



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Emily E. Aguilar	Project Number J2001
Project Title My Room Is Making Me Sick	
Abstract Objectives/Goals In this project, I used agar plates to test if HEPA filters actually remove mold spores and bacteria from the air. I was interested in this project because I am highly allergic to mold, and my allergist recommended that I try using a HEPA filter in my house. Methods/Materials I first placed 3 agar plates in my bedroom for 48 hours, without a HEPA filter running in the room. I also ran the experiment in my bathroom and living room. After the 48 hours were over, I collected the plates and taped them shut, and every 2 days I counted the number of bacteria and mold colonies, and take notes on their color, size, and shape. I then repeated the procedure with a HEPA filter running in each room while the plates were being exposed to the air for 48 hours. Results My results suggested that HEPA filters do remove most, if not all, of the mold and bacteria in a room. Conclusions/Discussion After looking at my initial results, I discovered that the most mold in my house was in my bedroom. I repeated my experimental procedure twice more, first leaving my bedroom door open while the agar plates were being exposed, and then again by removing my fish tank and its humidity. Neither trial produced the low mold count I wanted, so my parents and I finally decided to redo the floors in the upstairs bedrooms, thinking that there was probably mold underneath my carpet. Now that I have a new wood laminate floor in my bedroom, I am sleeping better, waking up less congested, and not getting sick as often. I went back to my allergist and discovered that my lung capacity has also greatly increased since I eliminated the mold from my bedroom.	
Summary Statement I conducted an experiment to determine whether HEPA filters are effective in removing mold and bacteria from the air.	
Help Received Mother helped design display board; Father helped make graphs.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Kylie L. Akiyama	Project Number J2002
Project Title Which Road Deicer Is the Best for the Environment?	
Abstract Objectives/Goals My objective was to find out which road deicer is the most beneficial for plants. My hypothesis was that the beet salt plants would grow to be the healthiest in height and weight. Methods/Materials To replicate what would happen in a real-life situation, five separate blocks of ice were melted with different deicers: magnesium chloride, calcium magnesium acetate (CMA), rock salt, and beet salt. The fifth ice block was the control. The resulting mixture of water and deicer was used to water radish plants. After 1 week of watering the plants, each of the four tallest sprouts were removed from their pots and placed in an oven for 8 hours, removing the water content. A triple beam balance was used to weigh the dry mass of the sprouts afterwards. Results When compared, the magnesium chloride proved to have the greatest average height and grew the most over the one week of watering with deicer, sometimes even greater than the control. CMA, rock salt, and beet salt fell behind in the measurements, with CMA shrinking the most. After being measured, the magnesium chloride weighed the heaviest along with the control. Conclusions/Discussion Using magnesium chloride is the best deicing method for plants. It provides essential nutrients for the sprouts, assisting their growth while also proving to be an effective deicer. Despite CMA companies claiming to be the most environmentally friendly, the results showed that the deicer had the most adverse effects on the radish plant. The rock salt and beet salt deicers are not as bad as CMA, still causing plants to wither, and are more practical for agencies who use millions of tons of deicer each year because of its inexpensiveness.	
Summary Statement My experiment was designed to determine which method of deicing roads would have the best effect on plants.	
