



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Nicole S. Avant	Project Number J1101
Project Title Absorbency: Do Dyes Matter?	
Abstract Objectives/Goals The goal is to determine if dyed table napkins are less absorbent than undyed ones. Methods/Materials All napkins are the same brand and size with the only difference being the color of the dye. Eight colors compared to white. One # 100 ml graduated cylinder; One # 9x13 glass pan; One # plastic funnel; One # timer; One # tong or tweezers. Napkins are placed in glass pan, 100ml of water poured over it, one minute to soak, one minute held above pan to drip, then napkin discarded. Water remaining in pan poured back into graduated cylinder and measured. Repeated 5 times for each color. The amount of remaining water was averaged. Results The results show that there is very little difference with the absorbency of dyed versus undyed napkins. The white paper napkin was the positive control and according to the hypothesis, it should have absorbed the most water. The black paper napkin was the negative control and it should have absorbed the least water. Both controls absorbed about the same. All colors absorbed about the same with a small difference with the orange napkin. Conclusions/Discussion The hypothesis for this experiment, dyed napkins will absorb less water, is not true. The process to dye a paper napkin does not interfere with the water retention. The key to absorbency is the cellulose fiber and the amount of embossing, or air pockets, created in the design. This experiment could have been improved by using a sample that is unbleached to see if it absorbs more water. As a concern, dyed napkins can not be used in compost piles at home.	
Summary Statement The absorbency of various colors of table napkins was tested and compared to see if the color made a difference.	
Help Received My sister, Michelle, helped with the photography. I borrowed the graduated cylinder from Morgan Winery.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Karine Babayan	Project Number J1102
Project Title Soaps	
Abstract Objectives/Goals The purpose of this experiment was to test different types of homemade soaps and a brand name soap for their different characteristics, such as forming bubbles, moisturizing ability, cleaning ability, scent, and color. Methods/Materials Once all four of the soaps were ready, they were tested on a random group of students. 100 students were surveyed, ranging between grades 6-12. Volunteers were asked to apply dirt to their hands. They were then each given a sample of soap. After washing their hands with the soap they were given a survey to fill out. MATERIALS Lye (Sodium Hydroxide), Distilled Water, Shea Butter, Coconut Oil, Jojoba Oil, Sweet Almond Oil, Avocado Oil, Castor Oil, Vitamin E Oil, Aloe Vera Gel, Olive Oil Essential Oils (fragrances), Food Coloring; Beaker, Bunsen Burner, Ring Stand, Scale, Thermometer, Stirring Stick, Stick Blender, Goggles, Latex Gloves. Results The results based on the survey showed that the soap that created the most bubbles was the peach-tangerine soap. The best moisturizer was also the peach-tangerine soap, and for getting rid of dirt the lavender AND peach-tangerine soaps tied. For hands feeling clean the avocado soap came out to be the best. The most fragrant soap turned out to be the "Irish Spring" soap, and the best colored soap was the baby soap. Overall, the most liked soap was the avocado soap. Conclusions/Discussion In the soap survey that was made for the students to take, there were many noticeable variations. A. All the soaps ranked pretty high in cleaning ability. This is because all the soaps that were tested (store bought and handmade) had extremely effective cleansing ingredients. The handmade soaps all had different fats that were very good for skin and hands, and the Irish Spring brand name soap has many lab approved substances which aren't available in stores. B. All the soaps ranked low on bubble formation. This, however, was not surprising because hand soaps aren't known for making bubbles. C. It was definitely obvious that the Peach-Tangerine Soap would rank high on moisturizing, because it has olive oil in it. According to an article olive oil, palm kernel oil, and hydrogenated soybean oil are the best moisturizers for the skin.	
Summary Statement In this experiment different soaps were made by HAND, and their characteristics were compared by using a survey of 100 students.	
Help Received Ms. Azadian supervised my project, and my parents helped me make the display board.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Shelby L. Constance	Project Number J1103
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Project Title
Determining if the Application of Scotch-gard and RIT Sun Guard Can Increase a Fabric's Ability to Block UVR: Year Two

Abstract

Objectives/Goals
My objective was to determine if the application of Scotch-gard (fabric protector) and RIT Sun Guard (laundry additive) can increase the ability of a fabric to block ultraviolet radiation. The fabrics I used were the 3 that proved the least effective at blocking UVR when treated with an SPF30 sun screen from my year one study. I hypothesized that the combination treatment of RIT Sun Guard & Scotch-gard would provide the best UV blocking potential to fabric.

Methods/Materials
Fabrics tested were: 1) 100% cotton, (natural fiber); 2) 50% polyester/50% rayon, (man-made fiber); 3) 55% linen/45% rayon, (blend). Each test trial will require 16 -150mL. test tubes (TT). For each of the 3 fabrics tested each test trail will have a sample treated with: 1) RIT Sun Guard, 2) Scotch-gard, 3) RIT Sun Guard & Scotch-gard, 4) SPF30 sun screen, and 5) Untreated fabric. TTs were tightly wrapped with fabric samples and filled with 15mL. of white grape juice. One TT was left unwrapped for my control. Then .10cc of active yeast solution was placed into each TT with a tuberculin syringe and cotton stoppers inserted into tops. TTs were then exposed for 1 hour in UV chamber. After exposure TTs were mixed, placed into a spectrometer to record % light transmission against the control. Test results were recorded and averaged on five trials.

Results
My hypothesis for the combination treatment of RIT Sun Guard & Scotch-gard was that it would outperform all other treatments. This was only true for the 100% cotton, natural fiber fabric. RIT Sun Guard alone outperformed the combination treatment on both the 50% polyester/50% rayon, man-made fiber fabric and the 55% linen/45% rayon, natural & man-made fiber blend fabric. The fabric and treatment which tested to have the worst UV blocking potential was the 100% cotton, natural fiber fabric treated with the SPF30 sun screen.

Conclusions/Discussion
In conclusion I have learned from my investigation this year and last year that the laundry additive, RIT Sun Guard will increase a fabric's ability to block UVR at a greater rate than the application of an SPF30 sun screen, and that the application of Scotch-gard fabric protector can help increase UV blocking when combined with RIT Sun Guard on a natural fiber fabric.

Summary Statement
My project was done because I want to find a way to safely and economically treat fabric to increase its UVR blocking potential.

Help Received
My mother took pictures and helped with proofreading and the layout of my board. My father helped by turning an old toy box into a UV radiation chamber. Mr. Nathan Wittington (H.S. Biology Teacher) allowed me to borrow a test tube mixer and spectrometer.



