



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Talar A. Alexanian	Project Number J0501
Project Title Apple Dehydration	
Abstract Objectives/Goals The objective of this experiment was to determine whether salt water or lemon juice had any effect on the rate of dehydration of different types of apples. The hypothesis was that lemon juice would increase the rate of dehydration. Methods/Materials Three different types of apples were used; Granny Smith, Gala, and Golden Delicious. 27 apple slices were weighed before and after being dipped in three solutions: distilled water, salt water, and lemon juice. Specimens were placed on appropriate, color-coded screens, within a cardboard chamber, near a window. Daily measurements were taken until weight loss became constant; thus, dehydration was reached. Results No significant difference was found in the rate of dehydration between the 3 types of apples(A,B,C). The major finding was that regardless of type, all apples experienced a water loss ranging from 83%-87%. Apples dipped in a salt water solution dehydrated marginally slower than apples dipped in distilled water. The difference of the daily percentage of water loss between apples dipped in salt water(AY,BY,CY) and those dipped in distilled water(AX,BX,CX) ranged from 2%-7%. Also, salt water had the most antioxidant effect on the apples. Most water loss occurred between the first 3 days of the experiment. Conclusions/Discussion The data from this experiment did not support the hypothesis, which stated that the addition of lemon juice would increase the rate of apple dehydration. Salt water had a slower rate of dehydration during the 1st 3 days of the experiment.	
Summary Statement The purpose of my experiment was to find out whether the application of lemon juice or salt water had any effect on the rate of dehydration of different types of apples.	
Help Received Dad helped me create home-made apple slicer, color-coded screens, graphs, charts and water loss percentages. Mom took me to various libraries for research as well as helped in dipping apples in their solutions and taking pictures during experimentation.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Fuad M. Beshir	Project Number J0502
Project Title Corrosion and Conductivity	
Abstract Objectives/Goals In this science project, I attempted to test which substances among air, salt, Clorox, water, or baking soda, rust a nail quicker. Methods/Materials I did three experiments and evaluated the results through three different methods that include observation and flow of electricity through the substance. Results The results of my experiments proved that my hypothesis was correct. The iron nail in Clorox rusted the most and the iron nail in the water with baking soda and air didn't rust at all. By using corrosion meter (flow of electricity), the order of which substance rusted the nail the most is: Clorox, water with salt, water and water with oil, water with baking soda, and the empty glass. Conclusions/Discussion My project was interesting and I learned a great deal about corrosion, its causes, the effect of various substances I tested on corrosion, and how to prevent it. Three things I will do different if I did my project again is that I will get pure copper, test the resistance, and take out all the noise (electricity in the air). A problem I encountered was that when I was testing the current, the numbers were unstable. The variables were the substances I used in my experiments such as Clorox, water with baking soda, water with salt, empty glass, and water with oil. My suggestion is that if you have to put iron in water, galvanize it.	
Summary Statement The effect of substances such as air, salt, Clorox, water, or baking soda rust a nail quicker as evaluated through observation and the flow of electricity.	
Help Received Father advise report; Mother advise project board.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Jarod A. Corey	Project Number J0503
Project Title Borax Acts or Gets the Ax	
Objectives/Goals Due to the recent fires in Southern California, my objective was to determine if the amount of borax will affect the flammability rate in wood. My hypothesis is that even the smallest amount of borax will slow the flammability rate in wood.	
Abstract	
Methods/Materials Diamond Kitchen Matches were cut to a length of 5 centimeters. The match sticks were divided into six groups of five sticks for all three tests. I soaked the match sticks in different solutions containing 1 gram, 2 grams, 3 grams, 4 grams, and 5 grams of Borax Laundry Booster along with a controlled group containing only water. They were soaked for two days and dried for three days. Using a torch, each match stick was burned for ten seconds. The average length of wood left after burning each group of match sticks was determined and graphed.	
Results All of the borax solutions slowed the flammability rate in the match sticks; however, Group E with 5 grams had the least amount of burn with the average length of (4.313 cm.), followed by Group B with 2 grams (4.293 cm.), Group D with 4 grams (4.273 cm.), Group C with 3 grams (4.08 cm.), and lastly Group A with 1 gram (3.926 cm.).	
