, Mr. Gutierrez, our computer teacher,help us find research material, Mr. Reyes, my partner's father helped us improve the design of our 2nd testing ramp, and our parents helped us by spending time with us at the

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Matthew E. Prewitt

Project Number
J1133

Project Title
Mono or Fluoro? Which Fishing Line (Monofilament or Fluorocarbon) Will Have the Higher Tensile Strength?

Abstract

Objectives/Goals
The objective is to gain knowledge of which type of fishing line is stronger. I will be testing monofilament and fluorocarbon fishing line. Each line will be tested for the tensile strength and the elasticity strength under tension.

Methods/Materials
I will be using the following: a spool of Stren#s six-pound monofilament fishing line, a spool of Stren#s eight-pound monofilament fishing line, a spool of Stren#s six-pound fluorocarbon fishing line, a spool of Stren#s eight-pound fluorocarbon fishing line, fishing spring scale, duct tape, ruler, dowel, tall item such as broom, two other slightly shorter items such as levels. In order to test the fishing line#s strength, I will wrap the fishing line around the weighing end of the spring scale, then move back slowly with my hand grasped around the handle of the spring scale until the fishing line snaps. I will see at which point of the ruler the fishing line snaps to find out how much the fishing line stretched. I will compare the results in order to find which type of fishing line is stronger.

Results
Type of Fishing Line Test 1 Test 2 Test 3 Average
2.7kg (6lb.) Monofilament 3.1 kg 3.1 kg 2.9 kg 3.03 kg
2.7kg (6lb.) Fluorocarbon 2.7 kg 3.3 kg 3 kg 3 kg
3.6kg (8lb.) Monofilament 4.4 kg 4.2 kg 3.6 kg 4.07 kg
3.6kg (8lb.) Fluorocarbon 4.1 kg 3.5 kg 3.3 kg 3.63 kg
Type of Fishing Line Test 1 Test 2 Test 3 Average
2.7kg (6lb.) Monofilament 20 cm 19 cm 18 cm 19 cm
2.7kg (6lb.) Fluorocarbon 18 cm 24 cm 23 cm 21.67
3.6kg (8lb.) Monofilament 36 cm 32 cm 26 cm 31.33
3.6kg (8lb.) Fluorocarbon 26 cm 21 cm 22 cm 23 cm

Conclusions/Discussion
It seems that the monofilament fishing line was able to endure more weight than the fluorocarbon fishing line. However, the monofilament line stretched more than the fluorocarbon fishing line. Perhaps the difference in size played a role in both of the tests. Each fishing line may have an advantage over the other, but they also have small flaws. Besides, with over two hundred fifty yards of line, some areas may have fallen victim to slight abrasion, or might have been improperly manufactured. The popular saying may not be true after all, because in this case, size did matter!

Summary Statement
I am testing monofilament and fluorocarbon fishing line to see which line has the greater tensile strength and most stretch.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Ryan N. Purdy

Project Number
J1134

Project Title
Get More Miles from Your Gas Tank

Abstract

Objectives/Goals
In my Science Fair Project, I attempted to discover which chemical additives could be added to gasoline to improve engine efficiency. I hypothesized that if a chemical additive raised the gasoline octane level, then it would improve engine running time.

Methods/Materials
To test my hypothesis I added 4mL of five different chemical additives (Outlaw Octane Booster, Methanol, 104+ Octane Boost, STP, and Techron) to 36mL of Thrifty gasoline and timed how long each mixture ran in a lawnmower engine. I performed five trials for each additive and compared their average to pure gasoline to determine if the additive improved engine efficiency.

Results
My results showed that the chemical additives Techron, Methanol, Outlaw Octane Booster, and 104+ Octane Boost improved engine running time. The only additive that did not significantly improve running time was STP Gasoline Treatment, which on average ran only two seconds longer than pure gasoline. Techron improved running time the most and ran an average of one minute and fifteen seconds longer than pure gasoline. Methanol, Outlaw Octane Booster, and 104+ Octane Boost ran one minute and one second, fifty-three seconds, and eighteen seconds longer than pure gasoline respectively.

