CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Niccole K. Anzivino

Project Number
J1201

Project Title
Which Vegetable Will Create the Best Dye?

Abstract

Objectives/Goals
Hypothesis: I think that the beet will create the best dye because it has a very dark color. I also noticed that when I cut the beets the juice immediately stained my hands. That is why I think that the beet will create the best dye.

Methods/Materials
Vegetables (0.5 kilograms of each):
Acorn squash, Beets, Carrots, Red onion, Spinach
1 for ea. vegetable type:
1 pot, 1L of water, 50ml of vinegar, gauze, sieve, 1 potato masher, 1 bowl
To test colorfastness: 20-8#x8# 100% muslin cotton squares, 1 tblsp of Tide detergent, 3L of hot water
Procedure:
Create the Dye: 1. Cut 0.5 kg of vegetables into chunks 2. put vegetables into a large pot and cover with 1L of water 3. boil for one hour 4. let cool for 1/2 hour 6. crush vegetables 7. strain through gauze lined sieve into bowl.
Dying the Cotton; 1. place two muslin cotton squares into each bowl of dye and let soak for 12 hours 2. remove muslin squares from dye bath and squeeze out all of the excess dye 3. let muslin squares dry for 12 hours 4. label muslin with permanent marker with first letter of vegetable name 1-4.
Comparing: 1. Wash one of the two dyed cloths of the same vegetable 3 times in 3 liters of hot water with 1 Tblsp of Tide. 2. Let dry. 3. Compare the washed cloth to the unwashed cloth. 4. Repeat experiment this time adding 50ml of vinegar to each dye bath. 5. Determine which of the vegetable dyes was the hardest to wash out.

Results
On scale of darkest to no color: Scale: Darkest, darker, dark, light, lighter, lightest. no color
* Red onion- dark * Beet-lighter * Spinach- in between lighter and lightest * Carrot- no color * Acorn squash- almost no color. Adding vinegar to the dye bath did not change the results.

Conclusions/Discussion
The red onion created the best dye which disapproved my hypothesis. The muslin dyed with the beet came out very dark. But, when it was washed, almost all of the color came out. When the muslin was dyed with the red onion it was a decently dark color, and when it was washed, the color not only stayed, it changed to green. Therefore the red onion created the best dye.

Summary Statement
I tested 5 vegetables to see which would make the best dye and be hardest to wash out the color after being used as a dye.

Help Received
Mom helped with pasting picture on board

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Zachary R. Barnard

Project Number
J1202

Project Title
Corrosion of Copper: Green with Envy

Abstract

Objectives/Goals
The objective of my project was to see if salt water produced more physical change in copper than vinegar, baking soda, salt water, or tomato juice.

Methods/Materials
I filled 26 jars with 360ml of 5 different solutions: vinegar, bleach, tomato juice, 6gm baking soda in distilled water mix, and 18gm salt in distilled water mix. Distilled water was used as a control. The pH level of each acidic & basic solution was recorded and a copper strip placed in each jar. Daily observations of each copper jar were recorded. At the end of a 10-day period the copper strips were removed, solution pH levels checked, and physical changes noted. I decided to rerun the test with more copper surface exposed to air versus being submerged. I filled 16 jars with 120ml of 3 different solutions: vinegar, bleach, and baking soda for a 5-day trial. Distilled water was used as a control.

Results
The copper and salt water formed the least amount of patina (copper carbonate) with no corrosion. Bleach produced the most physical change in the copper. It formed a creamy-like patina and corroded the plates. Vinegar formed a distinct powder-like patina that stuck to the plate, was hard to remove, but did not corrode.

Conclusions/Discussion
The salt water did not form any patina, and did not physically change the copper when compared to vinegar and bleach. The copper plates in salt water physically remained the same for the duration of the experiment. I had based my hypothesis on the Statue of Liberty#s formation of patina but realized that I didn#t factor 100 years of weathering into my experiment.

Summary Statement
My project showed whether vinegar, tomato juice, baking soda, bleach, or salt water would produce the most physical change in copper plates.

Help Received
Mom helped with report and organization of board. Dad helped with displays and photos.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Emmanuel Ceja

Project Number
J1203

Project Title
Which Metal Conducts the Most Heat?

Abstract

Objectives/Goals
I'm trying to figure out which metal has the ability to conduct the most amount of heat. By doing so i hope to help engineers around the world build better exteriors for space shuttles.

Methods/Materials
I used Lard, Aluminum metal rods, Brass metal rods, and Steel metal rods. I also used a gas stove, a graduated cylinder, and 12 test tubes.What i did first was i cut the metal rods. Then i melted the lard and poured it into the test tubes. I placed the tyest tubes inside the refrigerator. I left them in there for 600 seconds. I took them out and placed them next to were i was going to conduct my experiment. Then i placed a metal rod over the combustion flame of the gas stove. I left in lace for 120 seconds. I took the metal rod out and placed it in the test tube for 60 seconds. no more no less. Then i poured the melted lard into a graduated cylinder. I wrote the results down in my data book. I did the previous for every metal that i used.

Results
Aluminum metal rods were the best conductors of heat. They had a high of 16.9mL of lard melted.
Brass were the worst conductors of heat. They had a high of 10.6 mL of lard melted.
Steel metal rods were the second best conductors of heat. They had a high of 12 mL of lard melted.

Conclusions/Discussion
Aluminum metal rods were the best conductors of heat followed by steel and last but not least brass.All the metal rods conducted heat exept the control group. They had no heat variable added to them which led to the poor conclusion that no heat was conducted.

Summary Statement
My project was done to figure out which metal can conduct the most heat.

Help Received
Teacher helped give ideas for project; Mother helped conduct the experiment.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Eric C.J. Cibit

Project Number
J1204

Project Title
The Effect of Various Combined Thicknesses of Glass on Sound Transmission

Abstract

Objectives/Goals
My experiment tested the transmission of sound through glass. My objective was to determine what thicknesses of double-pane glass would reduce the most sound.

Methods/Materials
I built a sound proof box out of concrete block which was closed on all but one side to direct the sound. On the one open side I pipe-clamped various thickneses of glass in wooden frames. The sound source was a computer speaker inside the concrete box. I then broadcast computer generated test sounds at different frequencies at a constant volume for a duration of 10 seconds. Six frequencies and 3 double-pane glass combinations were tested. A Sound Level Meter (SLM) was used to take sound measurements in decibels. Over 100 samples were taken in the same location at the same time of day.

Results
My experiment showed a pattern in sound reduction by all combinations of glass tested as sound frequencies were increased between 400 Hz and 3150 Hz. However, the lowest frequency tested, 250 Hz, did not conform to this trend. Interestingly, the smallest oveall thickness of combined glass (1/4"& 1/16")reduced the most sound at the highest sound frequency of all glass combination tested, but reduced the least amount of sound at the lowest frequency. Conversely, the greatest overall thickness of combined glass (1/4" & 1/4") reduced the moste sound at the lowest sound frequency, but the least at the highest frequency.