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Alicia M. Copeland	Project Number J1104
Project Title Which Saddle Pad, Supracor or Equipedic, Will Dissipate the Most Heat from a Horse's Back?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Since the dissipation of heat is a prime factor in the metabolic health and recovery of an endurance horse, the objective of this project is to determine which saddle pad will have the greatest effect on the reduction of heat retention on a horse's back while undergoing a strenuous workout.</p> <p>Methods/Materials The normal back temperature of each horse was recorded before they were tested. Then they were taken one-by-one out to a field with four-inch deep sand and tested. The horses' testing consisted of riding them with each different saddle pad at seven miles an hour for two miles in the deep sand with their back temperature being recorded every half mile. Five middle-aged horses were tested with two saddle pads and a control (no pad) three times each. The two saddle pads were the Equipedic and the Supracor. To measure the temperature, an under-saddle thermometer was used. A Global Positioning System was used for keeping track of the speed and for assistance in keeping track of the miles traveled.</p> <p>Results When the horses were performing without a saddle pad, the average temperature increases for each horse were 5.87 degrees, 6.46 degrees, and 7.8 degrees with an average of 6.71 degrees. When the horses were performing with the Equipedic Saddle Pad, the average temperature increases for each horse were 5.33 degrees, 8.86 degrees, 8.53 degrees with an average of 7.57 degrees. When the horses performed with the Supracor Saddle Pad, the average temperature increases for each horse were 5.53 degrees, 5.33 degrees, and 7.93 degrees with an average of 6.26 degrees.</p> <p>Conclusions/Discussion The hypothesis stated earlier was incorrect. If a horse trots two miles in deep sand at seven miles per hour then the temperature under the Equipedic Saddle Pad will increase an average of five degrees less than when the same procedures are followed with a Supracor Saddle Pad. This is incorrect. The temperature under the Supracor Saddle Pad will increase at an average of 1.31 degrees less than the average increase under the Equipedic Saddle Pad. Even when a horse doesn't have on a saddle pad, the average increase is greater than with the Supracor Saddle Pad. Therefore, the Supracor Saddle Pad is the preferred saddle pad for endurance riders, as well as the competitive sport horse.</p>	
Summary Statement The intent of this project was to determine which saddle pad dissipated the most heat from a horse's back while undergoing intense physical conditioning	
Help Received My mother helped me saddle the horses, take care of the horses, take temperatures, and was interviewed for information regarding endurance riding. I interviewed my father for information regarding what effects temperature has on a horse. Richard Sacks sent me a cross section for my display. Information was	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Matthew P. Crockett	Project Number J1105
Project Title How Can Weight and Stress Strengthen or Weaken Standard Fishing Line and How Long It Takes to Break?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My goal was to determine if the five top-selling brands of 10 lb. test fishing line were all the same strength. I hypothesized that each brand would vary in strength based four weight tests- static, knotted, shock, and abrasion.</p> <p>Methods/Materials The following materials were used for this experiment: 1) Pens & pencils; 2) Colored markers; 3) Five brands of 10 lb. fishing line; 4) 16 oz. plastic cup; 5) 15 gal. bucket; 6) 60 lbs. of sand; 7) Light grit sandpaper; 8) Roll of duct tape; 9) Fishing knot book; 10) Line-tie platform; and 11) Books on various fishing knots, & how they are tied.</p> <p>Five top-selling brands of 10 lb. test fishing line were tested: 1) Yozuri Hybrid; 2) Stren; 3) P-Line; 4) Maxima; and 5) Fireline. Each brand of line was tested using four tests: 1) Static tensile strength; 2) Knotted static tensile strength; 3) Shock strength; and 4) Abrasion static tensile strength.</p> <p>Results My experiment yielded the following results: Only three of the 10 lb. fishing lines tested, met or exceeded the manufacturer's static tensile strength. All five brands varied in strength based on the test-type performed. In step one (static tensile strength); Fireline was the strongest line testing at 273 oz. The weakest line was P-Line at 97 oz. In step two (knotted tensile strength); Maxima brand line was the strongest line testing at 168 oz. The weakest line was P-Line at 57 oz. In step three (abrasion resistance), Yozuri Hybrid brand line was the strongest line testing at 30 seconds. The weakest line was Fireline at 4 seconds. In step four (shock strength), all five brands tested equal at 1 drop each. Overall, Yozuri Hybrid and Maxima brand lines rated highest in overall strength. P-Line tested the weakest.</p> <p>Conclusions/Discussion This data demonstrated that fishing line is not the same strength. Weight, knots, abrasion & shock affect the strength of all fishing lines & tested differently.</p> <p>Further discussion in this area of study might include the following: 1) Provide test results to the manufacturers & obtain their test procedure, data collection & analysis. 2) Conduct multiple trials of this experiment to determine variations & averages. 3) Conduct trials of other test weights from the same manufacturers, using the same procedures to determine variances or consistency by brand. 4) Determine other test procedure methodologies currently in use through literature research & manufacturer reports.</p>	
Summary Statement My project is about whether five top-selling brands of 10 lb. test fishing line are of equal strength based on four tests.	
Help Received My parents, Chris Crockett, who helped me set-up & run the experiment. Cathy Crockett for proofreading & helping me with my display board. I also wish to thank Adam McAndrews at Coyote Bait & Tackle in San Jose, Ca. for donating the fishing line used in my experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Emily M. Denker	Project Number J1106
Project Title Can Various Laundry Detergent Additives Affect the Flammability of Fire Resistant Fabric?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine if washing fire resistant fabric, such as children's sleepwear, with different laundry detergent additives, such as fabric softener or dryer sheets, could affect the flammability of the fabric. It was hypothesized that the children's sleepwear washed with the combination of Tide unscented liquid detergent, Downy liquid fabric softener, and Bounce dryer sheets would have the highest flammability, or burn rate.</p> <p>Methods/Materials Five identical children's sleepwear outfits were used to test the burn rate. One garment was not washed at all and was immediately cut up into fifty 1x3 inch strips. These strips were then individually burned and timed to calculate the ignition time. Another garment was washed with Tide detergent, then cut up into fifty 1x3 inch strips, burned and then timed for ignition after 3 washings, 7 washings, and 10 washings. These steps were repeated with the sleepwear washed with Downy fabric softener, the sleepwear washed with Bounce dryer sheets, and the sleepwear washed with the combination of Tide detergent, Downy fabric softener, and Bounce dryer sheets.</p> <p>Results The sleepwear washed with the Downy fabric softener and the sleepwear washed with the Bounce dryer sheets both ignited the quickest overall at about 5 to 6 seconds. The sleepwear that was washed with the Tide detergent ignited the slowest on average, at about 9 seconds. The sleepwear that was not washed at all, which was the control, ignited at approximately 2 seconds.</p> <p>Conclusions/Discussion The results did not support the hypothesis in this particular experiment. The sleepwear was found to be more flammable when washed with additives individually. This information directly relates to the subject of burns suffered by a child because of the clothing that they were wearing at the time of a fire. Washing a child's sleepwear with fabric softener or dryer sheets could in fact increase the child's chances of more serious burns or death if the sleepwear is exposed to flame.</p>	
Summary Statement The affect of laundry detergent additives on the flammability of fire resistant fabric.	
Help Received Parents supervised the burning of the fabric strips.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Delaine A. Downie	Project Number J1107
Project Title Gel Capsule Solubility	
Objectives/Goals My objective was to find the average breakage rates of five different brands of common over-the-counter cold and cough liquid gelatin capsules. My hypothesis stated that I expected the brand Sudafed to have the fastest breakage rates. This project will benefit consumers because now they can get faster relief from their colds without relying on advertising claims.	
Abstract My project contained 500 gel capsules, 100 per brand. I conducted 20 tests, each with 5 capsules from each of the 5 brands. To simulate gastric juice I diluted Muratic acid 60 part water to one part acid. This formula makes the diluted acid roughly the pH of gastric juice. I used five glass baby food jars, each containing the same amount of diluted Muratic acid and one gel capsule, and I set a heater before the experiment to raise the temperature to about 72-75 degrees Fahrenheit because it was about 50 degrees Fahrenheit outside when I conducted my experiment. Finally, the data was recorded by waiting until the first and second capsule had burst. If it was a long time between the first and second capsule's breakage, then the first capsule most likely had a faulty casing. After all tests were completed, the data was averaged and made into graphs.	
Methods/Materials My project contained 500 gel capsules, 100 per brand. I conducted 20 tests, each with 5 capsules from each of the 5 brands. To simulate gastric juice I diluted Muratic acid 60 part water to one part acid. This formula makes the diluted acid roughly the pH of gastric juice. I used five glass baby food jars, each containing the same amount of diluted Muratic acid and one gel capsule, and I set a heater before the experiment to raise the temperature to about 72-75 degrees Fahrenheit because it was about 50 degrees Fahrenheit outside when I conducted my experiment. Finally, the data was recorded by waiting until the first and second capsule had burst. If it was a long time between the first and second capsule's breakage, then the first capsule most likely had a faulty casing. After all tests were completed, the data was averaged and made into graphs.	
Results The results disproved the experimenter's hypothesis. It was not Sudafed that had the fastest rate, but Sav-on, which changed its name to Equaline during the experiment. Sudafed actually had the second fastest rate. The brand that took the longest on average was Wal-Phed.	
Conclusions/Discussion I believe that the results turned out the way they did because of the varying thickness and hardness of the gelatin casing on the different brands of capsules. I found that the Equaline brand had a much softer casing than the Wal-phed brand.	
Summary Statement This Experiment is about testing and comparing the average solubility rates of the gelatin casing of five brands of over- the-counter cold and cough liquid gel capsule medication.	
Help Received Mother helped find resources for Review of Literature; Father poured and diluted Muratic acid and provided some of the materials for project.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Lisa G. Hartley	Project Number J1108
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Project Title
Hidden Hazard During the Holidays

Abstract

Objectives/Goals
The question I'm trying to answer is how flammable these five species of trees are if people fail to water their Christmas tree during the holidays. The conclusions I reach will help people to realize the dangers of having a dry Christmas tree in their home.

Methods/Materials
I used the following materials: 1. Leylandii Cypress Tree; 2. Douglas Fir Tree; 3. Noble Fir Tree; 4. Mondell Pine Tree; 5. Italian Stone Pine Tree; 6. Masking Tape; 7. Ruler; 8. Water; 9. Tree Clippers; 10. Measuring Cup; 11. Plastic Ties; 12. Temperature Gauge; 13. Carbon Monoxide Monitor (Gastec GT 402); 14. Scale; 15. Watch; 16. Timer; 17. Sharpie Pen; 18. Five 5 Gallon Buckets; 19. Measuring Tape; 20. Cameras; 21. Paper; 22. Indoor/Outdoor Thermometer; 23. Notebook; 24. Matches; 25. Fireplace; 26. Pen; 27. Candle.

Results
Ranked average outcome in carbon monoxide level.
TREES AVERAGE CO LEVEL
ITALIAN STONE PINE 229 PPM
MONDELL PINE 177 PPM
DOUGLAS FIR 176 PPM
NOBLE FIR 137 PPM
LEYLANDII CYPRESS 131 PPM
Ranked average outcome in temperature.
TREES AVERAGE TEMPERATURE
ITALIAN STONE PINE 582.4°F
DOUGLAS FIR 530°F
NOBLE FIR 460°F
MONDELL PINE 417.5°F
LEYLANDII CYPRESS 414°F
Ranked average outcome in time.
TREES AVERAGE TIME
MONDELL PINE 46 SECONDS
LEYLADNII CYPRESS 39 SECONDS
ITALIAN STONE PINE 37 SECONDS

Summary Statement
My experiment is to test the flammability of different species of trees in various stages of dryness. The question that I am trying to answer is how flammable these five different species of trees are if people fail to water their trees.