Conclusions/Discussion
Based upon my experiment results, I concluded that Techron and Methanol are the best gasoline additives, while STP and 104+ Octane Boost did not improve engine performance enough to justify their expense.

Summary Statement
My project is designed to find which chemical additives can be added to gasoline to improve engine efficiency.

Help Received
Mother and M. Halpern (teacher) helped me organize my report; Father helped with mixing of chemicals & gasoline

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jocelyn H. Reist

Project Number
J1135

Project Title
The Effectiveness of Preservatives in Homemade Dog Treats

Abstract

Objectives/Goals
The main objective was to find out how long it takes my dog treats to spoil and then figure out which preservative (Tocopherol, Benzoate, and Propionate) works the best. I hypothesized that Tocopherol would be the most effective because it is commonly found in Kirkland Dog Treats and other grainy foods such as Cheerios and granola bars, which have ingredients similar to my dog treats.

Methods/Materials
1. Four groups of cookies (8 in each group) were made each containing either Tocopherol, Benzoate, Propionate, or no preservative (control)
2. Incubate all 4 groups of cookies at high humidity (85%) and temperature (95 degrees).
3. Observe the cookies for mold growth for 9 days
4. Remove and freeze one cookie from each group at day 0, 3, 6, and 9
5. Determine bacterial content in each of these samples by plating onto petri dish followed by incubation and visual counting of bacterial colonies.

Materials included: whole wheat flour, chicken stock, oatmeal, egg vegetable oil, petri dishes, sterile water, test tubes, preservatives (Benzoate, Tocopherol, Propionate). Equipment included incubator and digital scale.

Results
The first part of the experiment in which the cookies were placed in the incubator to speed up spoiling, the control cookie (without any preservative) developed mold by the third day. By Day 9 mold was covering 80% of the control cookie but was not seen on any of the cookies with preservative. The second experiment was to measure bacterial content. By day 3, all of the samples except the one with Tocopherol grew colonies of bacteria (the control sample had very many colonies). On day 6 and 9 all of the preservative samples had similar, but small numbers of colonies. The control sample showed more and more colonies on days 6 and 9.

Conclusions/Discussion
This project showed that preservatives can prevent spoilage of homemade dog treats. By two measures (visual mold growth and bacterial content) all three of the preservatives worked well preserving the dog treats for a longer time period compared with the dog treat without any preservative. However, it is possible that Tocopherol preserved them slightly longer. One possible reason for this is that Benzoate and Propionate are recommended to be used with low pH values. My cookies were at a pH level of 6.

Summary Statement
This project examines how well different preservatives can prevent homemade dog treats from spoiling.

Help Received
Father helped with laboratory experiments

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Mark A. Rocha

Project Number
J1136

Project Title
Slip and Fall: Determining the Most Effective Non-Slip Surface, A Two-Year Study

Abstract

Objectives/Goals
My project is to determine which substamce will best provide the shoe from slipping off the tile. I believe that Honey will best prevent it because it's very tacky.

Methods/Materials
I had a table with a 4'x4' tile at the end of a table with a clip to hold it down. I screwed a hole and placed a hook in the back of the shoe. From the hook i tied a string from the shoe to a bucket hanging off of the table. I added water to the bucket till it or started to fall. After the bucket hit the ground, i would weight the total aount on a scale to c the amount of weight it took to fall.

Results
The wax was the best substance used to best prevent the shoe from slipping.It took an average of 13.2 pounds for the shoe to fall. Honey, my guess, took an average of 12.4 pounds for the shoe to fall.

Conclusions/Discussion
My hypothesis was in correct. It stated that honey would be the best non-slip surface of my variables but it was wax. Wax was able to hold on the shoe for approximately .8 more pounds. This investigation shows me what we could do to help prevent anybody from slipping and hurting themselves.

Summary Statement
My project is to see which substance best prevents the shoe from slipping off of the shoe.