Help Received Gina Osberg provided triple beam balance and magnesium chloride; Chad Lynch at Smith Fertilizer and Grain provided beet salt	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Mahnur A. Bharucha	Project Number J2003
Project Title Sound Asleep? Effects of the Continuous Positive Airway Pressure (CPAP) on Obstructive Sleep Apnea	
Abstract Objectives/Goals I performed this experiment in order to determine whether using the Continuous Positive Airway Pressure (CPAP) appliance would help reduce the dangerous symptoms of patients suffering from Obstructive Sleep Apnea by at least fifty percent. Methods/Materials To verify this, I conducted a survey at the Sleep Center of Orange County which is a sleep clinic located in Irvine. The survey was comprised of questions relating to certain symptoms associated with sleep apnea as well as additional questions indicating whether these symptoms have improved after using the CPAP machine or not. In this questionnaire, I also included a list of questions regarding the enhancement of daily life before and after using the CPAP device. For this study, a total of one hundred and twenty-two patients participated by filling out the survey. Using Microsoft Excel 2010, each question/factor was organized into a table in order to find out the average of all the answers. Later, I organized it into graphs to ease the analysis and to determine whether the hypothesis was correct or not. Results The results showed that my hypothesis was proven correct. I found that 98% of the patients felt that their snoring decreased, and 87% of the patients reported that their fragment sleep was reduced. Restless Sleep was reduced by 89%, daytime sleepiness was reduced by 81%, and general fatigue was reduced by 79%. Reduction in irritability was experienced by 83% and morning headaches were reduced by 92%. Moreover, lessening in paroxysmal nocturnal dyspnea was experienced by 97% patients. After averaging the numbers and percentages, I found out that the patients symptoms' were reduced by 87%. Thus, it could be inferred that the patients symptoms' were reduced more than 50%. Conclusions/Discussion The hypothesis was supported by the results. The CPAP machine does help patients improve their symptoms. The average percent of improvement seen in patient were more than fifty percent. Therefore, the CPAP machine is very efficient for the patients who suffer from Obstructive Sleep Apnea.	
Summary Statement Effects of the continuous positive airway pressure (CPAP) on obstructive sleep apnea.	
Help Received My mother helped me with the board; Dr. Aceela Muqri helped me with making the survey; The Sleep Center of Orange County helped me conduct my surveys; My dad helped me with the graphs; My sister helped me proofread my report.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Joseph N. Blinder	Project Number J2004
Project Title Why Juice?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective is to investigate what happens to the vitamin C content of 3 freshly squeezed juices as they undergo processes similar to those performed on the juices sold at the supermarkets, i.e. flash pasteurization and addition of sugars to enhance the taste of the juice.</p> <p>Methods/Materials I used titration to measure the content of vitamin C in freshly squeezed apple, orange, and pomegranate juices. I prepared a royal blue starch-iodine solution and measured how many drops of juice were needed to cause the solution to change its color from royal blue to the color of the juice being tested. Then I warmed up each juice imitating flash pasteurization technique and checked the content of vitamin C. I then added sugar to each of the three juices and checked the content of vitamin C. My control group were the 3 different kinds of freshly squeezed juices (non-heated, non-sweetened). The experimental group consisted of juices heated to 80C, 90C, 100C and juices sweetened with 2g, 4g, and 6g of sugar.</p> <p>Results When I added sugar to the juice, the more sugar was added, the more drops of juice were needed to make the indicator lose its royal blue color, meaning that there was less vitamin C in each drop of juice. This means that the more sugar was added to the juice the less vitamin C it had. The higher temperature I exposed the juice to, the more drops of juice were needed to make the indicator solution lose its royal blue color, i.e. the less vitamin C was present in the juice.</p> <p>Conclusions/Discussion My hypothesis for this project stated 1)If the freshly squeezed juices are mixed with sugar then the juices lose some of their vitamin C because of the chemical reaction between ascorbic acid and sugar. 2)And if the freshly squeezed juices are heated, then the juices lose some of their vitamin C because the high temperature speeds up the reaction between air and ascorbic acid causing ascorbic acid to break down. The results showed that both parts of my hypothesis should be accepted. My experiment proved that freshly squeezed juices are healthier than those juices purchased in stores.</p>	
Summary Statement I investigated what happens to the vitamin C content of different freshly squeezed juices as they undergo processes similar to the ones performed on the juices sold in stores.	