Help Received
My parents hepled me buy the trees, provided the transportation to bring the trees home, building to stand to hold the trees, cutting off the branches, burning the trees in the fire place, taking pictures of the burning branches, measuring Carbon Monoxide and Temperature levels. My computer teacher showed me how to



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Conor P. Hawblitzel	Project Number J1109
Project Title Impact of Roofing Materials on an Interior Fire	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to determine if the type of roofing material used had any impact on the temperature of the roof or the rate of destruction on a structure when a fire was started in the interior of that structure. Three different roofing materials, fiberglass composite shingles, treated red cedar shingles and cement tile shingles were tested.</p> <p>Methods/Materials Thirty two plywood structures were built for this experiment. Four different groups of houses, a control group with no roofing material and three separate experimental groups, each with a different roofing material, were burned to complete destruction. Each of the houses was ignited using a 2.96 centiliter plastic cup of gasoline and a 30 cm by 2.4 cm paper wick. The temperature of the center of the roof on each structure was measure at time intervals using a non-contact thermometer. Additionally, the rate of destruction was timed on each of the structures.</p> <p>Results The analysis from the data from these experiments show that type of roofing material used impacts both the temperature of the fire and the rate of destruction on and interior fire. Composite tile structures burned with the lowest temperatures and the longest time to completely destroy the structure .Wood shingle structures burned with the fastest rate of increase in temperature and the fastest rate of destruction to the structure. Both wood shingles and composite shingles burned. Cement tile structures were completely destroyed the fastest, due to the weight of the tile, however cement tiles do not burn. In this experiment, Shake Shingles are the worst type of roofing materials in the case of an interior fire. Composite shingles were the best type of roofing materials for an interior fire. Cement tile, although they did not burn, increased the rate of destruction due to their weight and contributed to the destruction of the structure faster than those with Composite Shingles.</p> <p>Conclusions/Discussion In this experiment, Shake Shingles were the worst type of roofing materials in the case of an interior fire. Composite shingles were the best type of roofing materials for an interior fire. Cement tile, although they did not burn, increased the rate of destruction due to their weight and contributed to the destruction of the structure faster than those with Composite Shingles.</p>	
Summary Statement The purpose of this experiment was to find out if there was a difference of burn rate and destruction when the fire starts inside the house.	
Help Received Parents supervised cutting of materials and burning of test houses, proof read paper and helped with typing.	



CALIFORNIA STATE SCIENCE FAIR 2005 PROJECT SUMMARY

Name(s) Victoria B. Hilley	Project Number J1110
Project Title The Crunch Munchers vs. The Mush Mashers	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to investigate which cereal really stayed crispy longer. I became interested in this project when I often observed how quickly my cereal turned soggy. I realized how important it is for crunch munchers as well as mush mashers to know which cereal will get soggy the quickest. As I was viewing cereal commercials, I wondered how true their claims were that their cereal stays crunchy in milk. This experiment involved taking different brands of cereal and soaking their pieces in three types of milk.</p> <p>Methods/Materials Before you start soaking cereal, you need to build a simple testing stand. A testing stand will be built using six ice-pop sticks, white glue, and foam-core board (available at office supply stores). The basic procedure is to soak different types of cereal in different types of milk, using tweezers to put the cereal bits one by one over the bottom hole of the testing stand, and using a stopwatch to time how long it takes a stick (like a pencil with a round tip) to push its way through each wet cereal bit.</p> <p>Results The results confirmed my hypothesis: the thickness of the cereal, the amount of sugarcoating and the type of milk created differences in the time cereal takes to get soggy. The round puffed cereals took the longest to get soggy due to their thickness, and various types of coatings used to keep them crunchy. The sugarcoated cereals did stay a little crispier longer than their counterparts within the same categories. My testing also confirmed that whole milk and 2% milk did keep the cereals crispier longer than the non-fat milk. The results show that the fat provides an additional barrier between the cereal piece and the water in the milk.</p> <p>Conclusions/Discussion In conclusion, how long cereals remain crispy depends on the thickness of the cereal bit, amount of sugarcoating, and the fat content found in milk. I tried to find more information on fat versus milk, since the two components are not soluble in one another unless they are emulsified. It would make sense that the overall crispiness times of the cereals would be shorter in the non-fat milk, since it is like water. As you would see the coating in the inside of a glass from drinking 2% or whole milk, that same affect could also coat onto the cereal pieces, helping the cereal to remain crispy a little longer. So for now, if it is crunch you are after, the trick is thick and no fat free milk.</p>	
Summary Statement My project is about determining which cereals stayed crispy the longest using three different types of milk.	
Help Received Mom helped type report; Dad went to grocery store; Dr. Dunn proofreading report and provided direction.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Alex Hunter; Chas Rowland; Vincent Xiong	Project Number J1111
Project Title Can Homeland Security Benefit from the Use of Heat and Light Sensitive Inks?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of our project was to determine if Homeland Security could benefit from the use of heat and light sensitive inks.</p> <p>Methods/Materials We conducted research to find inks that could be used to enhance security. Three types of ink were studied for our project: ultraviolet (UV) sensitive inks, thermochromic inks, and photochromic inks. We tested: # the visibility of a UV ink under different lighting conditions using a photo light meter. # the temperature range needed to change the color of our thermochromic ink. # what types of light activated our photochromic ink. We each made a security badges using these inks and a duplicate badge made with non-activating inks. We surveyed 30 people to see if they could recognize any differences between the two different badges under indoor lighting, handling (heat), outdoor lighting (UV), and using black light. We conducted research to determine if these inks are already being used in National Security. Experts in the field were interviewed to determine current security uses of these inks. These experts included: an FBI agent, a California Highway Patrol officer, and personnel from State Airport Security and the California DMV. Questions were also asked of the U.S. Government: Office of Homeland Security, State Department, and Treasury Department.</p> <p>Results The thermochromic ink can be activated with body heat. Our photochromic ink can be activated with UV and black lighting. UV sensitive inks become visible only under black light. Out of thirty people surveyed, 80% recognized the activated thermochromic ink, 97% recognized the activated photochromic ink, and 100% recognized the activated UV ink. Our research indicated there is only limited security uses of these inks already in place. Only UV ink is being used by businesses and the U.S. government in the making of credit cards, currency, and driver's licenses. Based on our research, Homeland Security is currently not using any of the ink technologies we have tested.</p> <p>Conclusions/Discussion Thermochromic, photochromic, and UV sensitive inks have properties that make the ink easily identifiable upon activation, yet could be difficult to duplicate by counterfeiters. It is our recommendation that Homeland Security should use thermochromic, photochromic, and UV sensitive inks in furthering the security of our nation.</p>	
Summary Statement We researched and tested thermochromic ink, photochromic ink, and ultraviolet (UV) sensitive ink to see if they could be used by the Office of Homeland Security to enhance our nation's security measures.	
Help Received Parents helped with typing, project board assembly, and transportation. Advisor helped with experimental design, accumulating materials, supervision and safety, providing science classroom resources, and research materials.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Brandon R. Johansen	Project Number J1112
Project Title The Flame Game: Which Kind of Wood Burns Faster?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project was to answer the question: Which kind of wood burns faster? My hypothesis was that Cherry wood would burn faster because it seemed softer than the others.</p> <p>Methods/Materials To answer my topic question, I first obtained branches from nine different types of trees (Apricot, Ash, Black Walnut, Cherry, English Walnut, Eucalyptus, Mulberry, Nectarine and Olive) that appeared to be about the same age. I also obtained matches, a stopwatch, a torch, a ruler and some bricks for my testing setup. Branches of similar diameter were cut to the same length and allowed to dry in the sun for two months. Five pieces of each kind of wood were burned by placing the wood across two bricks and placing the torch under the wood. I measured the diameter of each piece of wood, lit the torch, started the stopwatch when the wood started burning and stopped the stopwatch when the wood burned through and broke in half. I recorded the diameter and the time for each piece of wood.</p> <p>Results Since there were two variables for each type of wood (diameter and time to burn), to be able to compare the results I divided the time (in seconds) by the diameter (in inches) to get what I called a "Burn Ratio" of seconds per inch for each trial. The average burn ratio for each wood was compared, and the smaller the burn ratio, the faster the wood burned. The results of my project showed the following burn ratios: Apricot = 381; Ash = 486; Black Walnut = 420; Cherry = 440; English Walnut = 475; Eucalyptus = 435; Mulberry = 227; Nectarine = 304; and Olive = 594.</p> <p>Conclusions/Discussion My conclusions are that: (1) of the woods I tested, Mulberry burned the fastest because it had the smallest burn ratio; (2) Olive burned the slowest; and (3) my data did not support my hypothesis.</p>	
Summary Statement My project is about determining which kind of wood burns fastest between the nine types of wood tested.	
Help Received My Dad helped me obtain materials and helped me analyze the data; My Mom helped with printing.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) C. Maritta Jones	Project Number J1113
Project Title Bacteria! Don't Drink It!	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To see if Brita filters contained coliform bacteria.</p> <p>Methods/Materials Water samples collected in sterile containers from seven sources, including a new Brita filter and an expired Brita filter. Samples were taken to the lab. One Colilert tablet was added to each container and shaken until dissolved. Samples were incubated for 24 hours at 35 degrees Celsius, then placed under an ultraviolet light to see if samples turned blue.</p> <p>Results The new Brita filter was negative for total coliform and negative for E.coli coliform. The expired Brita filter tested positive for total coliform but negative for E.coli coliform. Three of the remaining samples tested negative for both total coliform and E.coli coliform. The last two samples tested positive for total coliform but negative for E.coli coliform.</p> <p>Conclusions/Discussion Water sample from the new Brita filter don't contain coliform bacteria. Water sample from the expired Brita filter contained coliform bacteria and may not be safe to drink.</p>	
Summary Statement Testing Brita filters for coliform bacteria.	
Help Received Used lab equipment at Alpha Analytical Laboratories, Inc. under the supervision of a scientist named Julie. Teacher gathered samples from her spring and her well for me to test.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Kristen J. Jundt	Project Number J1114
Project Title Moisture Migration: What Effects Do Punctured Barriers Have on Moisture Migration?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals For many years people have had problems with mold and various moisture problems beneath floor coverings. I have found that any penetration in vapor barriers will allow water to pass through and possibly cause serious problems. Through my project I wanted to find what effects different penetrations in vapor barriers have on the rate of water vapor migration.</p> <p>Methods/Materials During my project I used buckets filled with three fourths gravel and a plastic Ziploc baggie as the vapor barrier with a penetration in it made by one of various cutting tools. Water would then pass through the barriers and into a container with a calcium chloride test kit, so that I could measure/compare the weight difference from before and after the test.</p> <p>Results Through my project I proved that even a sealed barrier still allows some, but very little water to pass through. A barrier with an unsealed slice or overlap in it would allow a little more water than a sealed barrier to pass through. However, I also found that a barrier with a hole in it was almost useless letting a little less water pass through than the buckets which had no vapor barrier (my control).</p> <p>Conclusions/Discussion My experiment showed me that having any penetration in a vapor barrier could potentially cause serious moisture problems. Because contractors are pushed to meet short deadlines for project completion it is likely that penetrations would be made in vapor barriers during construction. This problem has and can cause problems with mold, mildew, or even the dissolving of flooring glue. Creating sky-high prices for homeowners to repair any of these damages.</p>	
Summary Statement My experiment proved that any unrepaired vapor barrier penetration can cause serious moisture damage to floor coverings.	
Help Received Hugo Kevorkia gave me advice to help further my experiment; Dad helped me perform experiment; Ryan Privett gave me advice for my project; Joel Stokes gave me suggestions for my experiment; the moisture test kit company gave me calcium chloride test kits at a reduced price.	