Help Received
Teacher gave me items for experiment;Mother typed my research paper

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Cody J. Ross

Project Number
J1137

Project Title
Do You Smell What Soy Is Cooking?

Abstract

Objectives/Goals

Problem Statement: Although there is evidence that soy products contain beneficial properties which help reduce the risk for certain diseases, consumption of soy products in the United States is low.

Hypothesis: When substituting soy flour for white flour in a recipe; the product of the original recipe will have a better outcome and taste.

Methods/Materials

Procedure: A. Cook recipes with original ingredients {Yeast Bread (See Appendix A for recipe), Quick Bread (See Appendix B for recipe)}
B. Cook recipes substituting soy flour for white flour in the following amounts: 10%-12.5%, 25%, 50%.
C. Collect Data
Measure height, length and width of bread
Measure the weight of bread
Take picture to record color of bread}
D. Perform taste tests
E. Calculate nutritional data

Materials: Stove-Oven 9" x 5" Loaf pan
Internal Stove Thermometer Large mixing bowl
Recipe Ingredients (see Appendix A & B) Small mixing bowl
Measuring cups Wooden spoon
Measuring spoons

Results

Results: One of the primary findings of the testing was that the original yeast bread recipe provided a better outcome and was preferred for taste. However, all the loaves of quick bread produced fairly similar outcomes and the recipe that contained the most soy flour was preferred for taste.

Conclusions/Discussion

Conclusion: When substituting soy flour in a recipe it may be better to use a recipe that does not require yeast and is sweet.

Summary Statement

When substituting soy flour for white flour in a recipe; the product of the original recipe will have a better nutritional benefits and taste.

Help Received

Mom supervised cooking, administered some surveys to firefighters and helped with some typing, Dad supervised taste tests, Mr. Zimmerman administered some surveys to computer students.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Zachary R. Sailer

Project Number
J1138

Project Title
The Aging of Fruits and Vegetables and Ways to Slow It Down

Abstract

Objectives/Goals
My goal is to find a chemical or natural resource that has been made into a product which can slow the aging of fruits and vegetables better than man-made wax coatings.

Methods/Materials
I retrieved 26 Red Bell Peppers straight from their original plant. I cleaned them with soap and water and then santized them with household chlorine (bleach). They were divided into three (3) groups: one group had nothing on them, the second group had Signa-Fresh (a product of new technology used on fruits and vegetables to slow the aging process), while the third group had a man-made wax coating applied to each pepper. Every five (5) days I measured weight in grams, color using a book of color variations, and visible signs of decay such as bruises, black spots or shriveling. The results were recorded in a log book. On the fifteenth day I ended the experiment.

Results
In weight, the Signa-Fresh group peppers on average lost the least amount of weight. In color, (the goal being to have true RED color tone), the Signa-Fresh treated peppers had the most vegetables with a true red color tone. In checking for visible decay, I found Signa-Fresh ended with the most amount of peppers without decay.

Conclusions/Discussion
My hypothesis was correct. Signa-Fresh performed better than man-made wax coatings although the results were close. This is because Signa-Fresh is a pre-harvest product and my experiment was done post-harvest, causing the products to be less effective. Signa-Fresh still performed better because it contains a natural occuring phospholipid known as lysophospholipid which can help extend the life of the commodity.

Summary Statement
I am trying to find a way to prevent fruits and vegetables from rotting quickly.

Help Received
Agriculture consultant retrieved the peppers from the plant and gave me the Signa-Fresh product.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Laura J. Schisler

Project Number
J1139

Project Title
Which Fabric Type Bonds Best with Fiber Reactive Dyes?

Abstract

Objectives/Goals
The purpose of this experiment was to determine which type of fabric responds best to fiber reactive dyes.

Methods/Materials
The hypothesis stated when each piece of fabric was dyed under the same conditions a 100% cotton fabric would produce the brightest color compared to 100% polyester or 35% cotton / 65% polyester blend. In the experiment, ten 12-centimeter squares of each fabric type were used.