Conclusions/Discussion
These results are significant since they show that different combinations of glass thickness that make up a single piece of double-pane glass can be more effecive in reducing sound depending on the type of sound wave transmitted through the glass. As far as the 250 Hz frequency mentioned in the "Results" section above not conforming to the testing pattern, this could have been because of the size of my sound box and the position of the SLM relative to the speaker. A 250 Hz wave is about 4 feet long so the box should probably have been longer and the SLM further from the sound source to accurately measure this sound frequency.

Summary Statement
My experiment is about how different combined thicknesses of glass affect sound transmission.

Help Received
Dad provided guidance on building the sound box; Mom helped type; Dr. Segal provided acoustical advice. Dr. Wilson lent me the Sound Level Meter.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Daniel P. Clarkson

Project Number
J1205

Project Title
Analysis of Hydrophobic and Insulative Properties of Various Textiles

Abstract

Objectives/Goals
I enjoy hiking and outdoor activities. Avoiding hypothermia is very important when in the elements, especially in the winter. I decided to investigate the hydrophobicity of different textiles and study the properties of thermal insulation for each textile. I was interested in determining which was the best textile to wear when participating in mountaineering or other outdoor activities.

Methods/Materials
The materials I tested were cotton, wool, nylon, silk, silk shantung, and water proof nylon. To test the hydrophobicity of each material, I poured a measured amount of water onto a 20 cm x 12.5 cm piece of fabric and recorded the weight. I compared this measurement to the weight of the fabric when it was dry. To test the thermal insulation of the fabrics, I created an insulated test environment using a Styrofoam cooler with a piece of Styrofoam in the center, effectively dividing the cooler into two halves. I then cut a 17.5 cm x 10 cm hole in the center of the centerpiece. I tacked a sample of each fabric over this hole and measured the temperature difference between the two sides for both wet fabric and dry fabric samples. This allowed me to measure the change in temperature across the fabric when heat was added to one side of the Styrofoam cooler. I used a standard hairdryer as a convective heat source.

Results
The material that absorbed the most water and was the least hydrophobic was cotton. The two most hydrophobic textiles were water proof nylon and wool. Water proof nylon was slightly more hydrophobic than wool. The nylon absorbed slightly less water than the wool. However, the results were not different enough to prove that water proof nylon was statistically more hydrophobic than wool. In my test of thermal insulation, I found that wet cotton was the most effective insulator.

Conclusions/Discussion
I found that water proof nylon and wool were equally hydrophobic and that cotton was extremely hydrophillic. However, I believe that my results in the insulation test might have been affected by the hairdryer. The hairdryer used in the test blew hot air directly onto the wet material causing forced evaporation, cooling the non-heated side. If I were to repeat this experiment, I would be sure to use a radiant source of heat.

Summary Statement
I tested the hydrophobicity and insulative properties of various textiles and found that water proof nylon and wool were equally hydrophobic and that the findings in the insulative test may have been flawed by forced evaporation.

Help Received
My science teacher provided measuring instruments; My parents bought the materials needed.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Monika L. Gleim

Project Number
J1206

Project Title
Effects of Different Solutions on Elasticity Percentage of Various Fabrics

Abstract

Objectives/Goals
What type of fabrics will retract back with which solution, with the amount of 10 trials for each fabric.

Methods/Materials
fabrics cotton, lycra, nylon, and polyester. Solutions bleach, ammonia, baking saod, salt, and control. Two 25 pounds weight, and 11 long poles,room temp water.

Results
Bleach caused the fabric to streatch, but the elasticity was so trong that the fabric retracted back further than it's normal size.

Conclusions/Discussion
After completing my project I found that my hypothesis was incorrect and correct. I stated that the solution baking soda would cause less effect on the elasticity of the four fabrics: cotton, lycra, nylon and polyester. In the correct part of my hypothesis I stated that the bleach solution would have an effect on the elasticity of the fabrics and the solution will make the fabrics stretch more.

From my results I discovered that bleach stretched the fabrics the most. I also discovered that all the solutions had more effect on the cotton fabric.

Summary Statement
What type of solution will cause the fabric to retract back to it's normal size which it started from before it was stretched.

Help Received
Snowflake designs; Home Depot; Gleim Crown Pump

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Jasmine Griffin

Project Number
J1207

Project Title
In Hot Water: Comparing the Effectiveness of Reflective Material in Solar Ovens

Abstract

Objectives/Goals
The problem was, "How does changing the type of material used as a reflector in a solar oven affect the temperature reached in a solar oven?"
It was hypothesized that when the reflector used in the solar oven was made of Clear Dome Solar, the temperature reached would be higher than the Kirkland Aluminum Foil, Emergency Survival Blanket, Vons Heavy Duty Aluminum Foil, and Kirkland Aluminum Foil painted black. This was hypothesized because Clear Dome Solar is a professional solar oven material; it is supposed to reflect 70% of the heat. It is also the sturdiest material; when glued on the solar ovens, no wrinkles should be present, which could cause the temperature reached to go down.

Methods/Materials
A brief procedure of the experiment is as follows. Five solar ovens were made according to the directions given in the Procedure. A bowl of water sealed with cardboard and duct tape was placed in each solar oven, and they were placed outside for a period of four hours. The temperature was recorded before and after the testing period in degrees Celsius. All tests were repeated for a total of five trials.

Results
Kirkland Aluminum Foil had the highest average change in temperature, 29.3 degrees Celsius, and the highest overall temperature, 61.8 degrees Celsius. The Kirkland Aluminum Foil painted black had the lowest average change in temperature, 23 degrees Celsius. Clear Dome Solar came in fourth, with an average change in temperature of 25.9 degrees Celsius.

Conclusions/Discussion
The results did not support the hypothesis. This was unexpected because the Clear Dome Solar material is made for use in homes to reflect the sun#s energy away from homes to keep them cool in the summer. On the other hand, the Kirkland Aluminum Foil is a material that can be bought in grocery stores and its main purpose when designed was not use in solar ovens. To see the cheaper, easier to get a hold of material do better than the professional material was very surprising, and it shows that effective solar ovens can be made without a huge expense. This can help people outside the United States who have to rely on burning wood to cook their food; they can save a lot of time and effort using solar ovens. And these ovens can be inexpensive and yet effective, as shown by this experiment.

Summary Statement
This project looked into the reflectivity of different materials in solar ovens, and how they maximize the temperature water reaches in a solar oven.

Help Received
Mother bought all the materials needed for this project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Katherine E. Hogan

Project Number
J1208

Project Title
Does Organic or Man-made Material Insulate Better?

Abstract

Objectives/Goals
My objective was to determine if a natural insulator or a man-made material would insulate better. After researching, I hypothesized that one of my man-made materials would work the best. However, out of naturally occurring materials, I believed straw would work the best.

Methods/Materials
I first constructed a box that I used to complete my experiment in. Next, I filled the box with the insulation. Then I used a light bulb to heat the inside of the box up to 50 ºC. After that, I let the box sit and cool for 15 minutes and then recorded the ending temperature. I performed five trials for each type of insulator and then calculated the average remaining temperature.

Results
My results showed that fiberglass worked the best overall and that straw worked almost as well and was the best of the natural insulators. On average the dirt had a remaining temperature of 24.56ºC, the straw turned out to be 30.66 ºC, the cellulose turned out with 26.00 ºC, the leaves ended up being 27.68 ºC, the Styrofoam trials came out to be 31.18 ºC and the fiberglass trials came out to be 31.34 ºC.