Conclusions/Discussion It appears that, as the amount of Borax concentration increases, the rate of burn decreases. I found my hypothesis to be is correct, based on my conclusions.	
Summary Statement To determine if the amount of borax will affect the flammability rate in wood.	
Help Received My father supervised me using the propane torch and started and stopped the timer. My mother took the pictures.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Bryce M. Elder	Project Number J0504
Project Title Fire Storm 2004	
Abstract Objectives/Goals The objective of my project was to see if extreme hot and cold temperatures affect how long it takes brush to burn. Methods/Materials Freezer with digital readout. A oven with digital readout. A BIC barbeque lighter. 90 samples of dead brush. 90 samples of living brush. paper plates. metal cookie sheet. Results The results of my project were that even at much colder temperatures, the dead brush always burned more quickly. Conclusions/Discussion My conclusion is that the temperatures outside can affect how brush burns. Even when its colder, you still need to be aware.	
Summary Statement Will extreme hot and cold temperatures affect how long it takes brush to burn?	
Help Received My dad took me to the vally to collect my samples.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Blake L. Emberson	Project Number J0505
Project Title Which Orange Juice Contains the Most Vitamin C?	
Abstract Objectives/Goals To find out which type of orange juice contains the most amount of vitamin C. I think Del Monte orange juice from fresh squeezed oranges will contain the most vitamin C. I think this because I believe fresher orange juice will contain more vitamin C. Methods/Materials First, I made a test solution of water, cornstarch, and 2% iodine. Then, I combined 1 tablespoon of the solution and 10 drops of orange juice into a test tube. I arranged the tubes from lightest to darkest, lightest containing the most Vitamin C. Results Minute Maid Original contained the most vitamin C. Bolthouse Farms came in second followed closely by Springfield High Pulp, Minute Maid Country Style, Fresh Navel Del Monte, Tropicana Concentrate, Fresh Navel Victor, Springfield No Pulp, and then came Tropicana Pure No Pulp. Conclusions/Discussion The answer to my question was Minute Maid Original. If I did this project again I would use the same test solution however, I would use different kinds of juices instead of just orange juice.	
Summary Statement The amount of vitamin C in different types of orange juice.	
Help Received Dad helped cook and make the test solution. Mother helped with pictures.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Tara A. Filsuf	Project Number J0506
Project Title Abating Acid Rain	
Objectives/Goals Objective: My project was to test what types of soils can best buffer acid rain. I made a hypothesis that sandy soils would buffer the acid the best due to their texture. My next question was if soils can effectively buffer acid rain, are plants still at risk due to foliage exposure.	
Abstract	
Methods/Materials Methods/Materials: I collected 5 soil samples. #1 clay, #2 and #3 sandy, and #4 and #5 loam. I placed 2 cups of one soil in a coffee filter, placed in a funnel on a cup. I poured distilled water (pH 7) into the soil then tested the pH of the water that percolated through. I repeated this procedure with distilled water + white vinegar (pH 4). All soil samples were tested. I used a #rapitest# garden soil test on all the soils. Then I tested the mineral calcium carbonate content of the soil by dropping 1 teaspoon of soil into 1 cup of white vinegar and recorded the fizzing of Co ₂ gas. I sprayed 5 daisy plants foliage with 4 acid solutions and distilled water for 2 weeks. #1-pH 2, #2-pH 3, #3-pH 4, #4-pH 5, #5-pH 7	
Results Results: Soil samples #1 and #2 buffered the acid solution to pH 5, #3 and #4 stayed at pH 4 and #5 neutralized the acid to pH 7 in the percolation test. This didn't prove my hypothesis. I tested the pH of each soil; #1 and #2 were pH 8, #3 and #4 were pH 6, and #5 was pH 10. I saw a pattern. After the calcium carbonate test the pattern continued. Soils #1 and #2 had a little fizzing, #3 and #4 had no fizzing, and #5 had lots of fizzing of Co ₂ gas. The plant foliage test showed plant #1- completely dead, #2 -19 dead leaves, #3-6 dead leaves, #4 and #5 undamaged.	