On January 10, 2004, ten of each fabric sample were laundered and tied with small rubber bands. After twenty minutes in soda ash, a fixer, the samples were dipped in Rainbow Rock Turquoise Fabric Dye, a fiber reactive dye. After which, the fabric samples were lain to set for eighteen hours. On January 11, 2004, the fabric samples were triple rinsed in clean tap water, unbound, and dried in a gas dryer on a permanent press setting.

Results
The 100% cotton fabric was the most vibrant while the 100% synthetic fabric samples resulted in a less vivid hue. The synthetic blend fabric has a color tone in between the other two fabric types.

Conclusions/Discussion
In conclusion, 100% cotton fabric bonded best with a fiber reactive dye, indicating that the hypothesis was correct. Cotton fabric retained the color most vibrantly and would probably hold the coloration over time better than synthetic or synthetic blend fabrics. This project demonstrates that the differences in fabric structure and composition and can greatly affect the chemical bond that takes place during the dying process.

Summary Statement
This project explores how fiber reactive dyes bond with different types of fabric.

Help Received
Mother helped with photography and documentation, Mother, father, and family friend provided support and encouragement

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Tamara J. Van Dorn

Project Number
J1140

Project Title
Which Bubble Solution Produces Bubbles that Last the Longest?

Abstract

Objectives/Goals
The objective is to determine whether store bought or one of two home-made bubble solutions will produce bubbles that last the longest.

Methods/Materials
I purchased bubble solution at the store. I made two bubble solutions using water and JOY dish detergent. To one I added glycerine and to the other I added corn syrup. For the floating bubble experiment I blew eight bubbles (one at a time) with each bubble solution. I used a stop watch to time each bubble until it popped and recorded the times. I graphed the results. For the tray experiment I blew eight bubbles (one at a time) with each bubble solution onto a tray for each type of solution. I used a stop watch to time each bubble until it popped and recorded the times. Then I graphed the results.

Results
In both tests I performed, the glycerine solution gave the best results. The average time for the glycerine bubble floating in the air was 32.5 seconds. The average time for the glycerine bubble on the tray was 2 minutes 50 seconds. The average time for the corn syrup bubble floating in the air was 28 seconds and on the tray was 34.75 seconds. The average time for the store-bought bubble in the air was 31.25 seconds and on the tray was 25.5 seconds. I was really surprised when the glycerine bubbles on the tray lasted more than a minute each and the other two were not even close.

Conclusions/Discussion
My hypothesis was correct for both tests. The glycerine solution was the winner. I feel this is because it had the best hygroscopic qualities which helped its bubbles last the longest. The longer the water in a bubble can be kept from evaporating the longer the bubble will last.

Summary Statement
By blowing bubbles into the air and onto trays and timing them until they popped I was able to determine which bubble solution produced bubbles that lasted the longest.

Help Received
My father helped me to do research on the internet and to graph the results on the computer. My mother and brother helped me to blow bubbles and time them. My mother helped me to set up my science board and type my report.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jeffrey A. Van Voorhis

Project Number
J1141

Project Title
Effects of Cameras, Eye Color, and Lighting on "Red-Eye"

Abstract

Objectives/Goals
The purpose of this project was to test ways to reduce "red-eye" in photographs using different types of cameras. Cameras that utilize the "red-eye" reduction feature reduce "red-eye" significantly. But these cameras can not eliminate "red-eye" completely. The "red-eye" reduction only minimizes the "red-eye" in a photograph by making the pupil contract. This project used different angles of light to eliminate "red-eye" completely.

Methods/Materials
Nine volunteers were photographed. Three subjects had blue colored irises, three had green colored irises, and three had brown colored irises. Four pictures were taken of each subject with each of four different types of cameras in the dark. Two of the cameras were digital. One of the digital cameras was a compact camera, the other was an SLR (single lens reflex) camera. The other two cameras were film cameras. One was a compact and the other was a disposable camera. The photographs were analyzed by applying the RGB computer color system to determine the hue of the subject#s pupils in the photographs. The RGB color system is a hexadecimal code that mixes the colors red, green, and blue to create any color. I compared the RGB color of each iris to a black to red gradient in order to determine the amount of #red-eye# in each photograph.