Conclusions/Discussion
These results supported my hypothesis, because I had hypothesized that one of the man-made materials would insulate the best, however straw would also have a high ending result. I was excited to find how close straw#s results were to fiberglass#s results as it supports the idea that we can use natural materials that are much better for the environment in the building process.

Summary Statement
My project was designed to test and compare the effectiveness of natural and man-made insulating materials.

Help Received
My father helped me gather all of the materials and helped me build the box and get started on the testing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Emma S. Hopson

Project Number
J1209

Project Title
Snap, Crackle, and Pop!

Abstract

Objectives/Goals
My objective was to see if Rice Krispies would snap, crackle, and pop in liquids other than milk and I believed that club soda would pop the loudest because of its carbonation.

Methods/Materials
The materials I used for each of three trials were a sound meter, a video camera, bowls, Rice Krispies, orange juice, fat free milk, tap water, and club soda. I started with ½ cup of Rice Krispies in a bowl and ½ cup of one of the liquids in a measuring cup. I then poured the liquid over the cereal and recorded the data on the video camera. I then recorded the data in my journal by watching the video playback.

Results
I took the data from each trial and averaged the decibel level for each liquid. The average decibel level for the three trials for club soda was 58.4 decibels. Orange juice averaged 54.3 decibels, water 55.7 decibels and milk 53.3 decibels. Because of the video camera recordings, I had an unexpected set of results, which was the length of time the cereal snapped, crackled, and popped. In all three trials, club soda recorded for the longest time.

Conclusions/Discussion
Rice Krispies did snap, crackle, and pop in other liquids, and club soda caused the loudest decibel levels. Club soda also registered on the sound meter for the longest time of all the liquids in the trials. This project expanded my knowledge of physical science because I now know that liquid enters the Rice Krispies# air holes and cause them to #explode.# The carbonation in the club soda caused a more forceful #explosion# which lasted longer than other liquids. I also learned how to use a sound meter, and much more about how sound travels, and how it is produced.

Summary Statement
Do Rice Krispies snap, crackle, and pop in other liquids besides milk?

Help Received
Mother held the camera and called out the data on playback. Science teacher suggested use of a sound meter and provided the meter.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Amanda C. Imfeld

Project Number
J1210

Project Title
The Effects of Different Window Shades on Energy Consumption

Abstract

Objectives/Goals
My project was to determine what type of blinds would hold out radiant heat. The types of blinds I used were Vinyl Blind, Roller shade, Sun Screen and Aluminum Foil. I believed that the Vinyl Blinds would hold out the most radiant heat.

Methods/Materials
A box made of insulated wood, would my type of glass, single Pane. For example: I would place the Vinyl blind in the mount, put the Single Pane glass in the slot and then place the heat lamp 6 inches from the glass for five minutes checking the temperature every minute. I would do this for each blind type.

Results
Of the four different types of blinds the Aluminum Foil did the best at holding out radiant heat. The Sun Screen did the second best, the Vinyl blinds did second best, and the Roller Shade did the worst of the four.

Conclusions/Discussion
People who would like to buy new blinds for their home should pay more attention to the energy efficiency of the blinds and not the looks or style. I would suggest buying Sun Screen because it would insulate your home best although it was second it allows you to see through and still have some privacy.

Summary Statement
My project was about trying to figure out what type of blinds would hold out radiant heat.

Help Received
My mom helped type up my report. My dad got me the materials for the testing and showed me how to do the testing. One of my dad#s co-workers made the insulated wood box for me. Dan Notrica, from Phiefer Wire gave me the sun screen to do the testing with and Renyold#s Wrap Foil provided me with

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
M. Peter Kedzierski

Project Number
J1211

Project Title
Keep the Heat

Abstract

Objectives/Goals
Objective: The objective of the experiment was to figure out which insulator will keep bottles of water the hottest the longest and coldest the longest. Hypothesis: It was predicted that the best two for keeping the water hot would be cotton and aluminum foil and the worst two would be plastic and the Styrofoam sheets. Also, it was hypothesized that cotton and aluminum foil would be the best for cold and the worst two would be plastic and newspaper.

Methods/Materials
Materials: The seven insulators used were cotton, aluminum foil, newspaper, bubble wrap, plastic, Styrofoam sheets, and fleece.
Procedures: The cold test was performed by putting the bottles that were filled with water in the refrigerator for at least 12 hours then taking them out and wrapping them in the insulator. The bottles were then placed back in the refrigerator for five minutes to stabilize the thermometers. The bottles were then taken out and the temperature was recorded every five minutes for five hours or until the temperature was constant for three consecutive readings.
With the hot water testing bottles were wrapped with the insulation first and then the hot water from an electric coffee maker was poured into the bottles. The same procedures of measuring the temperature of the water that was used for the cold water testing were used for the hot water testing.

Results
Results: It was found that the aluminum foil and cotton were the best insulators for keeping the water cold while the Styrofoam sheets and the bubble wrap were the worst two insulators for keeping the water cold. The best insulators for keeping the water hot were cotton and plastic while the worst two insulators for keeping the water hot were the aluminum foil and the bubble wrap. Overall, it was found that the best insulator was cotton while the worst insulator was the bubble wrap.

Conclusions/Discussion
Conclusions: The reason why cotton worked the best is because there wasn#t as big of air pockets. This made is so that there is not as much convection, which is the movement of molecules to move heat and that is why bubble wrap is a terrible insulator. If the project was done again, the bottoms of each of the bottles would be wrapped so it could be determined if it made a difference in the results.

Summary Statement
The purpose was of this project was to determine which insulator would work the best at keeping water in bottles hot and which would work best at keeping the water cold.

Help Received
Father helped gathering materials and mother helped in preparing board

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Edward J. Kronfli, III

Project Number
J1212

Project Title
Can Your Shirt Handle Your Sweat?

Abstract

Objectives/Goals
My science fair project is on the subject of moisture management. I decided to do this project after noticing my friend#s dad after a long run being drenched in sweat. His cotton shirt took a long time to dry. So, I decided to test various athletic shirts sold on the market today to see which is the best.

Methods/Materials
My test involved weighing a constant size rectangle of fabric from each shirt on an analytical scale. Then I dipped the end of that rectangle into distilled water and measured in centimeters how fast the fabric wicked water by how high the water climbed. Then I reweighed the wet rectangle and hung it to dry in the lab. As the fabric was drying, I weighed it every ten minutes and recorded all my data. The lab is temperature and moisture controlled.

With this data, I calculated the weight of water absorbed and evaporated and its percentage of the residual weight of the wet fabric. I compared my data on a line graph and discovered that the fabrics that managed moisture best were made with microfiber polyester and not cotton. Also the lightest of the fabrics I tested, a white polyester mesh, was the quickest to absorb and the quickest to dry.

Results
My results showed that the polyester microfiber garment was the best in comparrison to the other garments. Fleece cotton was the worst preforming. It took a long time to dry. 100% polyester is best suited for moisture management. I also noticed that the mesh garments dryed quicker yet did not absorb as much water where as the pure polyester microfiber absorbed more.