Conclusions/Discussion Conclusions: After testing I concluded that the texture of the soil was not a factor in the soils ability to buffer the acid solution. It was the mineral content (calcium carbonate) of the soil that buffered the acid. I also concluded that even though some soils can buffer the acid rain the plants still may be at risk due to the exposure of the plant foliage. Very high levels of acid (pH 2) may kill the plant but lower levels (pH 3+) can weaken the plant foliage leaving it at risk. Acid rain should be eliminated at the source of the problem not just by correcting the pH balance of the environment.	
Summary Statement My project was to test different soil samples to find which soil can best buffer acid rain.	
Help Received Mother drove to get soil samples, took pictures.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Nicholas J. Hickernell	Project Number J0507
Project Title Do Oranges Lose or Gain Vitamin C After Being Picked?	
Abstract Objectives/Goals My objective is to see if an orange stays on the tree longer will it have more Vitamin C than one that is picked early. I think the orange that was picked on January 12, 2004 will have the most Vitamin C. I think this because it seems the longer the orange is on the tree the more it is nourished from the tree. The orange was also twice the size as the one picked on December 19, 2003. Methods/Materials I picked three oranges on three different days. I kept them in a cool refrigerated place. I made a Vitamin C solution, an iodine solution, and a starch solution to test how much Vitamin C is in oranges the longer they stay in the tree. I squeezed the juice from each orange and tested it by using a titration method. Results The orange that was picked on December 19 had the most Vitamin C. It took six drops to titrate it. The orange picked on January 6 took seven drops to titrate it. The orange picked on January 12 had the least Vitamin C. It took ten drops to titrate it. It was almost two to one. Conclusions/Discussion The orange picked on December 19, 2003 had the most Vitamin C. The reason I think it had the most Vitamin C is because Vitamin C is a water soluble vitamin and the oranges picked on January 6 and 12 were so much bigger with more juices. They were also sweeter.	
Summary Statement My project is about finding out if oranges lose or gain Vitamin C after being picked.	
Help Received Dad helped me with the solutions; Mom helped me with my board.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Danny J. Lee	Project Number J0508
Project Title Counterfeit Attack!	
Abstract Objectives/Goals The objective of this experiment is to explore jadeite and antique jade counterfeit methods. My hypothesis is that one can create a copy of an authentic jadeite or antique jade using heat, acid, and a variety of colors. Methods/Materials I obtained a required number of low-grade white jade with similar size, shape, approximate weight, and quality to run two tests. In both tests, the white jade pieces were baked in an oven at 400 degrees Fahrenheit for an hour and immediately were dipped in ice water until cracks formed on them to enable color seepage. Next, I prepared an array of beakers and allowed the white jade pieces to remain in dark soy sauce, iodine, red ink, base solution, and acid solution for a period of time for the first test. In the second test, the white jade pieces were immersed in solutions combined with different percentages of acid and red, green, and brown inks for four weeks. Results My first test showed that acid mixed with colored ink was the best solution to dye white jade because acid deepened the cracks on the white jade, and allowed the color to easily seep into them. Also, red ink turned white jade to pink. My second test indicated that 25% acid and 75% green ink was the best combination. Too much acid could result in over-etching, causing the white jade pieces to corrode away and reducing their color retaining power. Conclusions/Discussion After low-grade white jade pieces are heat-treated and acid-corroded, a colored solution can be used to induce a color change through the deep cracks formed on the white jade. From this experiment, jade aficionados and consumers can identify their collectibles more accurately, so that they will not be deceived by dishonest artifact dealers.	
Summary Statement The color of low-grade white jade can be enhanced to resemble genuine jadeite and antique jade through the use of heat, acid, and color treatments.	