Results
The digital SLR camera reduced "red-eye" most. The disposable camera photographs had the second least amount of "red-eye". The photographs that showed the second greatest amount of "red-eye" came from the compact film camera. The camera producing the most red eye was the compact digital camera. The compact digital camera photographs revealed intense "red-eye" in every picture taken.

Conclusions/Discussion
The flashes that were placed at angles farther away from the lens of the camera resulted in reduced "red-eye." The Digital SLR camera, with and without the attachable flash, produced images with indistinguishable amounts of "red-eye." Cameras that have flashes located farther away from the lens of the camera, will create the least amount of "red-eye."

Summary Statement
This project used various angles of light and different cameras to eliminate "red-eye" in photographs.

Help Received
Thanks to Jeff McDowell for supplying a digital SLR Camera. Thanks also to my science teacher who provided support throughout the project.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Lily C. Viramontes

Project Number
J1142

Project Title
Killing Germs in the House

Abstract

Objectives/Goals
To find out which household cleaner would best kill germs from chicken skin.

Methods/Materials
To test my questions, I rubbed chicken skin over marble tiles, thoroughly covering the tiles. Then I applied different cleansers to different tiles. I transferred the germs onto petri dishes with a sterile applicator. After the prepared petri dishes had been in an incubator for three days, the bacteria colonies were visible to the naked eye. I counted and recorded the number of colonies over one millimeter in diameter.

Results
I found that bleach killed the most bacteria, then came detergent, solvent and then normal tap water.

Conclusions/Discussion
According to my research bleach would kill the optimum amount of chicken bacteria.

Summary Statement
Which household cleaner was most effective at cleaning germs from chicken skin

Help Received
Mother helped with the procedure.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Stephen J. Wandro

Project Number
J1143

Project Title
Sound Barriers

Abstract

Objectives/Goals
Can I set up an experiment to see what household materials would make better sound barriers against different frequency notes?

Methods/Materials
I build a 2ft. wide by 2ft. deep by 1ft. tall box out of wood and drywall, kind of like a little room. I left one wall open to use for testing the different sound-blocking materials. Inside the box I placed three computer speakers attached to electric piano keyboard. The sound meter was placed outside the box to test the effect of the barriers on three notes covering most of the hearing range. The insulation materials tested were: plastic garbage bags, fiber glass (R13), egg cartons, bath towels, cement bricks, and dry wall.

Results
The results of the experiments show that plastic trash bags were the worst at blocking sound and the drywall with bricks was the best at blocking sound. Most of the materials blocked the high notes better than the low and middle notes.

Conclusions/Discussion
In this experiment I learned that different materials have different effects on the sound levels for the three frequency notes I tested. My hypothesis was that the heavier materials will be better sound barriers. I proved this to be true. The experiments where the heavy materials were used such as the drywall, bricks, and drywall and bricks or towels, reduced the sound the most. As my hypothesis stated, the heaviest materials performed the best. The lighter materials hardly reduced the sound at all. The plastic trash bags reduce the noise level by 1 or less decibels.

I could improve my project if I tested more materials, if I had better equipment and if I had better controls on the conditions. I would like to test not only household materials but materials such as metal, glass, water, and a vacuum (like in outer space). I tried to test water but it was too hard to work with. Better equipment would have increased the accuracy of my tests. I had gaps in the box, background sound, and the keyboard wouldn#t stay at a constant sound level. Even with all these problems, I was still able to see that the heavier materials were much better insulators that the lighter materials.

Summary Statement
I tested household materials to see which would provide the best sound barrier.

Help Received
My dad helped me build a wooden box for testing the materials.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Julia B. Wilson

Project Number
J1144

Project Title
Weed Killers: Effectiveness and Harm to the Environment

Abstract

Objectives/Goals
The objective of my science fair project is to test and find a weed killer that is quick, effective and does minimal harm to the soil and environment.