Conclusions/Discussion
Recently a new type of garment was developed, known as body mapping. This garment has a mesh in areas where the body sweats heavily and in areas of less moisture a microfiber polyester is used. That is the optimum solution.

Summary Statement
The project is about moisture management in textiles.

Help Received
Father assisted in testing and reaserch. Used laboratory at Antex Knitting Mills.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Emily E. Luna

Project Number
J1213

Project Title
Investigating Fingerprint Quality on Different Coated Surfaces

Abstract

Objectives/Goals
A crime scene could have fingerprint on several different surfaces and those surfaces could be covered with different coatings. An Officer at the crime scene would probably find a good fingerprint on certain surfaces with certain coatings,so my project will be determining which surfaces and coatings will have good quality fingerprint.

Methods/Materials
My method is the fingerprint Dusting method.
Materials:
Aluminum metal,raw wood,glass, non-sterol gloves,non- stick cooking spray,white paint, house dust and latent print field kit.

Results
My resalts were that paint on glass and metal and dust on glass had better qualitys then wood with any coating.

Conclusions/Discussion
I found out that my hypothesis was wrong and never look at wood first.

Summary Statement
About finding good qualitys on a coated surfacein a crime scene.

Help Received
I got help from 4 offic.ers on rating and facts

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Brian S. Maloy

Project Number
J1214

Project Title
The Effects of Different Insulators on the Melting Rate of Ice

Abstract

Objectives/Goals
The objective of this project is to find out which material used for insulation is the best. Also an alternative to fiberglass for insulating a house is another goal of this project.

Methods/Materials
This project used 13 different materials for testing how well they insulated. These materials were highest, middle, and the lowest grade of fleece, highest and lowest grade of fiberglass, newspaper, woodchips, cardboard, Styrofoam, foil, packaging peanuts, bubble wrap, and computer paper. Protective gear, wood, screws, and screen were used.

Results
The project found that the highest grade of fiberglass did the best with a time of 135 minutes, followed by the highest grade of fleece with a time of 118 minutes. The middle grade of fleece produced a better time than the lowest grade of fiberglas as well. The lowest grade of fiberglass (used to insulate the wall of a house) produced a time of 100 minutes. The worst material to be used as an insulator is computer paper.

Conclusions/Discussion
The conclusion to this project is that the insulation with the highest R-value did the best. For example the highest grade of fiberglass had the highest R-value so it did the best.

Summary Statement
This 2 year study is about testing 13 different insulators and their ability to insulate a 250 ml block of ice for the longest period of time.

Help Received
I received help from my mom, who drove me to get the materials I needed, my teacher, who kept me on and track.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Maddie C. McMorrow

Project Number
J1215

Project Title
Wireless or Wire More?

Abstract

Objectives/Goals
To determine whether wireless signals will be affected as they pass through different materials. Another goal to determine was if the signal went through the materials, or tried to go around the materials.

Methods/Materials
Materials were used to construct barriers between a wireless router and a computer. Six different materials built of 2 feet by 4 feet walls were placed as barriers in front of the computer to measure any impact on the signal. The materials consist of metal, plywood, pressboard, glass, drywall, and cardboard. Then each of the materials were used to construct boxes, which were placed over the router to see if the signal strength was impacted when the barrier blocked the router instead of the blocking the computer.

Both the Internet speed and the distance between the router and computer were constant throughout the entire procedures.

Conclusions/Discussion
All materials tested had an impact on the signal. The results indicated that metal affected the reception more than the other materials did, as the hypothesis stated. The prediction was right and wrong in different matters. The surprising conclusion was it did not matter whether the materials were placed on top of the router, or 66 feet away from the router and in front of the computer, because the results were about the same. Therefore, the signal went through the different materials.

Summary Statement
My project is about how different materials affected the wireless router signal.

Help Received
Teacher helped get organized; Dad cut supplies; Mom checked spelling and grammar.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Madalyn A. Morris

Project Number
J1216

Project Title
Sizzling Hot Sunscreen: Does a Sunblock's SPF Level Correlate with Its Ability to Block Harmful Rays from the Sun?

Abstract

Objectives/Goals
The objective of this project is to determine if sunblocks with SPF levels of 40, 50, 60, or even 70 truly protect any better than sunblocks with an SPF level of 30.

Methods/Materials
Hotdog Method/Materials
Hotdogs were coated with varying sunscreens with varying SPF levels and placed under a bed in a tanning salon to test protection levels. The results were inconclusive so a new method was used.
Solar Graphic Paper in Natural Sunlight Methods/Materials
Solar graphic paper was placed under transparencies with varying sunblocks and varying SPF levels. The papers were placed outside to be exposed to sunlight. Paper colors were scanned into the computer and results were assessed.
Solar Graphic Paper in Tanning Bed Methods/ Materials
Same method as at the tanning salon except the trays were under the tanning bed#s light for ten minutes and at one minute intervals.

Results
Hot Dog Results
After three trials lasting an hour and a half total in a tanning bed, the results showed that all of the hotdogs had the same coloring and that no one hotdog was lighter in color than the rest. The results were not as anticipated and a new test using solar graphic paper was used.
Solar Graphic Results
There were six trials for each product, three in regular sunlight and three in the tanning bed, and the results were much more conclusive. The solar graphic paper began fading. It faded less in areas covered with sunblock, but the longer the paper was in the sun, the more it faded, even with sunscreen covering the transparency over it. There was no significant difference in sun exposure between the SPF 30 and 50 and 70.

Conclusions/Discussion
The hypothesis regarding sunblock effectiveness was proven correct. The hypothesis is that SPF 50 and 70 specifically aren#t more effective or protective than SPF 30. The hotdogs showed no significant difference but the solar graphic paper results were conclusive. The SPF 50 and the SPF 70 did not perform as good as the SPF 25-30.

Summary Statement
This experiment was to determine whether or not advertisement claims that sunblocks with higher SPF levels protect better than lower SPF levels.

Help Received
My mom helped type and glue my board together; Hanz On Tanning Salon and Elelctric Beach for the use of their rooms.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Kyle Moua

Project Number
J1217

Project Title
Investigating What Common Household Liquids Will Extinguish a Fire the Quickest

Abstract

Objectives/Goals
The objective is to investigate and determine what common household liquids would extinguish a fire the quickest.

Methods/Materials
I started with cutting a Dura Flame log into 14 slices and putting them into induvidual mediium sized alluminum trays. I then lit the logs and let them burn into a full flame.
I made an extinguisher by putting common household liquids into a sprayer. 4 cups of each variable.
Variables were: Soapy water, coca cola, vinegar, apple juice, grape juice, lemon juice.
Water was the control.
I pumped sprayer 25 times then srayed liquid onto the fire. Counted amount of sprays, and amount of time it took to extinguish fire completely. I also measured amount of liquid used.
2 trials for each variable.

Results
Liquids that were sweet or sugary had little effect on extinguishing a fire.
Liquids that were acidic such as soapy water or vinegar had a big effect on extinguishing a fire.
Vinegar had the strongest effect. The lowest amount of sprays was 60 sprays. It is also the shortest amount of time and least amount of liquid used.
Vinegar worked even better than the control. (water)

Conclusions/Discussion
Based on these results, If you were to have kitchen fire, or small house fire where water wasn't readily available. You could grab a botlle of vinegar, and extinguish the fire that way, before it got out of control.