Help Received Mr. Kaleikau, my science teacher, offered instructions and guidance. My father assisted in giving me essential advice. My mother helped in gathering all the necessary materials.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Hunter W. Link	Project Number J0509
Project Title Acid Ice: The Effect of pH on the Freezing Point of Water	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to determine if pH has an effect on the freezing point of water. My hypothesis was that a lower pH would lower the freezing point of water.</p> <p>Methods/Materials 4 groups of 4 beakers were filled with 200mL of distilled water. 0.6mL of citric acid was dissolved in one group, 2.5mL in another, and 5mL in another. The last group, the control, was left as pure water. I measured the solutions# pHs and they were 6.2, 6.1, and 6.0, respectively. Pure water had a pH of 6.4. I placed the groups in the freezer (25° F) and checked them every 10 minutes (min.) for frost. I assumed that there was a correlation between when the solutions froze and their freezing point. Those that took the longest time to freeze had the lowest freezing points.</p> <p>Results The average freezing times were as follows: pure water froze first in 95 min., the .6mL group froze in 120 min., the 2.5mL group froze in 125 min., and the 5mL group froze in 170 min. This means that the 5mL group has the lowest freezing point.</p> <p>Conclusions/Discussion The results confirmed my hypothesis that solutions with lower pH freeze at lower temperatures than solutions with higher pH. After researching my topic, however, I realized that salt water, pH 7, also froze at a lower temperature than pure water. To investigate this I repeated the process but used 2.5mL of salt and sugar dissolved in two different beakers of 200mL of water. I placed these as well as a beaker of pure water and a beaker with 2.5ml citric acid solution in the freezer. I discovered that all the solutions had lower freezing points than water. My conclusion is anything dissolved in water changes its freezing point.</p>	
Summary Statement My science project is to find out whether or not pH can change the freezing point of water.	
Help Received My parents helped me procure the necessary supplies for my project, reminded me to check the freezer, and also helped edit my board and report for grammar.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Hayley E. McDonald	Project Number J0510
Project Title C The Juice: Temperature and Vitamin C	
Abstract Objectives/Goals People are seeking to get the best health benefits and research shows fruit juices are high in Vitamin C. Will the Vitamin C content of fruit juices be affected by temperature? It was hypothesized Vitamin C would be affected in the chilling of various fruit juices as research shows when juices are exposed to oxygen, it lowers the Vitamin C count. Methods/Materials The mg of Vitamin C in bottled and fresh squeezed juices at room temperature and with those chilled for two hours were tested. Control tests found the average number of drops of iodine needed to react with 25 mg of Vitamin C was 50. Iodine drops were added to each identical measured sample jar of 10 different bottled fruit juices along with a starch solution until a blue/black color indicated a reaction with the Vitamin C. The percentage decrease from room to chilled temperature was found by 100 minus the mg of chilled temperature which had been divided by the mg of Vitamin C at room temperature. 3 tests of 10 bottled juices were run in experiment 1 and 5 tests of 10 different types of fresh squeezed and bottled juices in experiment 2. Results All of the bottled and fresh juices tested at room temperature and then chilled showed a drop in the mg concentration of Vitamin C. The mg concentration of Vitamin C in fresh squeezed juices was less than in bottled. The percentage decrease from room to chilled temperature remained basically the same results as those in bottled juices. Most of the juices dropped an average of 50-60% from room to chilled temperature. Conclusions/Discussion In both experiments, the hypothesis was correct because Vitamin C was affected after chilling fruit juices. People should drink their juices immediately upon opening for maximum Vitamin C benefit. It has been shown that bottled fruit juices have a higher concentration because Vitamin C is added. The percentage decrease in all samples was the same. This proves that temperature does affect juices and fresh squeezed juices dont give you more Vitamin C benefit.	
Summary Statement To see the affect chilling on the Vitamin C content in 10 various fruit juices.	
Help Received My parents drove me and bought materials. My sister helped me with science fair guidelines.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Shelli E. Melkonian	Project Number J0511
Project Title Effect of Water and Temperature in Varying the Toxicity Level of Different Pollutants	
Abstract Objectives/Goals My objective is to determine if the pH level of a toxic solution is effected by certain water teemperatures. Methods/Materials The materials that were used in my experiment are : DAP glue, oil based paint, motor oil, paper plates, pH meter, water, salt, plastic cups and lids, jumbo craft sticks, water heater, aquarium. After the toxic solution was dry on the jumbo craft sticks, I tested it by putting them in plastic cups with water, and then I would put those cups in the degree I was testing, which were 48 degrees, 70 degrees, 70 degrees salt water, 76 degrees, and 82 degrees. After 4 days, I would measure the pH level of each toxic souldtion. Results I found out that the higher the temperature is, the pH level will increase. But in 48 degrees, motor oil came out to a way different pH level than DAP glue and oil based paint. Yes, the temperautre does effect the pH level of a toxic solution. Conclusions/Discussion The hotter temperatures that had the toxic souldtion had a higher pH level, which means that it is a base. The cooler temperatures with the toxic solution had a lower pH level, which means that it is an acid. This make me think that in the warmer water temperatures, the toxic solutions could have evaperated into the air and making it more of a base. I predict that these toxins in various temperatures could have an effect on their stability and sturdiness.	