CALIFORNIA STATE SCIENCE FAIR 2005 PROJECT SUMMARY

Name(s) Jennie R. Kaplan Woodson	Project Number J1115
Project Title What Would Wood Do?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In my experiment I tested five different pieces of wood to see which wood would absorb the least amount of water. I tested Pine, Myrtlewood, Willow, Redwood, and Maple. I did this experiment because we have an outside door that absorbs a lot of water in the winter and I wanted to see what the best wood was to make a new door out of.</p> <p>Methods/Materials In my experiment I used three 3 inch x 3 inch x 1 inch pieces of Pine, Maple, Willow, Redwood, and Myrtlewood, a balance scale, 7 cups of water, rocks to weigh down the wood and 3 pans to hold the wood. I labeled the pieces of wood 1, 2, or 3 to indicate which of the 3 experiments I was doing. Then I weighed all of the pieces of wood to get the beginning weights. I took all the samples and put one piece of each type in each pan. I poured 7 cups of water in each pan; made sure the wood was submerged by putting a rock on top of them and let them sit for 12 hours. After the 12 hours I took the pieces out and weighed them again. I put the samples back in their pans and let them sit for 12 more hours. After 12 more hours I took out the samples and weighed them. I put them back for 24 more hours so they were in the water for a total of 48 hours. Then I weighed them for the last time and got my results.</p> <p>Results I did the experiment three times exactly the same way. In each experiment my results looked about the same. The Pine, Willow, and Redwood were the lighter woods and they absorbed larger amounts of water. The Maple and Myrtlewood were the heavier woods and absorbed less water at a slower rate.</p> <p>Conclusions/Discussion The three Myrtlewood samples followed my hypothesis that the heavier woods would absorb the least amount of water, so I believe that Myrtlewood would be the best wood to use outdoors. The Willow, Redwood, and Maple all soaked up about the same amount of water, but more than the Myrtlewood. The Pine would be the worst to use outdoors because it soaked up a large amount of water in a short amount of time. In the end I noticed that woods with similar beginning weights soaked up different amounts of water. Weight may not be the only factor involved in absorption. I believe that the water went into the air pockets in the wood. Each wood has a different structure, so the air pocket spaces are unique to each type of wood.</p>	
Summary Statement My project was about how much water Pine, Myrtlewood, Willow, Redwood and Maple samples would absorb in different time periods.	
Help Received My dad and Eric Almquist of Almquist Lumber Company provided the wood; my teacher Andy Slavin provided the scale; my mom helped me with making the graphs of my data in Microsoft excel.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Hannah R. Katkov	Project Number J1116
Project Title Does Price Equal Quality of One-Time-Use Cameras?	
Abstract Objectives/Goals The objective of the experiment was to determine if there is a difference in one-time use (disposable) cameras, and does the quality of the photographs produced correspond with a price difference in the cameras? Methods/Materials Twelve disposable cameras (six different types and two of each type), were used in this experiment. Each camera took six photographs of six #poses#. Two of the poses were taken outside. Four were of still life objects taken inside, with and without flash. A black sheet was used to cover a wall and shelf. Still life objects, consisting of primary and secondary colors and flesh tones, were arranged upon the black sheet. Each camera took two pictures of the still life objects. One photograph with flash and one photograph without flash. The black sheet was then removed and a white wall and white shelf was used for the still life arrangement. The process that was used for the black sheet was repeated. The other two photographs taken were one of an outdoor landscape scene in consistent light and the other of the experimenter outdoors in consistent light. Two photographs were taken, both without flash. The photographs were then developed without color correction, and compared for four photograph quality aspects. Results All of the cameras produced good quality photographs, but the Kodak High Definition camera (at \$10.99), produced more defined images, the most accurate color reproduction, and the clearest images. The Longs Advantage 35 Daylight disposable camera at \$5.99 produced the least accurate color reproduction, and the least defined images. This camera did not include a flash feature. Conclusions/Discussion The results showed a correlation of photograph quality to purchase price of the one-time use camera. The most expensive disposable camera at \$10.99 produced the highest quality photographs. The most inexpensive camera (\$4.99) produced the second lowest quality photographs.	
Summary Statement This project examines whether or not the price of one-time-use cameras correlates with the quality of the photographs taken by the cameras.	
Help Received Mother helped take photographs.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Carson B. Keller	Project Number J1117
Project Title Wood Shingles vs. Composition Shingles: A Comparative Analysis of Ignition Rates	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective is to see whether class B, class C, and untreated wood shingles will ignite faster than 50 year, 40 year, and 30 year composition shingles, when using a magnifying glass.</p> <p>Methods/Materials I started out my project by gathering my wood shingles, composition shingles, and magnifying glasses. The next thing I did was put together my experimental platform. To do this I had to measure, cut, and screw the wood together to create my platform. My platform was built to hold my magnifying glasses. After all of my materials were collected and my platform was finished I could finally start my experiment. In my experiment I set up one wood and one composition shingle against a brick and used my platform to position the magnifying glasses, while blocking the sun. I then let the sun go through the magnifying glasses and started my timer. After each ignition I recorded the times, repeated to get a total of 10 trials for each shingle and repeated with the rest of the shingles.</p> <p>Results As a result of my experimentation I discovered that wood shingles would ignite faster than the composition shingles. I found that of every shingle I tested, the wood shingles always ignited faster. The total average for the wood shingles was 5.64 seconds until ignition. The total average for the composition shingles was 12.85 seconds until ignition. The average wood shingles will ignite 43.9% faster than the average composition shingles.</p> <p>Conclusions/Discussion As I predicted in my hypothesis, the wood shingles ignited faster than composition shingles, when using a magnifying glass. The wood shingles would smoke and then ignite with a flame right away. The composition shingles would start to bubble and then catch on fire, but not as fast as the wood shingles. This data suggest that the best shingle to have is class A shingles; they are effective against severe fire when exposed. The second best is class B; they are effective against moderate fire when exposed. The third best would have to be class C shingles; they are effective against light fire when exposed. The last and worst rating to have is untreated roof shingles; they provide no fire protection when exposed. This information is important for consumers to determine what shingles are the most fire retardant and safest to use on their homes.</p>	
Summary Statement My project was about testing and comparing the ignition rates of composition shingles and wood shingles, when using a magnifying glass.	
Help Received Art Fernandez, salesman of ABC Supply, donated class B, C, and untreated wood shingles, and 50, 40, and 30 year composition shingles. My father helped me by cutting some of the wood for my experimental platform with a power saw.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Lauren E. Kelly	Project Number J1118
Project Title Does Density Affect a Wood's Combustion Rate?	
Abstract Objectives/Goals To discover if the density of a wood affects its combustion rate in a measurable way. Methods/Materials Materials: 1 hot plate, 1 stopwatch, 6 plastic cups, metric ruler, pen, triple beam balance, calculator, bowl of water, notebook, table saw, 18 wood samples Methods: Six different species of wood were cut into samples of equal dimensions and, therefore, equal volume. Three samples were made for each species. The mass of each sample was recorded and its density calculated. Each sample was then placed on a hot plate and the time that it took the sample to reach combustion was recorded. The average of the three samples' combustion rate was calculated for each species of wood. The results were analyzed to determine if there was a connection between the density of a specific wood and the time it took for that wood to reach combustion. Results The lowest in density of my six samples of wood was redwood with an average density of 0.314 gm/cm ³ . It was also the lowest in combustion rate with an average time of 2 minutes, 11 seconds before it ignited. The wood sample with highest density was maple with a density of 0.769 gm/cm ³ and maple also had the highest combustion rate with an average time of 3 minutes, 5 seconds before it ignited. My data shows that as the density of the wood gets bigger, the time it takes for the wood to ignite also increases. Conclusions/Discussion After completing my investigation testing the effects of density on a wood's combustion rate, I can conclude that density does affect a wood's combustion rate. My hypothesis states that density affects a wood's combustion rate by increasing its time and I believe that the cause of this is that the particles are tightly compacted, making it difficult for heat currents to go through the wood to create a flame. After comparing my results with my hypothesis I can conclude that my hypothesis is correct.	
Summary Statement This project is an investigation into the relationship between a wood's density and its combustion rate.	
Help Received Father helped supply and cut wood samples, mother helped format my typed pages.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Dylan Z. Knudsen	Project Number J1119
Project Title Which Decking Is Most Flammable?	
Objectives/Goals I am trying to find out which decking is most flammable.	
Methods/Materials I made a jig to hold the materials, Trex, Geo-Deck, Brazilian Harwod, and Redwood, at a constant distance from the flame.	
Results My results were that Geo-deck decking took the longest to ignite, when Redwood was the fastest.	
Conclusions/Discussion My conclusion is that, if you were to build a deck the best choice wood be Geo-deck decking, and the worse would be Redwood.	
Summary Statement I am trying to find out which decking is most flammable.	
Help Received step dad helped get the materials and supervised the exsperiment, because he is a fire fighter.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Daniel Lee	Project Number J1120