Vinegar suffocated the fire quickly. Vinegar is carbinated and acidic, which when heated, turns into a gas or vapor that is more dense than oxygen so the gas pushed out the oxygen and suffocated the fire.

Summary Statement
This project demonstrates how common household liquids can be used to extinguish a small fire in an emergency.

Help Received
Mother helped putting board together, teacher helped with scientific process, computer graphing. Father helped with guidance and safety.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Candice Nahigian; Nichole Rindahl

Project Number
J1218

Project Title
Paper or Plastic: Which Is Requested Most, More Cost Effective, More Durable, and Better for the Environment?

Abstract

Objectives/Goals
Our project was designed to determine which type of grocery bag was better for the environment, more cost effective, stronger, and requested the most, paper or plastic.

Methods/Materials
Research the environmental impact of plastic and paper bags.
Observe 100 customers from four different types of grocery stores.
(one supermarket chain, one organic grocery store, one discount grocery store and one privately owned grocery store)Determine the cost of each type of bag to the retailer from the store manager.Identify the average amount of weight comfortable for customers to carry in their bags to use as a starting weight for the tests.Test each bag, paper and plastic, from the four stores, ability to hold weights while hanging from a PVC pipe. Repeat the test on each bag five times and record the results.

Results
Paper bags were not as strong as the plastic bags. The average amount of weight held by the paper bags was 40.3 lbs. The exception was the discount grocery store paper bag; it did not have handles and held an average weight of 45.31 lbs. The organic grocery store plastic bags held the maximum weight of forty five pounds without breaking. The combined average weight plastic bags were able to hold was 45.7 lbs.The cost of the bags varied slightly at each of the stores, however plastic bags cost an average of 3.25 cents per bag and paper was 7 cents per bag.Of the 400 costumers observed 65.75 % preferred plastic, 30% preferred paper, 2.5 % had no preference and 2.75% preferred cloth.

Conclusions/Discussion
We determined that plastic bags preformed better than plastic.The amount of weight that each bag was able to hole did different from store to store. When it comes to the environment,they are both equally hazardous for the environment. Paper bags are harder on the environment to make than plastic;however they are easier to recycle than plastic.Our environmental research data lead us to the use of cloth bags.Two of the stores offered cloth bags to customers for $1.00 each. So the answer to our question Paper or Plastic?is neither. The best thing to use at a grocery store is a cloth bag. They are the best option for our environment, they hold the most weight,they can be recycled and reused easier than paper or plastic.

Summary Statement
Our project was designed to determine which grocery bag is better, paper or plastic.

Help Received
Mom helped fill out the forms, get supplies, glue the board, provided transportation, supervision, and moral support.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Jonathan L. Noyola

Project Number
J1219

Project Title
How Do Different Substances Affect How Appetizing Cooked Vegetables Look?

Abstract

Objectives/Goals
When a vegetable is cooked, it's color changes. It can get brighter or darker. The color change of the food can make it look unappetizing. For my science fair project, I was trying to find out how to stop that from happening. How does cooking under different conditions affect the color of the vegetable?

Methods/Materials
I started the project by filling my pot with water. Then I put broccoli in the pot. I tested that three times, and then I also added lemon juice to the water. I repeated that three times, and then I added salt instead of the lemon juice. I repeated that three times, too. Then I repeated the whole thing again with green beans and carrots. Then I had my mom, dad, and brother rate the level of how appetizing each batch of vegetables looked. They wrote a number from one to ten for each trial. One was the least appetizing and ten was the most appetizing. Then I also used paint samples from Home Depot to compare the color of the vegetables from each trial.

Results
The broccoli cooked in only water was darker and more appetizing than the raw broccoli. The broccoli that was cooked in lemon juice turned partly yellow and partly a dark greenish-brown. The broccoli that was cooked in salt turned a solid dark green.

The green beans were all mostly the same. The green beans just cooked in plain water looked the most appetizing. They were darker than the raw green beans. The green beans cooked in lemon juice were the least appetizing. The green beans that were cooked in salt water looked darker than the raw green beans, but not as good as the green beans cooked in plain water.

All of the carrots appeared the same as each other, and they were darker than the raw carrots.

Conclusions/Discussion
The carrot wasn't affected by salt or lemon juice. The green vegetables were the opposite of what I thought: the lemon juice made the green vegetables lighter in color and they looked the least appetizing. The salt turned the green vegetables darker and they looked the most appetizing. I thought it was interesting the way the vegetables turned out. If you want your green vegetables to look more appetizing after they are cooked, avoid lemon juice and use salt in the water. For the vegetables to taste good, though, don't put in too much salt.

Summary Statement
My project studied how different cooking conditions affect the color of vegetables.

Help Received
Mom, Dad and brother helped rate the appetizing level and color of vegetables. Mom helped with stove.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
LeeAnn A. Patrick

Project Number
J1220

Project Title
Wood It Matter? A Comparison of Solid Body Electric Guitars

Abstract

Objectives/Goals
The objective of this experiment was to see if the myths behind guitar tonality were true. According to these myths, the sound of a solid body electric guitar can be determined by what type of wood is used to make the body.

Methods/Materials
Four guitars were built from identical kits, but with different types of wood for bodies. The tested woods were basswood, mahogany, and alder. Two of the guitars were made with basswood, as a control. There were two parts in testing, one subjective, and one objective. For the subjective test, a survey was created that used words commonly used to describe guitar tonality. Guitarists with 5+ years experience took the survey and rated each word on a scale of 1 to 5 on how well the word described the guitar. In the objective test, each guitar was hooked up to a computer. A string-picking device struck the low "E" string and a computer recorded the results in mV.

Results
When all the results of the surveys had been averaged, there was not a significant difference between guitars. The results were so varied that each guitar's mean, mode, median and standard deviation all showed a central tendency. The objective test showed a slight difference in the shape of the graphs, but not enough to draw significant conclusions.

Conclusions/Discussion
The conclusions drawn from this experiment are that the presumed tonality of a guitar cannot be based on the wood used for the body. The subjective results show that the response of each guitarist is as individual as people are varied. There is a difference, but it cannot be described with everyday words. The objective results show that there is, in fact, a slight difference in mechanical measurement.

Summary Statement
The focus of my project was to determined if the type of wood used to build a solid body electric guitar makes a noticeable difference in the guitar's tonality.

Help Received
My father supervised my use of power tools and helped edit my write-up; My mother helped edit my work and helped me put together the display; A few friends helped me acquire test subjects who met my requirements and lent me identical amplifiers for testing.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Austin R. Reed

Project Number
J1221

Project Title
The Quiet Zone

Abstract

Objectives/Goals
The objective of this project is to determine which material will best soundproof a wall.

Methods/Materials
First I will construct four 18x18 inch wall units that replicate a section of wall from a standard home. I will leave the inside of one unit empty as a control, and the other three wll be filled with fiberglass insulation, packing peanuts and insulating foam. Then, I will tap each wall with a mallet, on a pendulum to insure consistent pressure, and use a sound meter to test the amount of sound that travels through the walls.