Summary Statement My project is about measuring the pH levels of certain toxic solutions in variuos water temperatures.	
Help Received I did my project on my own	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Camille T. Miake	Project Number J0512
Project Title Orange You Glad You Have Vitamin C? Citrus Fruits: Their Absolute Vitamin C Content and How It Is Affected by Storage	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Which citrus fruit contains the highest absolute vitamin C content? Is that value affected if it is covered or uncovered? My objective is to find which type of citrus fruit contains the highest absolute vitamin C content and to see if over time having the fruit juice covered or uncovered affects the vitamin C content.</p> <p>Methods/Materials 5cc Syringe, Plastic containers with lids, Plastic containers without lids, 500mL of 1% starch solution, Iodine, 250mg vitamin C tablets, 25mL Pipette, 100mL Burette with stop cock, 250mL of distilled water, Juicer, 2125mL of juice of the following: Florida grapefruit, Lemons, Valencia oranges, Limes, Minello Tangerines. I used the titration method to test for the absolute vitamin C content in the juices.</p> <p>Results Results were as follows: for the fresh test, the oranges had the highest vitamin C content, followed by lemons, grapefruits, tangerines, and limes. When looking at the vitamin C content in the stored juice both the covered and uncovered samples had about the same amount of vitamin C content by day 8, though it was lost at different rates.</p> <p>Conclusions/Discussion Valencia oranges had the highest absolute vitamin C content when freshly squeezed. This disproved my hypothesis that the lemons would have the highest content. I have also concluded that the environment in which juice is stored can affect its vitamin C content but not as significantly as I expected. At first the covered juice lost vitamin C slower than the uncovered, however, it kept losing each day. The uncovered lost vitamin C content very rapidly within the first few days but was then able to stabilize itself to the point that by day 8 it had basically the same vitamin C content as the covered.</p>	
Summary Statement Testing different citrus fruits for their absolute vitamin C content and how that value is affected by storage	
Help Received Mother helped research, print papers, and design board and Father for getting me a burette and pipette and identify the different parts of the Scientific Method.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Stefan J. Portale	Project Number J0513
Project Title Effects of Soap, Salt, and Temperature on Water Surface Tension	
Objectives/Goals I experimented to find the effects of certain variables on the strength of water surface tension. The three variables that will be tested are salt, dish soap, and different temperatures. I wanted to find out which of the variables had the most effect.	
Abstract Methods/Materials To complete the experiment my Father and I made a balance out of plastic pieces. On one end of the balance was a small basket and on the other end there was a small plastic disc. This disc rested on the water. I applied staples to the other side until the disc was pulled off the water. The approximate weight of the staples was the amount of surface tension for the particular liquid mixture.	
Results All the variables tested had an effect on the surface tension. Out of the three, soap had the most lowering effect. Salt also lowered the surface tension, but after a point it stopped influencing the surface tension. The higher the temperature was, the weaker the surface tension got. The concentrations used were 33 grams/litre and 78 grams/litre of salt, .001 ml/l, .01ml/l, and 1 mg/l of soap. The temperatures were 48 degrees C, 23 degrees C, and 7 degrees C.	
Conclusions/Discussion Surface tension in liquids is caused by a phenomenon know as cohesion. Cohesion is when the molecules of a substance cling together more tighly to each other than to molecules of other substance. The water molecules at the surface have fewer molecules around them than the ones in the middle, so the bond between these surface molecules is stronger than the bonds of other water molecules. This attractionof the surface molecules to each other is also much greater than their bond to the air molecules surrounding them.	
Summary Statement I tested how different variables affected the surface tension of water.	