Help Received Mother supervised and helped operate the stove when I was flash-pasteurizing the juice.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Natalie E. Boust	Project Number J2005
Project Title Do Various Consumable Energy Stimulants Have an Effect on an Organisms' Behavior?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my science fair project is to determine the effects of various energy stimulants on living organisms. The reason I am doing this investigation is to determine if energy drinks are detrimental to the environment and to identify which consumable energy stimulant would have the lesser negative impact on consumers.</p> <p>Methods/Materials # Natural Organic Gardner & Bloome Premium Topsoil; # Sure Ketch Mini Crawlers; # 9 oz Clear Solo Cups; # 4x4 Graphing Paper; # 4 pack Red Bull Energy Drink; # 4 pack Rockstar Energy Drink; # 4 pack Monster Energy Drink; # 1/2 cup measurer; # Graduated medicine spoon; # Duck Tape; # 4 pack Sharpie Fine Point; # 4 pack Ballpoint Pens; Testing Method: After letting the worms to saturate in the contaminated soil, I placed each worm on a sheet of grid paper and set the timer for 30 seconds. In that 30 seconds, I used a fine point Sharpie to mark ever square the worm came in contact with. Each dot on the paper represents one unit.</p> <p>Results Day1: grid test results # Most active group= Water-average 4.6 # Least active group= Monster-average 2 Day2: grid test results # Most active group= Water-average 8.07 # Least active group= Red Bull-average 2.14 Day3: grid test results # Most active group= Water-average 2.67 # Least active group= Rockstar-average .4 Day4: grid test results # Most active group= Monster-average 5.47 # Least active group= Red Bull-average .8</p> <p>Conclusions/Discussion The Monster Energy Group was the most active during testing, so this led me to believe that Monster Energy was the least detrimental. However, after analyzing the results for the Water Group, I discovered that only three out of the original fifteen worms were left (twelve worms escaped from their containers). The worms that escaped their containers had enough strength to crawl out of their designated cup, onto the</p>	
Summary Statement The reason I am doing this investigation is to determine if energy drinks are detrimental to the environment and to identify which consumable energy stimulant would have the lesser negative impct on consumers.	
Help Received Father bought materials; Mother helped arrange title on board	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Sabrina P. Chan	Project Number J2006
Project Title Are Your Eyes Safe? The Efficiency of Contact Lens Solutions	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment is to observe whether contact solutions kill bacteria on contact lenses after one wash. It is hoped that through this experiment, one contact solution will be more effective than the two others. The goal of this experiment is to find growth on the control half of each plate and a low amount of growth on the solution halves.</p> <p>Methods/Materials For this experiment, the Bausch and Lomb Renu Fresh solution, Complete by AMO multipurpose solution, and Opti-Free Replenish multipurpose solution will be tested to kill bacteria from 3 live subjects who wear contact lenses. The three subjects will place their worn contact lenses into one vial filled with a solution and another filled with sterile water (control). After receiving the vials from the subjects, the solutions from the vials will be repeatedly smeared onto a tryptic soy agar plate 4 times using a sterile cotton swab. A total of 45 tryptic soy agar plates will be required. One half will be smeared with the contact solution and the other with the control. After inoculating the plates, they will be placed into an incubator set to 37 degrees Celcius for 72 hours. The results will be recorded and the entire process will be repeated 3 times in order for each subject to use each solution once.</p> <p>Results The Bausch and Lomb Renu Fresh solution killed 99.9% of the bacteria on subject 1#s contact lens, and 100% of the bacteria on subject 2 and 3#s. The Complete by AMO multipurpose solution killed 100% of bacteria from subject 1#s lens, 97% from subject 2, and 99.9% from subject 3. The Opti-Free Replenish multipurpose solution killed 100% of the bacteria on every subject#s contact lens.</p> <p>Conclusions/Discussion In conclusion, contact solutions do kill bacteria from contact lenses and they are vital to keep the human eyes healthy. Throughout all of the trials the Bausch and Lomb Renu Fresh solution and the Complete by AMO multipurpose solution killed 99.9% of the bacteria, and the Opti-Free Replenish multipurpose solution eliminated 100%. The many people who wear contact lenses receive infections and are concerned about finding the right solution. From the conclusions of this experiment, people who are concerned to risk their eye health can see which contact solution was the most efficient throughout the testing.</p>	
Summary Statement This project tests the effectiveness of different commercially-found, multipurpose contact lens solutions.	