Results
The result of this project was that the wall filled with insulating foam allowed the least amount of sound to travel through it.

Summary Statement
Try to find which material will most efficiently soundproof a standard interior wall.

Help Received
My step-father showed me how to build the wall units, and my mom helped assemble the board.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Devin C. Rousso

Project Number
J1222

Project Title
Wire/String Telephone

Abstract

Objectives/Goals
This experiment tested which wire/string transmitted audible sounds the best.

Methods/Materials
1) Materials: two tin cans that are identical in terms of size and shape, 18 gauge copper wire, aluminum wire, steel wire, and nylon string, a tape recorder, paper, and a pen. 2) Drill a small hole in the bottom of the cans. 3) The string and wires lengths should be twenty-five feet long with two inches extra material. 4) Bend one inch of the copper wire at each end and slip that bent part through the hole in each can. 5) The speaker will hold one can, and the listener will hold the second can and walk away from the speaker until the wire/string is taut. 6) Put one can up to the listener#s ear and the other can up to the speaker#s mouth. 7) The speaker will then say the twenty-five words using the same tone of voice and speed. 8) The listener will write down the words he heard as each one is said by the speaker. 9) Repeat steps 4-8 for each wire/string. For the nylon string, a knot needs to be tied at each end. 10) Record the data and see which material allowed the most words to be correctly heard by the listener. 11) Conclude which material is best for transmitting sound waves.

Results
Both the steel wire and nylon string had the same number of words heard correctly. I decided to perform the test again using a tape recorder to say the words so that there would be a more consistent tone of voice. I played the tape 4 times, using a different material each time. In the second test the nylon string had the most words heard correctly.

Conclusions/Discussion
In test two show the nylon string had the most words heard correctly. The steel wire in test two had all of the words heard, but not correctly. The copper wire and aluminum wire didn#t have that many words heard correctly in either test and had a lot of words not heard at all. In many cases, the word that was heard was very close to the correct word and often rhymed with it. I can conclude from this that each material transmitted the sound the same, but may have had problems from the speaker#s manner of speaking. My hypothesis was wrong. The material that did the best was the material that I thought would do the worst, the nylon string. I think that my hypothesis was incorrect because I could not pull the wire taut enough and I could not keep my tone of voice the same or my pronunciation clear enough.

Summary Statement
This experiment tested which wire/string held taut between two tin cans transmitted audible sounds the best .

Help Received
My mom helped me with the layout of the board and she reviewed my reports.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Chelsea L. Ruthrauff

Project Number
J1223

Project Title
Ice and Sawdust as Insulation?

Abstract

Objectives/Goals
My experiment is to determine if sawdust, mixed with water, and froze; act's as a better insulator than regular ice. My hypothesis is that the combined mixture will act as an insulator and create a barrier against the outside air. Wood is a natural insulator in other environmental applications and I believe that if a barrier is created the core temperature will be maintained for a longer period of time.

Methods/Materials
Two identical 1 gallon plastic milk cartons, cut in half, are filled with the same portions of water. In one of the water filled milk cartons 1000ml. of sawdust is added to the container. Each holds a smaller (500ml.) container, filled with 200ml of water in the middle of the carton. This creates a capsule of air within the water to be frozen. Therefore, an area is formed to take the temperature with two identical digital thermometers at thirty minute intervals for eight hours.

Results
The container filled with ice and sawdust, became colder, and lasted longer than the pure, untreated ice.

Conclusions/Discussion
In conclusion, I proved my hypothesis is correct. The sawdust filled container stayed colder. I discovered that inside the sawdust and water ice capsule, I could keep things colder for longer periods of time. Sawdust does insulate ice!

Summary Statement
Combining sawdust with water, and freezing creates a better insulating barrier in an ice capsule.

Help Received
Father helped drill holes in lids of the 500 ml. bottles, and helped cut the milk cartons.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Jared Shahbazian

Project Number
J1224

Project Title
Which Building Material Disrupts a Wireless Connection the Least?

Abstract

Objectives/Goals
The purpose of my project is to discover which commonly used building material will disrupt a wireless internet signal the least. This is important to know if you are downloading a file from the internet and need the top speed.

Methods/Materials
Procedures:
1. Construct boxes made of sheetrock, cement, wood, and cardboard.
2. Lay a wireless b router down and roll out a measuring tape starting at the router and ending at 25 meters.
3. Place the sheetrock box over the router and lay the laptop computer at one meter.
4. Record the percentage of reception that the computer is recieving from the router.
5. Repeat this action at 2 meters and so on until at 25 meters.
6. Repeat steps 2-5 for the cement box, wood box, cardboard box, a metal bucket, and with no material over the router.
7.Repeat steps 2-6 again and average the two results for every meter .

Results
At 25 meters, with the metal bucket over the router, the computer recorded an average of 17%, which was the lowest percentage recorded. The highest percentage recorded at 25 meters was produced by the cardboard box, it recorded an average of 30%.

Conclusions/Discussion
After completing my investigation on the disruption of a wireless connection from building materials, I conclude that cardboard will disrupt your signal the least while metal will disrupt it the most.

Summary Statement
Which commonly used building material will disrupt a wireless connection the least.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Courtney A. Sluder

Project Number
J1225

Project Title
Must There Be Rust?

Abstract

Objectives/Goals
The problem trying to be solved is whether or not antibacterial affects the rust on iron nails. I think the nails with the different amounts of antibacterial will rust slower and less, for in my research I came to find that bacteria could help cause rust. To solve this problem I will place cups of water with antibacterial to see if it rusts less.

Methods/Materials
In my research I also learned all about bacteria, rust, and iron. Rust can form anywhere where there is iron, water, and oxygen. Bacteria can create rust and deteriorate metals. Iron is a very common element that is found all throughout our solar system, from Earth to the stars, and even the sun. Also, rust is found a lot too. It can cause much harm to cars and framing. Luckily these days though there are ways to prevent and get rid of formations of this substance. I tested by placing 50 nails in 50 cups of water, with 4 different groups. There were different concentrations of Dawn soap, antibacterial soap, and rubbing alcohol. I then had 10 people rate a single nail from each group. The results were the nails with antibacterial had much less rust.

Results
Antibacterial does slow the rusting process of iron nails for there was almost none with the antibacterial soap and covered in rust in the plain water. The rating of the nails in antibacterial soap and water were rated a lot lower then those in just plain water.

Conclusions/Discussion
Because rust is caused by bacteria, without it the rust is a lot less.

Summary Statement
My project was to test whether or not antibacterial slows the rust on iron, to prove that bacteria is a cause of rust.

Help Received
Dad got all my materials and helped me set everything up; Ms. Buchanan helped me go in a better direction for my project.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Mary E. Smith

Project Number
J1226

Project Title
Sun Protection on the Courts: A Test of Colors and Materials in Tennis Clothing

Abstract

Objectives/Goals
My objective was to find out if people who play tennis consider their clothing as a means of sun protection. I also wanted to test whether the color and material made a difference in blocking out the sun's harmful ultraviolet rays.