Help Received Father taught me how to use Power Point to make graphs and use a drill to build scale.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Alyssa A. Reinhart	Project Number J0514
Project Title Comparing the Differences of Clarity of Fingerprints on the Surface of Glass in Different Temperature Environments	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine which temperature gives the clearest fingerprint on glass. My hypothesis was that the frozen glass would give a clearer fingerprint. I wanted to do this so that police officers who were searching for fingerprints at a crime scene would know where to look for the clearest fingerprints.</p> <p>Methods/Materials Materials-lifting tape,dusting brush,dusting powder,30 glass jars,3 cookie sheets,3 thermometers,rubber gloves,3x5 cards,fingerprints. Methods-I heated 10 jars to 100 deg.,froze 10 jars,left 10 jars at room temp using thermometers. I placed fingerprints on all of them. I let the jars come back to room temperature again.Using lifting powder, I dusted the prints then lifted them with lifting tape & placed each on a card. I then had 4 police officers compare & judge them on a 1-10 scale. I then averaged the results to determine which temperature gave the clearest print.</p> <p>Results The best fingerprint was lifted from the glass that was at a frozen temperature of 32 degrees. The next clearest print was lifted from the glass that was at room temperature (72 degrees). The least clearest print was lifted from the glass that was at a temperature of 100 degrees.</p> <p>Conclusions/Discussion After completeing my investigation, I found that my hypothesis was correct. My hypothesis stated that the glass that was frozen would have a better effect on the fingerprints, because it wouldn't evaporate the oils and perspiration in the fingerprints. The best temperature to find fingerprints at a crime scene is the frozen temp. The second best temperature to find fingerprints at a crime scene is the room temperature (72 deg.) and the third best temperature to find fingerprints at a crime scene is the heated (100 deg). After comparing my results I came to the conclusion that police officers searching for latent fingerprints at a crime scene should first look in areas that are frozen or cold.</p>	
Summary Statement To determine which temperature gives the clearest fingerprint on glass.	
Help Received Police Officer Tom Reinhart showed me how and supervised me as I dusted and lifted the fingerprints off of the glass jars.	



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

Name(s) Natalie K. Schauser	Project Number J0515
Project Title Controlling Crystal Growth	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this project was to establish the best growing conditions for the earth alkaline carbonates (Magnesium, Calcium, Strontium, and Barium), considering temperature and concentration, in order to obtain nice, single crystals with distinct crystal shape and size.</p> <p>Methods/Materials The crystals were grown above saturation concentration for each alkaline earth carbonate, by choosing at least three different concentrations and two different temperatures: (4C and room temperature). Highly soluble earth alkaline salts (chloride or nitrate) reacted with ammonium bicarbonate to form earth alkaline carbonate in a double replacement reaction. The obtained crystals were examined under a microscope that was connected to a computer and shape, size, and density of the crystals were recorded.</p> <p>Results All carbonate crystals grew only at concentrations at least 50 times higher than their saturation concentration. The best growing conditions for calcium carbonate were 5mM concentration at room temperature and 10mM at 4C. The crystals grown at 4C had an average size of 60 um versus 30um at room temperature. The crystal density was about the same for both temperatures. Strontium and Barium grew big, single carbonate crystals best at room temperature. For strontium carbonate a 10mM salt concentration resulted in a crystal size of 80um. Barium carbonate grew best at 5mM concentration. The crystals size was 100um. Magnesium carbonate crystals did not grow well in this set-up. Only a few crystals grew at a concentration of 250mM and they dissolved before they could be counted.</p> <p>Conclusions/Discussion Many things influence crystal growth. While the shape or morphology of the crystal depends only on the earth alkaline ion, the size and number of the carbonate crystals depend directly on temperature and on concentration. Interestingly strontium and barium grew bigger carbonate crystals at room temperature while calcium grew bigger crystals at 4C. Magnesium carbonate crystals dissolved, because the crystals probably attracted water from the air very easily. These results will be useful in Material science, because these crystals can be used as #building blocks# to form high tech mixed crystals.</p>	
Summary Statement The project investigates how temperature and concentration affect earth alkaline carbonate crystals# growth, size and shape.	