Project Title The Difference Between Standard Sealed Beam Headlights and Halogen Headlights	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to determine which headlight, the standard sealed beam headlight or the halogen headlight, would enable the driver of an automobile to see further distances. I hypothesized that the halogen headlight would enable the driver to see 100% further in length than the standard sealed beam headlight.</p> <p>Methods/Materials Two cars, a Nissan Maxima with a pair of standard sealed beam headlights installed and a Toyota Sequoia with a pair of halogen headlights installed, were parked adjacent to each other. The standard sealed beam headlights on the Nissan Maxima were turned on to the low-beam power. The assistant then took a large sheet of colored paper and stood approximately 150 meters away from the two cars (facing the cars' headlights). The assistant slowly moved towards the Nissan Maxima until the observer in the car could clearly see the color on the paper. I then measured how far the assistant (holding the paper) was from the headlight in meters and recorded it for later examination. This test was done with 8 different colors which included red, orange, yellow, green, blue, purple, black, and white. Each color was tested 3 times for both headlights. However, I did not think that the data collected was a sufficient amount for a valid conclusion so I did the experiment once more this time with 5 tests run for each color.</p> <p>Results The halogen headlight consistently dominated over the standard sealed beam headlight in every trial that was run except for 2 trials during the first experiment. The color was purple and it had an overall 4% increase compared to the length of the halogen headlight. The red color could be seen the farthest, and then came orange, white, yellow, green, blue, purple, and black.</p> <p>Conclusions/Discussion I conclude that the halogen headlight is the better headlight because it gives the driver an extra 18-25 meters of vision at night which will give them enough time to avoid an emergency. Although the halogen headlight was the dominant one, it never had a 100% increase from the standard sealed beam headlight. My hypothesis was partially correct in that the halogen headlight did perform better, but not as well as I thought it would.</p>	
Summary Statement Determining which headlight, the standard sealed beam headlight or the halogen headlight, will give the driver of an automobile more reaction time to avoid an emergency situation.	
Help Received Father was assistant for experiments; Mother was observer for experiments.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Lindsey A. Meyer	Project Number J1121
Project Title An Analysis of Bismuth-Telluride Based Peltier Devices	
Abstract Objectives/Goals The purpose of my science project was to understand the materials science (including structure, electrical and heat-flow properties) of peltier devices and to design a small portable peltier based refrigerator in order to test, gather data and analyze the efficiency, heat flows, and other properties of these semiconductor-based static devices. Methods/Materials 2 peltier coolers, 10 ft. of silver insulation, Infrared thermometer, 1-1# fan, 1-3# fan, Heat sink, X-Acto blade, 1-12-volt power supply, Silver tape, 8x8x12# cardboard box, Anderson Power Pole connectors, Packing Tape, Electronic Temperature Sensor. Using my test apparatus, I tested the internal resistance of my peltier device. Then, using a calibrated resistive heater applied to the heat sink, I reproduced the Seebeck Effect to determine the thermal conduction through the peltier device. Using a multimeter, I conducted a number of experiments to determine the efficiency and coefficient of performance for the Bismuth-Telluride (Bi_2Te_3) based peltier thermoelectric cooler. I also calculated as many of the heat flows as possible in my test system. Results The low internal resistance of the Bismuth-Telluride material results in high current flows that limit the efficiency of these devices, partly due to resistive heating. My measured efficiency approached 18% - about half that of a traditional compressor based refrigeration unit. However, analysis of the heat flows through the test system showed that the Bismuth-Telluride material in my peltier device had remarkable heat pumping properties for its size, but its construction and thermal conductivity limited its overall efficiency. Conclusions/Discussion This experiment showed how the unique crystalline properties of Bismuth-Telluride can exhibit a very strong peltier effect for use in many refrigeration applications. Future improvements that minimize resistive heating and thermal conduction could dramatically increase efficiency and applications for these devices and would allow the size of the peltier coolers to be increased as well.	
Summary Statement The goal of this project was to understand and test the material properties of a Bismuth-Telluride based static peltier device and determine its internal resistance, thermal conductivity, heat flows and efficiency.	
Help Received My Mom helped with graphics, cutting refrigerator cardboard and gluing my display board. My Dad helped with finding formulas and diagrams of heat flows. Dave Rank helped me understand heat flows better and gave me some ideas for project testing.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Kasey N. Nakajima	Project Number J1122
Project Title Muffin Fluff: The Effect of Flour Type on Muffin Density	
Abstract Objectives/Goals In this experiment, the goal is to find the effect of flour type on the density of muffins. Out of all the different flour types used, the experimenter believed that soy flour would create the densest muffin. Methods/Materials Different types of flour that were tested include oat flour, wheat flour, soy flour, all-purpose flour, and unbleached flour. One batch of muffins was made for each type of flour using the same recipe. After baking, the experimenter calculated each muffin's density by measuring its weight and volume. Results After reviewing the collected data, the experimenter found that oat flour made the densest muffins. Conclusions/Discussion In conclusion, the experimenter's hypothesis was not supported. She also found that the gluten level in flour greatly affects the density of baked goods. Things that may have influenced the experimenter's results could have been the consistency of oven temperature, the consistency of the room temperature, and how well the batter was mixed.	
Summary Statement My project explores the effect of flour type on muffin density.	
Help Received My mother and father helped me convert my raw data into computerized graphs.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Kody N. Nerhan	Project Number J1123
Project Title Rubberized Asphalt: A Sound Idea	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The research and testing attached attempts to explain the effectiveness of rubberized asphalt as a traffic noise mitigation measure.</p> <p>Methods/Materials Decibel measurements were made by setting up two stations, one Station 'A' located on the rubberized asphalt (RAC) portion of the roadway and the other Station 'B' on the standard asphalt concrete (AC) portion. Reading were simultaneously taken each minute for a twenty minute period three times per day at each station. These measurements were taken on three separate days. Also a traffic count was taken to establish the sound relation to the number of vehicles.</p> <p>Results The test data determined that the rubberized asphalt portion of the roadway reduced the sound levels by 4 to 9 decibels. The rubberized asphalt was an effective method of attenuation at each of the tested times during the day. Certain traffic conditions such as amount of heavy trucks, speed and flow, influenced the decibel readings however, the reduction of noise created by the rubberized asphalt remained constant throughout the testing.</p> <p>Conclusions/Discussion The results from the test concluded that the use of rubberized asphalt resulted in the decrease of noise by an average of 6.5 decibels. This is an 80% reduction in sound making rubberized asphalt beneficial as a traffic noise mitigation measure. Using rubberized asphalt will reduce the dependency on traditional traffic sound barriers such as walls, berms and vegetatino strips.</p>	
Summary Statement This project tests the sound levels emitted by traffic traveling over rubberized asphalt vs standard asphalt concrete.	
Help Received Caltrans engineers, Maurice El Hage and Nilesh Pandya supplied maps, information and allowed me onto the highway right of way. Mother manned one decibel meter since readings needed to be taken simultaneously, Teacher, Mr. Dolyniuk loaned the decibel meters.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Kylie L. Page	Project Number J1124
Project Title What Type of Sunglasses Are Best under UV Light?	
Abstract Objectives/Goals Sunglasses are used by many people and there are many different types of sunglasses. By doing this experiment the researcher wants to determine which type of sunglasses is best at blocking UV light. UV light is one type of ray that the sun projects and can be harmful to your eyes and skin. The researcher's hypothesis was that the Polycarbonate Polarized lens would block the UV light the best. The researcher chose this lens because it was much thicker than most of the other lenses. Methods/Materials To do this project the researcher exposed bacteria to UV light with or without a lens, for a certain amount of time. The researcher then counted the number of surviving bacteria. The researcher did this experiment with multiple lenses. Results The researcher discovered that there was no difference between the different types of plastic lenses that were used. The researcher also discovered that the lenses with UV coating and UV tint blocked the same amount of UV light. From the Polycarbonate lenses, the Polycarbonate Polarized lens was better than the Polycarbonate lens. Conclusions/Discussion The researcher also discovered from this experiment that either the material Polycarbonate is better at blocking UV light or that the thicker the lens the more it protects. The researcher predicts that it was the thickness that made a difference.	
Summary Statement I was trying to find out what type of sunglasses are best at blocking UV light.	
Help Received Lenscrafters donated lenses. Point Loma Nazarene University donated facilities & equipment under supervision of Dr. Dawne Page (mom).	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Jacob M. Parks	Project Number J1125
Project Title Every Volt Counts: Are Sport Drinks Worth It?	
Objectives/Goals The question that I would like to answer is which drink (Milk, Gatorade Lemon, Gatorade Lemon Ice, Water, Coke, 7-Up, Grapefruit Juice, or Pediatric Electrolyte, A.K.A. #Ped-Light#) had the most electrolytes and salts. I decided to do this project because I wondered if you could buy a cheaper drink than Gatorade and get the same amount of electrolytes.	
Abstract I test the amount of electricity the drink #conducts# By hooking wires and a meter up to a battery. The drink that conducts the most electricity has the most salts and electrolytes.	
Methods/Materials MATERIALS Drinks and liquids to test Jars Measuring device (if not on jars) Battery Wires Electrical meter	
Results (from best conductor to worst) Grapefruit, Milk, Ped-Light (Pediatric Electrolyte), Gatorade Lemon-Lime, Gatorade Lemon-Ice, Water, 7-up, and Coke.	
Conclusions/Discussion Grapefruit Juice was the best conductor of electricity. This means that it had the most salts and electrolytes. The drink with the least was Coke. The cheapest drinks were Gatorade Ice and Lemon-lime and milk, at \$0.03 per oz. each. The most expensive drink was Ped-Light, at \$0.10 per oz.	
Summary Statement Which drink has the most electrolytes and salts vs. its price.	
Help Received Father help with materials; Mother helped with board; Rick Scott with grounding idea.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Bradley E. Perek	Project Number J1126
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Project Title
Burn Baby Burn. Antacids: Do They Work?