Methods/Materials
I used two methods in this project to determine my objective:
1. survey of individuals who play tennis
2. experiment using solar paper under various colors and materials

Results
From my survey I found that people are concerned about skin cancer, but that they do not choose their tennis clothing based on protecting them from the sun. From my experiment I discovered that the dark blue shirt blocked out the most ultraviolet rays.

Conclusions/Discussion
I am under 21 years old, and I learned that most people my age are not concerned about skin cancer. After researching the disease, I discovered that skin cancer is very serious, and can be life-threatening. Sun protection all the time is very important. I found that putting on sunscreen is not enough. All of us should protect ourselves on the court by choosing sun-protective clothing.

Summary Statement
My project tested the best materials and colors for sun protection.

Help Received
Mother helped purchase supplies and gave suggestions for organizing results.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Ryan B. Stoler

Project Number
J1227

Project Title
Photodegradation of Colored Paper

Abstract

Objectives/Goals
Which light source will cause dyes to fade the most? This information can be used to determine how to display and preserve important documents, historic artifacts, priceless art, and photos.

Methods/Materials
Seven sheets of paper, each with four smaller squares of colored construction paper, were scanned using a computer and scanner. Next, six sheets were exposed for 24 hours to different light sources (incandescent bulb, sunlight, fluorescent tube, LEDs, infrared bulb, and an ultraviolet blacklight). The seventh sheet was not exposed to light. The sheets were scanned again. Two computer programs were used to measure the red, green, and blue (RGB) values of four random spots on each colored square. The differences between RGB values before and after exposure were used to determine which light sources cause the most and least fading.

Results
Sunlight caused the most fading. It had more fading than all other light sources put together. LEDs and fluorescent tubes caused the least fading.

Conclusions/Discussion
If you want to keep precious objects from fading, store them in a place without light. If lights must be used to display them, use LEDs or fluorescent lights. Keep them away from sunlight.

Summary Statement
Light energy affects dyes differently depending on the source, but which light source has the greatest effect?

Help Received
My father helped me set up the equipment and scan the papers. I ran the software and read the RGB values to him while he entered the data for me.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Alec G. Swager

Project Number
J1228

Project Title
Sound Attenuation of Different Wall Materials

Abstract

Objectives/Goals
This experiment tests which wall material will attenuate the most sound. The wall materials tested were brick, wood, and foam. Brick and wood were chosen because they are common wall materials, and foam was chosen to see if it may absorb sound better than a brick or wooden wall

Methods/Materials
The three walls constructed were concrete brick, foam brick and wooden board. The sound source used was an electric piano because it can test different frequencies and the sound is repeatable and consistent (loudness and frequency). A small guitar amplifier was used to amplify the sound and direct it at the walls. Eight different frequencies were tested between 65 to 2093 Hz. The sound level was measured in front and then behind the wall to get the attenuation. Three tests were averaged for each frequency.

Results
The attenuation of sound was not the same for all frequencies. The brick wall, being thicker than the wooden wall and densest of the three walls, attenuated more sound at the majority of frequencies. It attenuated more sound at 165 Hz, 262 Hz, 523 Hz, 1397 Hz, and 2093 Hz. The wooden wall was most attenuating at 65 Hz, and the foam wall was most attenuating at 98 Hz, 784 Hz, and tied the brick wall at 1397 Hz.

Conclusions/Discussion
The sound attenuation by a wall is affected by several different factors. The most important factor is reflection. Sound is reflected better by denser objects. In this experiment the brick wall was the best at attenuating sound because it was the densest wall material tested. Refraction also plays a large roll in the amount of sound attenuated. Some sound will refracted around and over the wall. The higher frequencies are refracted less than the lower frequencies. This may explain why more sound was attenuated at the high frequencies. Last, absorption played a roll in this experiment. The foam wall is best at absorbing sound where sound enters through small holes stay in the wall. The foam wall attenuated more sound than the wood wall. The foam wall being less dense than wooden wall would not reflective as much sound, but attenuated more sound partly because the foam wall was thicker and more absorbent.

Summary Statement
The experiment explores which wall material is best at attenuating sound.

Help Received
Father assisted in playing the tones during the experiment and advised on report, Mrs Carol Turpin (teacher) advised on all stages of the experiment

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Kamei Triebell

Project Number
J1229

Project Title
CSI Forensics: Absorbtion and Extraction of DNA from Various Fabrics

Abstract

Objectives/Goals
I am interested in forensics. I wanted to find out if DNA might be more difficult to recover from certain fabric types, and I also wanted to see how soaking the fabrics in salt water or washing the fabrics with detergent might affect the amount of DNA recovered. This project evaluated the ability to detect and recover blood stains from various fabric types. A set of eight untreated, blood spotted fabric samples were compared to eight untreated, blood spotted fabric samples were compared to eight soaked in salt water or washed in Tide laundry detergent. It was the assumption for all three sets that 100% cotton (white) would yield the most DNA because cotton is a natural fiber and white cotton does not contain dye. The second assumption was that a 100% polyester fabric sample with gold glitter would yield the least DNA for all three sets of fabric samples tested because the glitter would interfere with the blood adhering to the fabric.

Methods/Materials
Fabric samples and control element were processed for blood application and isolation of genomic DNA. The procedure consisted of a sample application method, sample treatment, DNA recovery, DNA purification, and a DNA quantitation assay.

Results
The water submerged set resulted in almost no DNA recovery from each fabric. In the Tide detergent set, of the eight fabrics tested, the 100% cotton with a light print yielded the most DNA with approximately 249 ng recovered, while the 100% polyester with gold glitter recovered less than 1 ng of DNA. In the untreated set, the 100% cotton denim and dry 100% cotton light print recovered the least DNA and retained only approximately 86 ng and 121 ng of DNA respectively.

Conclusions/Discussion
The results indicated the amount of DNA recovered from the fabric varied according to the condition. For example, when the fabrics were dry, the polyester gold glitter sample allowed for the most DNA recovery. When the gold glitter sample was washed, it yielded the least amount of DNA. The light weight cotton print sample retained the most DNA when washed, but only recovered a moderate amount, compared to other fabrics when dry.

Summary Statement
This project compared recovery of DNA from a variety of bloodstained fabrics under conditions of dry, salt water-soaked, or machine washed, and found that recovery varied dramatically within the same fabric.

Help Received
Father helped type report; Used lab equipment at GenVault Corp. under the supervision of Mrs. Roxanne Hunker

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Drew A. Vecchio

Project Number
J1230

Project Title
Suppressing Metal Alloy Melting Temperatures: Does Size Matter?

Abstract

Objectives/Goals
The first goal of the experiment is to find the lowest melting temperature of a eutectic Pb-Sn alloy. By adding a small amount of a third element to the Pb-Sn eutectic melt, the experimenter could achieve the second goal to determine which addition suppressed the Pb-Sn eutectic temperature. Comparison of the atomic size ratios between these third element additions with Pb and Sn allowed their affect on the melting temperatures to be determined.

Methods/Materials
Materials used are: lead, tin, indium, silver, antimony, gallium, a hotplate, thermocouple, temperature measurement display, crucibles, a scale, and insulation. All elements are weighed, the required ratios placed in a crucible and melted on the hot plate. The temperature of the melt was measured as it cooled.