Help Received Lab equipment and chemicals were used from the lab of Professor Daniel Morse, UCSB under the supervision of a graduate student: James Weaver.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Megan L. Serpa	Project Number J0516
Project Title The Formation of Frosty Diamond Crystals in an Aqueous Solution of Aluminum Potassium Sulfate	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to evaluate "Frosty Diamond Crystal" growth if one of the following: the "seed" (pure aluminum potassium sulfate), the growing chemical solution (aluminum potassium sulfate dissolved in water), or the "base rock" substrate (granite) is removed. This experiment will test the hypothesis that the seed, the growing chemical solution, and the substrate are required to be simultaneously present for crystal growth.</p> <p>Methods/Materials Four ceramic growing cups of equal size and shape were labeled "control", "no growing chemical solution", "no substrate", or "no seed." The "control" contained all three of the variables; the seed, the growing chemical solution, and the substrate. The cup labeled "no seed" contained the growing chemical solution and substrate only. The cup labeled "no growing chemical solution" contained the seed, water, and substrate. The cup labeled "no substrate" contained the seed and growing chemical solution only. The crystals were observed and data were collected in chart form for four days. Crystal growth was recorded according to size and number of crystals observed on each day. Any crystal larger than or equal to 1/2 inch was recorded as "large". Any crystal smaller than 1/2 inch was recorded as "small"</p> <p>Results Results showed that crystals could not grow without the chemical growing solution, but could grow in the absence of the seed and substrate. It was also noted that when the seed was present, crystals were greater in number and smaller in size relative to the samples which received no seed.</p> <p>Conclusions/Discussion It was concluded that Frosty Diamond Crystals can be grown if the seed and substrate are removed, but will not grow if the growing chemical solution is removed. Furthermore, the presence of seeds increased the number of crystals grown, while decreasing the size of the crystals relative to samples which received no seed. These data do not support our hypothesis. However, it was discovered that crystal formation under the conditions used in this evaluation can be manipulated to produce crystals of differing size.</p>	
Summary Statement To evaluate the relative importance of of the seed, the growing chemical solution, and the substrate in the growth process of Frosty Diamond Crystals.	
Help Received Steve Serpa (father) supervised the use of chemicals and heat in the growth process. Matt and Lori Milnes (uncle and aunt) proof-read text for spelling and and grammar	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Leo M. Simkin	Project Number J0517
Project Title Growing Crystals under Variable Conditions	
Abstract Objectives/Goals To evaluate the variable temperature and solutions saturation effect on the crystallization process speed and the resulting crystal(s) size. Methods/Materials Methods: - Cooling Method - Evaporation Method Materials: - Granulated sugar - Monoammonium phosphate Results When the fast cooling method without evaporation was used for crystallization, then the process of crystallization began earlier than in the slow cooling method, but the rate of crystal growth at a constant temperature was reduced and a fewer number of crystals were formed. When the high-saturated solution was used for crystal growing with the evaporation method at a constant temperature, the crystal speed was higher than for the low saturated solution, but the resulting crystal sizes were smaller. Conclusions/Discussion The faster critical saturation is achieved, by either the fast cooling or high saturation of the initial solution, the sooner crystallization process begins, resulting in a greater number of smaller crystals. Slower achievement of critical saturation will result in slower rate of crystallization, but in a smaller number of larger crystals. One of the practical applications is to determine optimal conditions for food product storage to avoid crystallization of dissolved sugar.	
Summary Statement My project is about growing crystals in different temperatures and with different solution concentration.	