Methods/Materials
I did extensive research on types of weeds killers, store bought and homemade and chose 7 to use for this experiment. They were boiling water,Roundup,Bayer Advanced Garden/Power Force Grass and Weed Killer,Spectracide Systemic Grass and Weed Killer,bleach solution,vinegar solution,and ammonia solution. I then gathered and repotted over 80 dandelion plants of roughly the same size. With a control group I labeled the other plants, and applied the seven choices to groups of eight plants each. Temperature, weather readings, and plant measures were documented in a log book for a period of three weeks. Afterwards I analyzed the data, created charts and a picture diary.

Results
All eight plants exposed to boiling water died 4 days after one application. Only 3 dandelion plants died after the first application of Roundup. Bayer Advanced Garden Grass and Weed Killer had only one plant death after 7 days. All eight plants of the Spectracide group died after the second application seven days later. After the second application seven days later none of the bleach solution sprayed plants have died but many were stunted. None of the plants treated with 2 applications of vinegar died. After 7 days and 2 applications none of the ammonia treated plants had died.

Conclusions/Discussion
Of all seven additives used in this experiment, boiling water killed the dandelion plants the quickest and did no damage to the soil or the environment. Boiling water after only one application was able to cause plant death to all eight dandelions in just 4 days. The next best weed killer was Spectracide, which was predicted to be the best as per my hypothesis. Spectracide was able to cause plant death to all eight dandelions in seven days, but two applications were needed. Based on my research Spectracide was also proven to be the most harmful to the soil and environment. Based on these results I will reject my hypothesis and when safely used, I recommend boiling water to be poured on any unwanted weeds.

Summary Statement
The goal of my science fair project is to test and find a weed killer that is quick, effective and does minimal harm to the soil and environment.

Help Received
Mother helped with buying supplies and constructing the display board; Step-father helped with typing and printing the report and pictures; I applied weed killers and boiling water under the supervision of my step-father.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Lauren A. Zeidler

Project Number
J1145

Project Title
Generic vs. Brand Name Light Bulbs: A Bright Idea?

Abstract

Objectives/Goals
The purpose of this experminet was to determine the actual lifespan of incandescent light bulbs and to assess whether light output changed over time.

Methods/Materials
A light meter was placed parallel to the shadow of the filament support in the bulb, using a 0.91 meter stick to verify the distance. Every two hours (whenever possible) the reading on the light meter was recorded along with the date, time, and input voltage. 60 watt GE brand (brand name) light bulbs and ACE brand (generic) light bulbs were tested at 120 volts, 135 volts, 147 volts, and 157 volts.

Results
At 120 volts, packaging claimed the bulbs would last 1000 hours (42 days) and have a lumen output of 840 lumens. The ACE bulb lasted only 358 hours, and the GE bulb lasted 764 hours. Both became dimmer on average until they finally burned out, but the lowest lumen measurement was 972 lumens.
A second set of light bulbs was connected to a variac voltage converter, which was set at 135 volts. This reduced the estimated lifespan to 210 hours. The GE bulb lasted 215 hours, and the ACE bulb lasted 338 hours - over 50% more hours than predicted!
Next, the variac voltage converter was set to 157 volts, making the estimated lifespan 30 hours. This time the ACE bulb lasted 36 hours, while the GE bulb lasted 46 (over 50% more hours than predicted).
A fourth experiment was performed at 147 volts (since this variac could not be set at 157 volts). The estimated lifespan at this voltage was now 70 hours. The GE bulb lasted 46 hours. The ACE bulb lasted between 54-62 hours (it burned out overnight).

Conclusions/Discussion
The ACE brand light bulb seemed to be the better buy. On average, the ACE bulbs were brighter than the GE brand bulbs in all four experiments. There was no clear better bulb in terms of lifespan.

Summary Statement
The purpose of this experiment was to determine the actual lifespan of incandescent light bulbs and to assess whether light output changed over time in both brand name and generic brand light bulbs.

Help Received
Mother and father supervised the experiment; Sam Runco and JVC supplied me with the variacs.