Abstract

Objectives/Goals
 To determine how well different antacids work in liquids.
 HYPOTHESIS: All antacids perform the same in liquids.

Methods/Materials
 The experiment was carried out by measuring, testing, and recording pH* levels in the test liquids. After crushing the two antacid tablets (the recommended dose) into a powder, it was poured into each liquid and stirred thoroughly. A pH strip was inserted at 0, 1, 15, and 30 minutes. Once these tests were completed, the results were recorded and graphed.

Results

Liquid	pH	pH							
Roloids Brand	Target	Generic	Brand						
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Water (Folsom Tap)	6.0	7.0	8.0	10.0	6.0	7.0	7.0	8.0	
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Milk (1%)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Apple Juice (Tropicana Light)	3.0	6.0	6.0	7.0	3.0	5.0	6.0	7.0	
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Orange Juice (Tropicana Calcium Enriched)	4.0	4.5	5.0	6.0	4.0	4.0	4.5	5.0	
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Lemon Juice (Realemon)	2.0	3.0	4.0	4.0	2.0	3.0	3.0	3.0	
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Cola (Coke Regular Classic)	2.0	6.0	7.0	7.0	2.0	6.0	6.0	6.0	
	0 min	1 min	15 min	30 min	0 min	1 min	15 min	30 min	
Vinegar (Heinz)	2.0	5.0	5.0	4.5	2.0	4.0	4.0	4.0	

Conclusions/Discussion
 The data collected from the experiment showed that the name brand antacid, Roloids, worked better at neutralizing the acid in the liquids than the generic brand. Coloring of the antacid tablets affected the color of the liquid, but not the effectiveness. Coca Cola and vinegar seemed to fizz and froth the most once the antacid was added, but was more substantial with the Roloids. The Target brand did very little to change the pH in many of the test liquids. In many cases, the Target brand did not dissolve well and

Summary Statement
 This Science Fair Project investigated how different antacids reacted in several liquids typically consumed around the home.

Help Received
 Mom helped with the typing and dad explained how to create a graph in Excel.



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Sarah H. Roberts	Project Number J1127
Project Title Is Sunscreen SPF for Real?	
Abstract Objectives/Goals Evaluate the amount of UVA penetration when using different sun protection factor (SPF) sunscreens. Methods/Materials Using a UVA monitor, the UVA reduction was measured as four different SPF sunscreens were applied to glass plates. Results The greater the sunscreen SPF, the less UVA penetrated the glass plate. Lower SPF sunscreens (SPF 8 and 15) did not perform as well as their SPF rating would suggest. The higher SPF sunscreens (SPF 30 and 50) met or exceeded the expected UVA reduction. Conclusions/Discussion All tested sunscreen products did provide some degree of UVA protection. SPF 30 and 50 sunscreens performed as their labels advertised, providing the best protection against UVA penetration. The difference in UVA reduction between SPF 30 and 50 was minimal.	
Summary Statement This project evaluated which sun protection factor (SPF) sunscreen best protects your skin from ultraviolet A radiation.	
Help Received Science teacher provided precision scale; parents purchased materials and assisted with trials; father assisted with spreadsheets; mother assisted with board assembly.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Laura J. Schisler	Project Number J1128
Project Title How Does Sodium Carbonate Influence the Process of a Fiber Reactive Dye?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to determine how the addition of sodium carbonate fixer alters the dyeing process when using fiber reactive dyes. The hypothesis states if twenty 100% cotton fabric samples are dyed with a fiber reactive dye, omitting the soda ash pretreatment for ten of the samples, then the sodium carbonate fixer treated fabric samples will produce a more vibrant hue than those samples dyed without the use of a sodium carbonate fixer. In this experiment, twenty 12-centimeter squares of 100% cotton fabric were used.</p> <p>Methods/Materials On January 8, 2005, twenty 12-centimeter squares of 100% cotton fabric samples were laundered and tied with small rubber bands. Ten of these samples were soaked for twenty minutes in a sodium carbonate fixer while the other ten swatches were soaked for twenty minutes in tap water prior to dyeing. The samples were then dipped in Rainbow Rock Green Fabric Dye, a fiber reactive dye, and set out for eighteen hours. On January 9, 2005, the twenty fabric samples were triple rinsed in clean tap water, unbound, blotted, and then dried in a gas dryer on a permanent press setting.</p> <p>Conclusions/Discussion In conclusion, when dyeing with fiber reactive dyes, using a soda ash fixer will vastly improve the hue and vibrancy for a 100% cotton fabric, thus proving the hypothesis correct. The samples dyed with a prior soak in water did not produce a covalent bond thereby leaving them with a blue and yellow coloration even though a green dye was used.</p>	
Summary Statement This project explores how the addition of a sodium carbonate pre-soak influences the vibrancy of cotton fabric swatches dyed with fiber reactive dye.	
Help Received I would like to thank my parents, Ron and Rosemary Schisler, and family friend, Paul Lechner, for their support and encouragement on my project.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Christine N. Smith	Project Number J1129
Project Title How Do Sunblocks and Sunscreens Compare?	
Abstract Objectives/Goals The objective of my project is to determine if sunblocks are more effective than sunscreens in blocking ultraviolet rays in sunlight. I believe that the three brands of sunblock will block more UVA and UVB rays than the three brands of sunscreen. Methods/Materials Samples of three brands of sunblock and three brands of sunscreen were weighed and each spread over a separate 5 cm X 5 cm area on a clear plastic folder. Printing-out paper (photosensitive paper) was inserted in the plastic folder and it was placed in the sun for five minutes. The exposed printing-out paper was rinsed, then submerged in Kodak Fixer. This process was repeated for four trials. The developed paper was compared to a gradation scale. Results The sunblocks were more effective than the sunscreens when they both had the same Sun Protection Factor (SPF) number. Conclusions/Discussion My conclusion is that sunblock ingredients do block out more ultraviolet rays than sunscreens. Sun Protection Factor (SPF) number is a reliable indicator of the effectiveness of sunscreens, but it is not a reliable indicator of the effectiveness of sunblocks.	
Summary Statement I compared sunblocks to sunscreens using photosensitive paper to determine which was more effective when exposed to UVA and UVB rays in sunlight.	
Help Received My father helped type some of the report.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Christian D. Valley	Project Number J1131
Project Title How Does Temperature Affect the Breaking Points of Different Types of Fishing Line?	
Abstract Objectives/Goals Objective: My project was to determine if the material a fishing line was constructed of affects the pounds of pressure (p.p.) a line withstands before breaking in different temperatures. Methods/Materials Materials and Methods: Three types of fishing line, each eight-pound test, were tested in a simple two foot high wooden framed machine I designed. The machine's construction held constant the pulling force variable by utilizing a wing nut on a screw. In addition, a 100% proof knot, the Single San Diego, was used based on my research to eliminate the variable of knot tying from either slipping or weakness. The lines were tested four times each in three temperature-controlled environments of 6, 40, and 80 degrees Fahrenheit (F) after having fifteen minutes to adjust to the environment. The pounds of pressure was determined when the line snapped in the simple machine. Results Results: Braided line withstood 18 p.p. in 6 degrees F, 15.3 p.p. in 40 degrees F, and 21.6 in 80 degrees F. Fluorocarbon withstood 7.9 p.p. in 6 degrees F, 9.8 in 40 degrees F, and 13.7 in 80 degrees F. Monofilament withstood 8.3 p.p. in 6 degrees F, 8.8 p.p. in 40 degrees F, and 8.1 p.p. in 80 degrees F. Conclusions/Discussion Conclusions: In conclusion, the line constructed with multiple filaments of cloth, braided line, consistently withstood more pounds of pressure in each temperature environment than each of the other types of lines. Through my research, the chemical composition of monofilament line and fluorocarbon contained chemicals, which expanded and contracted according to the temperature. The colder the temperature the less pounds of pressure those lines held, and, the higher the temperature the more pounds of pressure those lines withstood. Therefore, a fisherman benefits by using braided line which was the strongest line in all temperatures, but must consider other factors such as line color, line density, and line visibility when selecting a line, and, of course, line test strength at lower temperatures.	
Summary Statement This project analyzed three types of fishing lines' breaking points in three temperature controlled environments.	
Help Received Dad helped with supervision of construction of simple machine; Mother helped with taking me to interviews.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Richard R. Van Horne	Project Number J1132
Project Title Is Your Cleaner Making the Grade?	
Objectives/Goals I tried to find the most effective, safest and most cost-effective bathroom cleaner. In PHASE ONE I thought that Tylex would work the best for preventing and killing mildew. In PHASE TWO I thought that Clorox spray would work the best on all germs.	
Abstract Methods/Materials I have two phases. In both phases there are 2-3 experiments using agar petri dishes and bacteria or mildew samples. I also tried the cleaner directly on the shower mildew in PHASE ONE. I tried all cleaners on the samples to both prevent growth and kill it. All experiments were repeated to test reliability and validity. All variables were carefully monitored and results were photographed. I kept a detailed journal with all measurements and observations.	
Results I found that Tylex worked the best in Phase one in both preventing and killing shower mildew. The generic brand produced more growth than the control. I found that Clorox spray cleaner worked the best in both preventing and killing bacteria and mildew growth. Oust, which was the most expensive, produced more growth than the control. I have graphed all results.	
Conclusions/Discussion I have decided that choosing a product solely by cost is not a good idea. You should always read the label. Expensive does not necessarily mean effective! Products that contain the higher levels of ammonium chloride will work the best for disinfecting bathrooms. Products with a lot of sodium hydrochloride can irritate skin and eyes so they are not safe around children. I learned there is a difference between a disinfectant and a sanitizer. Also, keeping areas dry will help prevent harmful microorganisms from growing in a bathroom.	
Summary Statement I want to find the most effective, safe, and cost effective bathroom cleaner.	
Help Received My mother helped me type and organize my report.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Case B. Walker	Project Number J1133
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Project Title
Which Paper Towel Gives You the Most Bang for Your Buck?