Help Received Father helped with digital photography	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Sara K. Spaventa	Project Number J0518
Project Title Why Are the Apples Brown?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I would like to receive an award for either first, second, or third place as I did in the County Science Fair! I would like all of my hard work recognized by the judges, other contestants and audience and I hope that all of my interviews go very well.</p> <p>Methods/Materials The materials I used were Fuji apples, strips to test the pH of the substances used, a dropper, plastic food wrap, glasses, a thermometer, a browning chart, pens, knives, a cold area such as a freezer, a warm area similar to an oven, a camera, plastic gloves, a small table to place all of the apples on, a timer, and substances that ranged in different pH levels which were lemon juice, orange juice, water, soda (sprite,) mineral water, cranberry juice, and baking soda. The method I used was to first get each substance and then to take the pH strips and test the pH of each liquid, then to line up the slices of apples on the table, then to use the dropper and put an equal amount of drops of each substance on each individual apple, then to set a control apple aside, then to set the timer, then to record how long it takes for each apple slice with each different substance on it to turn dark brown.</p> <p>Results My results were that lemon juice is the best preservative to put on apple slices and that cranberry juice is the worst. The order of the preservatives from best to worst goes from lemon juice, to soda, to mineral water, to water, to an apple slice with nothing on it (control,) to orange juice, to baking soda and ending with cranberry juice. My results for the second experiment were that the best temperature to put apple slices at is a warm temperature such as 100 degrees Fahrenheit, then at room temperature, then a temperature of 39 degrees Fahrenheit, and ending with the worst temperature to put apple slices at when wanting to preserve them which is a freezing temperature such as 32 degrees Fahrenheit.</p> <p>Conclusions/Discussion I came to the conclusion that lemon juice is the best substance to put on apple slices when wanting to preserve them because it is high in citric acid. It also has Vitamins A, C and E in it. These are good because it lowers the pH level of the apple causing it to turn brown slower. It is best to put apple slices at a hot temperature because if you put it at a cold, the ice breaks down the cell walls of the apple and introduces the enzyme called "polyphenol oxidase" to air which is what turns the apple brown.</p>	
Summary Statement My project is about what the factors that are affecting apple slices turning brown and what the best ways are to help preserve the apple slices.	
Help Received Mother helped buy supplies; Science teacher helped set up the board.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Christopher S. Vargas	Project Number J0519
Project Title Which Beverage Stains the Most?	
Abstract Objectives/Goals My project is about the following: does Green Tea, coffee, Tea, Chocolate, Pepsi, Grape Juice, Cranberry juice, or Tang stain teeth the most and does temperature affect staining? I thought that if I set one tooth each in twelve jars, then Hot Coffee will stain the tooth the most. Methods/Materials My materials were the following: baby food jars (12), peps, grape juice, cranberry juice, coffee, tea, green tea, tang drink mix, chocolate drin mix, teeth (12), plate, tubes, tongs, and gloves. The staining of the teeth was measured by a whitening shade guide. Results My results are the grape juice stains the most, cranberry the second,pepsi and hot green tea third, hot tea the fourth, coffee and green tea the fifth, hot coffee, tea, hot chocolate, sixth, and chocolate the least. Conclusions/Discussion My conclusion and results show that my hypothesis was proven incorrect. My conclusion shows that drinking ordinary beverages has a major toll on how badly your teeth get stained.	
Summary Statement My project is about how beverages in various temperatures have different staining levels on teeth.	
Help Received Dentist provided teeth.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Dayna A. Williams	Project Number J0520
Project Title Electricity and Electrolytes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal is to better understand how the concentration of ions and strength of ions affects the flow of electrons through different types of electrolytes.</p> <p>Methods/Materials I used a 12 volt battery, bottle, some wire, light bulb, and a volt meter to measure the amount of current flowing through the selected electrolytes. The electrolytes used were water, salt water, acetic acid, hydrochloric acid, and sulfuric acid. The latter 4 were measured at different concentrations.</p> <p>Results The water and acetic acid conducted electricity as expected and according to my readings. The water conducted no electricity and the acetic acid conducted very little. The salt solution seemed to conduct electricity better at the 6 and 10 percent concentration, not at the higher concentration of salt as expected. As for the two strong acids, HCl and H₂SO₄, HCl conducted slightly more electricity than the H₂SO₄.</p> <p>Conclusions/Discussion I discovered that the higher the concentration of salt does not mean the more ions transmitted, or better conductivity. For some reason the 6 and 10 percent salt solution conducted electricity better than the 19 percent salt solution. I also noticed that the hydrochloric acid tended to transmit slightly more electricity than the sulfuric acid at both concentrations. The acetic acid transmitted a little bit of electricity and the water transmitted none. Therefore, my hypothesis was incorrect in that the more ions there are the more electricity transmitted, but it was correct in that the strong electrolytes transmit electricity much better than weak or nonelectrolytes.</p>	
Summary Statement My project is about showing how the flow of electricity is affected by the concentration of ions in a solution and the strength of ions in a solution.	
Help Received My Godfather, Anthony Walker	