Help Received Used lab equipment at Axkin Pharmaceuticals under the supervision of Dr. Tai Wei Ly	



CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s) Grace M. Dailey	Project Number J2007
Project Title Brand vs. Generic: Is Neosporin(R) Original Ointment Really More Effective than Generic Antibiotic Ointment?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project compares the efficacy of NEOSPORIN# Original Ointment with generics Good Neighbor Pharmacy and CVS Pharmacy antibiotic ointments on Bacillus cereus (gram positive) and Rhodospirillum rubrum (gram negative) bacteria. My hypothesis was that NEOSPORIN# would be the most effective as indicated by the larger mean inhibition zone.</p> <p>Methods/Materials 64 nutrient agar petri dishes were prepared. 3 of these dishes were used as controls to see if the bacteria were viable and if the agar was pure (one inoculated with Bacillus cereus, one inoculated with Rhodospirillum rubrum and the last only agar). The remaining 61 petri dishes were divided into two sections, labeled 'B' for brand and 'G' for generic. Each petri dish served as an individual trial (NEOSPORIN# vs. a generic). Petri dish #s1-31 were inoculated with Bacillus cereus and petri dish #s32-61 were inoculated with Rhodospirillum rubrum. A hot water bath was used to melt the antibiotic ointments so that they could be applied via measuring pipet onto the inoculated mediums in measured amounts. Petri dish #s1-16 and 32-46 received Good Neighbor Pharmacy Antibiotic Ointment in the 'G' section, while petri dish #s17-31 and 47-61 received CVS Pharmacy Antibiotic Ointment in the 'G' section. Photographs were taken of each petri dish at 48 and 96 hours post inoculation. Quantitative measurements were taken by measuring the inhibition zone areas of each antibiotic in Adobe Photoshop CC (larger inhibition zone area=greater efficacy).</p> <p>Results The mean inhibition zone areas at 48 hours post inoculation were 78.87 mm² for NEOSPORIN#, 29.93 mm² for Good Neighbor Pharmacy, and 71.58 mm² for CVS Pharmacy. At 96 hours post inoculation, the mean inhibition zone areas were 101.92 mm², 58.63 mm², and 86.89 mm², respectively.</p> <p>Conclusions/Discussion All three of the antibiotics contain the same amount of the same #active ingredients.# However, their #inactive ingredients# differ. NEOSPORIN# Original Ointment contains Cocoa Butter, Cottonseed Oil, Olive Oil, Sodium Pyruvate, Vitamin E, and White Petrolatum. CVS Pharmacy Antibiotic Ointment contains the identical #inactive ingredients# with the exception of sodium pyruvate. Good Neighbor Pharmacy Triple Antibiotic Ointment contains only one #inactive ingredient,# white petrolatum.</p> <p>NEOSPORIN# Original Ointment contains the most #inactive ingredients# and was the most effective (greater mean inhibition zone area).</p>	
Summary Statement This experiment compares the efficacy of NEOSPORIN# Original Ointment with two of its generic counterparts when tested on Bacillus cereus and Rhodospirillum rubrum bacteria (larger inhibition zone indicates greater efficacy).	