Abstract

Objectives/Goals
My project was designed to test whether higher cost in paper towels meant higher quality or not.

Methods/Materials
To test absorbency, I put a paper towel into a 6-inch plastic embroidery hoop and put it on a clear bucket so that only the plastic hoop was touching the bucket. Then I dropped one drop of water at a time into the center of the paper towel, at about one per second. When one drop dripped out the bottom of the paper towel, I would stop counting and record my data. I did this for three times per brand.
To test strength, I would take the wet paper towel that was wet enough to drop one drop of water or more out of the bottom, and put penny after penny into the center of the paper towel until the paper towel ripped and pennies spilled out the bottom. I then recorded my data and repeated twice more.

Materials-

- 1.Nine different brands of paper towels from a standard supermarket
- 2.A dropper
- 3.Water
- 4.Pennies
- 5.Plastic embroidery hoop
- 6.Clear tub with the bottom cut out
- 7.Recording sheets and writing instruments

Results
At the three cheapest, Slim Price, Earth First, and Vons, my hypothesis fit perfectly. Most of the medium priced paper towels also followed my hypothesis. But the best paper towel, Thirsty, was very inexpensive, and the most expensive paper towel, Viva, was shown as not that good.

Conclusions/Discussion
The paper towels in the study, although don't follow my hypothesis exactly, mainly follow my hypothesis. It is mostly only two of the paper towels that are wacky. The best performing paper towel is in the low-medium price range and the most expensive paper towel is medium quality.

Summary Statement
I used two tests on nine paper towel brands to determine the quality, then compared the results to the costs.

Help Received
Mom helped getting supplies, typing, and cutting and glueing; Dad cut out the bottom of a clear plastic tub.



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Krystal M. Watkins	Project Number J1134
Project Title Which Smoke Detector Will Work Best to Alert You to the Possibility of a Fire?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to determine if a more expensive smoke detector would alert you to a possible fire faster than a less expensive smoke detector.</p> <p>Methods/Materials Materials: I used three different priced smoke detectors. Three 2ftx3ft covered boxes were used. 1 fog machine and 1 bottle of fog maker. 1 stopwatch. 3 9 volt batteries. 1 piece of PVC, 2" diameter by 19" long. I attached a different smoke detector to each box, and then labeled them accordingly, box 1, 2, and 3. An adult helped me with the fog machine and I waited for the alarm to go off and wrote the time down. I repeated the same steps 3 times on each box.</p> <p>Results The medium priced smoke detector faster to alert you to a fire by 00:07.16 seconds. I thought that the higher priced smoke detector would work faster so my prediction was wrong.</p> <p>Conclusions/Discussion After testing all 3 smoke detectors 3 different times I averaged the results from each one and found that the medium priced or #2 smoke detector worked better than the more expensive one by 00:07.16 seconds. Although 00:07.16 seconds does not sound like a lot of time, it would be enough time to dial 911. Enough time to yell and get someone up and out of danger. Basically 00:07.16 is enough time to save a life.</p>	
Summary Statement My project is about which smoke detector could save your life.	
Help Received Two Sonora City Firepersons helped me with web sites and one let me borrow his fog machine. My grandfather helped me with the fog machine. My grandmother took pictures.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Adrian J. Weddington	Project Number J1135
Project Title Best Buy in AA Batteries	
Abstract Objectives/Goals My project was to determine which of 9 AA batteries purchased from family patronized stores would give the best general performance, with an emphasis on the most work per dollar. I hypothesized that the Panasonic Alkaline battery would perform best and be the best buy. Methods/Materials Six alkaline and three non-alkaline AA batteries were performance tested in two trials using a toy train engine pulling 4 cars on an oval wooden track. Lap times, operational time, and train weight were recorded. Calculations included power, work, and work per dollar. Results The Eveready Gold Alkaline battery performed best and was the best buy, disproving my hypothesis. The alkaline batteries outperformed the non-alkaline batteries. Conclusions/Discussion Cost per battery and battery performance varies among the batteries tested. When purchasing batteries, knowing the work per dollar will help you select the best buy in AA batteries.	
Summary Statement Comparing work per dollar among 9 different AA batteries used in operating a toy train can help you make a good financial decision about which battery to purchase.	
Help Received Father helped with computer graphics; editing and review helped by Mrs. Luckin (Fairmont School); mother helped with typing and general assistance.	



CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s) Amelia M. Whittaker	Project Number J1136
Project Title Stain Remover Experiment	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project is to determine which stain remover works best on white cloth.</p> <p>Methods/Materials The stain removers I chose were Soilove, Oxiclean, and Spray #n Wash. The stain I used was Aqueous Annatto Extract. I placed one drop of the stain on the center of the white cloth (same size cloth). I waited an hour before applying the stain remover. I applied # ml of stain remover on the stain. I waited ½ hour before processing the cloth through the washer and dryer. I took pictures of each stage: #Before# (plain white cloth); #With Stain# (stain on the cloth); #After# (after the stain remover was applied and the cloth was washed and dried). I tested all three stain removers four times.</p> <p>Results I used Adobe Photoshop # PS to see which stain remover removed the most amount of stain. I used the #Mean# to measure how much stain each stain remover removed. The #Mean# is based on the electromagnetic spectrum 0-255 (0 is really dark and 255 is white). Example of #Mean#: 174.99 (Before-#Mean#). The stain remover that removed the most amount of stain looking at the color spectrum: #Colors# was Spray #n Wash with an average of 61.14%. Oxiclean came in second place with an average of 49.89%. Soilove came in last place with the average of 35.16%. I also separated the Color Spectrum into three distinctive colors: Red, Green, and Blue to measure amount for each color. The equation I used to determine how much stain was removed was: Percent Change. The equation is #After-mean# minus #With Stain-mean# over #Before Stain-mean# minus #With Stain-mean# then multiply by 100.</p> <p>Conclusions/Discussion I found Spray #n Wash removed the most amount of stain. Spray #n Wash worked best, because it had enzymes when no other stain remover had. When the stain remover is going through the steps to remove a stain the two other stain removers didn#t have enzymes to eat the stain. Enzymes speed up the process of oxidizing agents. Since Soilove and Oxiclean didn#t have enzymes it would take longer to eat the stain. Adobe Photoshop # CS generates graphs based on the electromagnetic spectrum. The electromagnetic spectrum goes from 0-255. 0 being really dark, and 255 being pure white. This means the stain was removed partially and you can see the difference in the graph. I found Spray #n Wash removed the most amount of stain.</p>	
Summary Statement My project is about product testing of stain removers.	
Help Received Mother helped with software and provided help for grammar and punctuation; Father helped with photography and printing of pictures; Science Teacher helped with research.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Asher H. Wittenberg	Project Number J1137
Project Title Which Light Bulb Is Bright but Cool?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to compare the efficiency of different types of light bulbs by testing the light and heat output of the bulb. I did this because the electricity companies are telling people not to use so much electricity and because the cost of electricity keeps escalating. Using more efficient bulbs would reduce the amount of electricity a person would use and reduce their bill.</p> <p>Methods/Materials The I tested two each of five different types of bulbs. I tested 40 watt clear incandescent, soft white incandescent, and halogen bulbs and 42 watt and 9 watt fluorescent bulbs. I did a light-emitting test and a heat-emitting test. Each test was performed 5 times and the results averaged.</p> <p>Results I found that fluorescent bulbs are the most efficient and incandescent bulbs are the least efficient. 42-watt fluorescent bulbs were the most efficient and gave off 7.22 LUX/cal. The clear incandescent bulbs were the least efficient and gave off 0.85 LUX/cal.</p> <p>Conclusions/Discussion I conclude that using fluorescent bulbs is the best choice. They are the most efficient by far and use the least electricity for the amount of light produced.</p>	
Summary Statement My experiments were designed to determine which type of light bulb is the most efficient producing the most light and the least heat.	
Help Received Father helped supervise all of the experiments for safety. Teacher helped producing graphs and data tables.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Sam D. Wood	Project Number J1138
Project Title Insulation and Flammability Characteristics of Straw Bale, Fiberglass, and Styrofoam	
Abstract Objectives/Goals This experiment compared the flammability and insulating effectiveness of three materials: straw bale, fiberglass, and Styrofoam. There has been renewed interest recently in straw bale construction because it is a renewable resource. Methods/Materials For the insulation test, a glass jar filled with water heated to 79 degrees Celsius was placed in a box filled with insulation material. A thermometer probe was placed in the jar through a hole in its lid and the water temperature was recorded at 15, 30, 60, 120, and 180 minutes. The test was performed three times for each of the insulation materials with air used as a control. For the flammability experiment, a torch heated to 700 degrees Celsius was placed on equal amounts of each material for two minutes. The combustibility of each material was observed and recorded. The experiment was performed outside, wearing a mask and goggles. Results The results of the insulation tests demonstrated that Styrofoam was the most effective of the insulating materials while straw bale was the least effective. After three hours, the average temperature loss was 10 degrees Celsius for Styrofoam, 19 degrees Celsius for fiberglass, 23 degrees Celsius for straw bale, and 50 degrees for air (the control). Fiberglass is not flammable and seems that it might even help block a fire. The Styrofoam melted quickly and disappeared under the flame, which might allow a fire to move through a house. The loose ends of the straw caught on fire, but the rest of the bale did not burn. Conclusions/Discussion These results indicate that of these materials fiberglass is the best choice when fire-resistance is the main consideration, while Styrofoam should be used when insulation ability is of greatest importance. Straw bale may be a desirable insulating material when environmental impact is of greatest concern.	
Summary Statement This experiment compared the flammability and insulating effectiveness of three materials: straw bale, fiberglass, and Styrofoam.	
Help Received Mother supervised my project; Grandpa helped me build my experiment apparatus.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Connor A. Wynveen	Project Number J1139
Project Title Blondes Can't Bear, All That Green Hair!	
Abstract Objectives/Goals Objectives/Goals: Many people that swim in pools have green hair and have trouble getting this green residue, copper, out of their hair. Acids, vinegar and lemon juice, and chelating agents (molecules that bond to metal), aspirin and Ultraswim shampoo, will be tested to determine which treatment is better at removing the green from blonde hair.	
Methods/Materials Methods/Materials 1. Acquire blonde hair. 2. Collect six cups of pool water. 3. Analyze pool water with an Aquachek kit. 4. All hair, except control group, will be soaked for 8 hours in pool water. 5. Divide hair into 41 equal sections, 40 will be treated, one will be left as a control. 6. Distilled water, and treatment agents were titrated with a syringe. 7. Preliminary tests were performed: 1. 50 ml of distilled water was tested using copper test strips. 2. Distilled water 50ml and control hair was tested for copper. 3. Green hair that was soaked in pool water but not treated was tested for copper levels. 8. The remaining green hair was divided into 4 groups of 10 and placed in baby food jars containing the agents noted: Group 1, 25ml of fresh squeezed lemon juice, with 25ml of distilled water Group 2, 25ml of apple vinegar with 25ml of distilled water Group 3, 625mg of aspirin (two aspirin) with 25ml of distilled water Group 4, 10ml of Ultraswim shampoo 40ml of distilled water 9. All groups of hair were soaked for 5 minutes. 10. All groups of hair were rinsed for 5 seconds with distilled water. 11. Hair was put in 200ml of distilled water for one minute, removed, water was tested for copper levels with Aquachek copper strips.	
Results Results: Lemon juice, the most acidic at 2.2pH, average level of copper remaining after treatment was 1.55ppm mg/l, Vinegar, acid 2.9pH, average copper level was .825ppm mg/l, Aspirin, a chelating agent, average level of copper was .38ppm mg/l, Ultraswim shampoo, a chelating agent, average level of copper was .36ppm mg/l. Ultraswim worked best.	
Summary Statement Blonde haired swimmers often get green hair from pool water, acids and chelating agents were compared to find which is best at removing the green, copper, from blonde hair.	
Help Received Leslies Pool Supply for information, Teachers for advice, Del Cerro Pool for pool water, and my mother for her help with everything.	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Adam S. Youssef	Project Number J1140
Project Title How Does Miswak Compare to a Toothbrush and Toothpaste in Cleaning and Killing Bacteria?	
Objectives/Goals The objective is to find out how miswak compares to a toothbrush and toothpaste in cleaning and killing bacteria.	
Abstract	
Methods/Materials Experiment 1: .4 grams of miswak was shaved off then placed in a mortar after being measured by a triple beam balance and ten grams of water was then added. The miswak and water was then smashed in the mortar with a pestle until it became a fine mixture. This was then poured into a beaker. .4 grams of toothpaste was then placed into a mortar after being measured by a triple beam balance. Ten grams of water was then added to the mortar. The toothpaste and water was then smashed with a pestle until it also became a fine mixture. Ten grams of distilled water was also added into another beaker. 48 punches were then hole punched from sterile filter paper. 16 whole punches were put into each of the three beakers. Each of the 12 Petrie dishes was then labeled into four quadrants. Nutrient agar was then poured into each dish. Staphylococcus epidermis the chosen bacteria was then added into each dish. 1 whole punch was then added to each quadrant of the Petrie dishes. The Petrie dishes were then left untouched for two days. Growth areas were then observed, measured, and compared. Experiment 2: 36 tiles were stained with one ml each of grape, juice, and coffee. 1/3 of the tiles for each liquid. The tiles were then baked at 350 degrees until thoroughly caked on. 6 tiles stained with grape juice were then brushed with miswak for thirty seconds each. They were then rinsed. 6 tiles stained with grape juice were then brushed with a toothbrush and toothpaste. The tiles were then rinsed. These steps were then repeated with coffee and tea. The tiles were then compared to see which tiles were whitened better.	
Results The results for my first experiment resulted as toothpaste being the winner. The miswak did not kill any bacteria. While the toothpaste all had rings of defense ranging from 1 to 1.7. For my second experiment miswak was the winner. Miswak cleaned the coffee stained tiles a little better than the toothpaste and toothbrush. With the tea-stained tiles miswak cleaned better. And with the grape juice stained tiles miswak cleaned much better.	
Conclusions/Discussion The conclusion is that while miswak may not be as good in killing bacteria as toothpaste it is better in whitening tough stains.	
Summary Statement The central focus of my project was to determine if miswak was a more effective material to clean teeth than the commonly used toothbrush and toothpaste.	
Help Received Mother helped in using the paper cutter. Used lab equipment under the supervision of Mr. Jeff Hodges (science teacher)	



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Frankie Ziman	Project Number J1141
Project Title How Effective Is Your Mouthwash?	
Abstract Objectives/Goals The objective of this project was to find out which mouthwash would be most effective for the least amount of money. Listerine Cool Mint, Listerine Less Intense Natural Citrus, Mint Scope, Mint Cepacol, Listerine Cool Mint PoketPaks, and Listerine Less Intense Natural Citrus PoketPaks are the six mouthwashes that were tested. Methods/Materials Two trials were conducted. Five different dilutions of water to mouthwash were created. One milliliter of E. Coli Bacteria was added to each culture tube. The PoketPaks were dissolved into water before the water for the dilution was added. The culture tubes were then put into an incubator set at 37 degrees Celsius for 24 hours. After that they were put into a spectrophotometer to test for the amount of bacteria absorbance. Results On an average of all of the dilutions and trials, Mint Scope only had .0332 absorbance units, as compared to the average control, which had 2.1933 absorbance units. Mint Scope also sold for the lowest cost at \$0.13 per ounce. Cepacol killed the second largest amount of bacteria. The third best mouthwash was Cool Mint Listerine and the fourth best was Less Intense Natural Citrus Listerine. Both of the Listerine PoketPaks did the worst of all the products tested. Conclusions/Discussion Mint Scope is the preferable mouthwash being the most effective and selling for the lowest cost. Mint Cepacol could be used as a second choice, but the rest of the mouthwashes should not be used because they are not effective and they are sold at a higher cost.	
Summary Statement Which mouthwash out of Listerine Cool Mint, Listerine Less Intense Natural Citrus, Mint Scope, Mint Cepacol, Listerine Cool Mint PoketPaks, Listerine Less Intense Natural Citrus PoketPaks is most effective at the least cost?	
Help Received Mother helped with board; Ms. Reynolds corrected papers; Dr. Rubinoff was interviewed; Used equipment in the Cravatt Lab at the Scripps Research Institute under the supervision of Dr. Cravatt.	