Results
The eutectic composition was determined to be ~62wt%Sn ~38wt%Pb, and the eutectic temperature found to be 183ºC. The eutectic alloy with indium added froze at 179º for 1wt% and 173ºC for 5wt% alloy additions, with silver added it froze at 179ºC for both addition amounts, with antimony added it froze at 184º for 1wt% and 187ºC for 5wt% additions, with gallium added it froze at 174º for 1wt% and 163ºC for 5wt% additions.

Conclusions/Discussion
The addition of gallium decreased the eutectic temperature from 183ºC to 163ºC, the greatest decrease among the alloy additions investigated. The elements whose atomic size is similar to lead and tin (silver, antimony) had very little affect of suppressing the eutectic melting temperature. Elements whose atomic size differed significantly from Pb-Sn had the greatest effect (indium, gallium).

Summary Statement
It was possible to determine the eutectic Pb-Sn composition and temperature using the cooling curves of the Pb-Sn melts.

Help Received
Father provided materials and supervision. Brothers and other family members gave small contributions.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Matt A. West

Project Number
J1231

Project Title
Lead-Free Solders: Are They All that They Are Cracked Up to Be?

Abstract

Objectives/Goals
There has been a push to make more environmentally safe products, such as solder. It is unknown if non-lead based solders have better or worse mechanical properties in comparison to lead based solders. This experiment asked the question: How will different solder alloys be affected by different temperatures as measured in relative fracture toughness?

Methods/Materials
A way to test the fracture toughness is to build an Izod Impact Tester that breaks the sample with a swinging hammer. Fracture toughness is inversely proportional to the distance the hammer travels past the breaking point.
Test specimens made of four different alloys were cast using a mold in the shape of a pawn. Then the impact tester was built by attaching a hammer on a hinge, then attaching a variable resistor to measure the distance the hammer traveled. The test specimens were tested at room, freezer, ice bath, and dry ice bath temperature.

Results
The alloy that had the best relative fracture toughness was the lead-free alloy: 96.5%Sn 3.5%Ag. The 50%Pb 50%Sn lead solder alloy was third best, and the 95.5%Sn 3.45%Cu 1%Sb 0.05%Ag was the worst performer. The 50%Pb 50%Sn lead solder had increasing measurement variance as the temperature went down. The results did not support the hypothesis. The alloys with higher percentages of tin had higher fracture toughness.

Conclusions/Discussion
My hypothesis stated that the solders with higher percentages of tin would be more brittle, based on the fact that tin is a comparatively brittle metal at temperatures below 13 C. The hypothesis was incorrect. Based on data, the higher percentages of tin alloys were actually among the toughest compositions. The 95.5%Sn 3.45%Cu 1%Sb 0.05%Ag, and 50% Pb 50% Sn solder were the ones who had the poorest fracture toughness. In summary, I found that some solders are better than the common lead based solder, and those should be introduced into the market.

Summary Statement
This experiment asked the question: How will different non-lead based solder alloys be affected by different temperatures as measured in relative fracture toughness?

Help Received
I received help from my dad in the part that he thought of the idea for the variable resistor to measure the distance the hammer traveled.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Teagan K. Zoldoske

Project Number
J1232

Project Title
What Is the Effect of Duct Tape as an Insulation Material?

Abstract

Objectives/Goals
To see if the amount of layers of Duct Tape affect the cooling process of water from 93°C to room temperature, 26°C.

Methods/Materials
You need eight glass jars that hold 24 oz. with lids, at least 128 oz. of water, two rolls of Duct tape, a measuring cup that can hold 16 oz., a microwave, a stopwatch, and a thermometer with a range of 0-100 degrees Celsius. firsth you gather all materials, then you set two of the glass jars aside with no Duct tape, cover two glass jars and there lids with two layers Duct Tape, cover two glass jars and there lids with four layers Duct Tape, and cover two glass jars and there lids with eight layers Duct Tape. Next Heat water to 93°C and pour two cups into each jar. Next attach lids and put the jars in a 26°C room. Finaly check the water temperature every 10 minutes until it goes down to the room temperature.

Results
The control, the non Duct tape covered jars, cooled at an average of about 311 minutes. The 2 layers of Duct tape jars cooled at an average of about 315 minutes.The 4 layers of Duct tape jars cooled at an average of about 325 minutes.The 8 layers of Duct tape jars cooled at an average of about 330 minutes.

Conclusions/Discussion
The layers of duct tape did matter. Two layers of duct tape seemed to keep the jar warmer for about five minutes. Each layer of Duct tape rose the cooling time about 1.3% with two layers, 4.5% with four layers, and 6% with eight layers compared to the control.

Summary Statement
To see if the amount of layers of Duct Tape affect the cooling process of water from 93°C to room temperature, 26°C.

Help Received
father helped with research, teacher helped with display.

CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Samuel Girvin

Project Number
J1299

Project Title
Chocolate Tempering

Abstract

Objectives/Goals
When tempering, what mix of temperatures (recommended-recommended, higher-higher, higher-recommended) creates the highest temper in chocolate?

Methods/Materials
Clear your workspace, clean all of the chocolate molds, fill the bottom pan of the double boiler with water, allow this water to simmer, and place upper pan over lower pan. Place 1 lb. of chocolate in top pan. Checking with the thermometer, bring the chocolates temperature to 120°. Take top pan off and allow chocolate to cool to 75°, starting to stir after the chocolate reaches 105°. Immediately heat chocolate back up to 89°, taking caution not to heat the chocolate beyond. Maintain 89°. Using the syringe, pour 12 ccs of chocolate into each of three molds. Repeat steps using the rest of the chocolate unpoured plus another ½ lb, 125° instead of 120° and 94° instead of 89°. This is temperature set higher-higher. Repeat steps again using another ½ lb. of chocolate, 125° instead of 120°, and keeping 89° (higher-recommended), and then remelt the chocolate and pour 12 ccs into three cups (control). Test properties.
Two lbs. Semisweet Chocolate, Double Boiler, Water, Digital Thermometer, Stove, 12 Identical Molds, 12 cc Syringe, Metric Scale, Sheen Chart, Clamp

Results
The Recommended-Recommended combination provided the highest temper in all categories, followed by Higher-Recommended, which had the second-highest temper. Higher-Higher had the third-best temper in most categories, but in snapping strength the Control Group had better results. The Control Group had the worst temper except in strength.

Conclusions/Discussion
My hypothesis was wrong. The average recommended-recommended actually had the highest values in all test areas, instead of the higher-recommended that I had predicted. Higher-recommended came in second, but was lower than recommended-recommended in all categories. This surprised me in that I expected it to be first, or at least very close to it. The temperature difference between higher-recommended and recommended-recommended should only have served to more thoroughly melt the fat crystals in the higher-recommended chocolate, according to my research. This suggests to me that there is another property that melting at temperatures higher than 120° causes that creates unstable crystals. Higher-higher did have the worst temper of the three. All three had better tempers than the control, which was melted and cooled.

Summary Statement
My project is about tempering chocolate to manipulate its properties, showing whether or not my instructions are optimized

Help Received
Mother helped hold instruments; Father provided books and raw materials