Help Received Assistance from my neighbor and science teacher obtaining supplies, cutting, gluing and configuring with Photoshop and MS Word (I had minimal exposure to these programs before my experiment).	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Sierra H. Evans	Project Number J2008
Project Title Determine Which Gloves Give Protection from the Cold and Still Allow for the Best Dexterity and Sensation of the Hands	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine which type of outdoor work gloves provide protection from the cold but allow the best dexterity and sensation of the hands.</p> <p>Methods/Materials During this study I used the 9 hole peg test to test dexterity and the Semmes Weinstein Monofilaments to test sensation. These tests are standardized tests. I also used an infrared thermometer to measure the temperature of the hand.</p> <p>I first obtained a baseline temperature of the hand with the infrared thermometer. Then I applied cold to the hand for 10 minutes and measured the temperature of the hand again. I obtained 10 measurements for each glove.</p> <p>I then obtained a baseline score for each individual on the 9 hole peg test and the Semmes Weinstein Monofilaments. I then retested each individual while wearing the different gloves. Using the data I obtained from these tests I compared and contrasted the different work gloves.</p> <p>Results The results of my investigation on determining which gloves give protection from the cold and allow the best sensation and dexterity indicate that the Neoprene glove provide the best protection from the cold but the Leather gloves allow the best score on sensation and dexterity tests.</p> <p>Conclusions/Discussion My investigation showed that Neoprene gloves are the best type of gloves to use in the cold but you shouldn't use them if you need good manual dexterity or sensation for your job. Leather gloves weren't the best to wear in the cold but they were good if you need sensation and dexterity. Fabric gloves should not be worn if you work in the cold.</p>	
Summary Statement Determining which gloves give protection from the cold but still allow for the best dexterity and sensation of the hands.	
Help Received My mother helped type the report and taught me how to give the standardized tests, Dad helped me center the title on the board.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Michelle A. Gelejian	Project Number J2009
Project Title How Sweet It Is!	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project was designed to measure glucose level in various food and juice categories. Too little glucose in the blood, and your brain and other organs will not have the energy they need to function. Too much glucose in the blood can cause diabetes. To know the concentration level of glucose in a variety of common fruits and juices, will help us separate the ones which are high in glucose, so that we can minimize them from our daily diet. Since too much glucose in our blood can cause diabetes, which is not a good disease to have.</p> <p>Methods/Materials I performed the following steps to measure the concentration of glucose in a variety of foods: Poured a small amount of liquid into a cup. Dipped the test strip into the liquid or pressed the test strip on the foods. Started the stopwatch as soon as the test strip has been dipped, waited for 30 seconds. Compared the color on the test strip with the color on the side of the container to determine the glucose concentration. Materials: Disposable cups Glucose tablets Tap water Glucose testing strips Foods and Juices (Orange juice, Mango juice, Ketchup, Peanut Butter, Honey, Ice cream, Pear, Apple, etc.)</p> <p>Results I was very surprised in my test results. My hypothesis was actually disproven. I thought that orange juice would have the highest amount of glucose, but my tests showed that in fact mango juice was the one with the highest amount of glucose.</p> <p>Conclusions/Discussion With these experiments, I learned that a little bit of glucose is ok, but too much glucose in the blood can cause diabetes. It is better to know what's in your food, so you can have more control over what you eat. I can use this information to help people be aware as to the types of food they eat, so that they may eat healthy and live longer.</p>	
Summary Statement To measure the concentration of glucose in a variety of common fruits and juices, in order to find out which ones are high in glucose, so we can minimize them from our daily diet.	
Help Received My mother helped me with the photos.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Elizabeth Gonzalez	Project Number J2010
Project Title Sunscreen Effectiveness against Ultraviolet Radiation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to figure out what sunscreen product is more effective in blocking ultraviolet radiation, which can cause skin cancer if not properly protected.</p> <p>Methods/Materials Four different brands of sun screen lotion with the same SPF rating of 30 were utilized (Aveeno, Banana Boat, Coppertone, and Neutrogena). To assist with the procedure the following materials were used: UV meter, plastic wrap, graduated cylinder, latex gloves and a nice clear sunny day. A total of 60 trials were conducted, twelve trials for each brand of sunscreen. Utilizing the plastic wrap as the control of the experiment, the percent difference in how much ultraviolet radiation was repelled with each sunscreen brand was calculated.</p> <p>Results The majority of the trials performed on Banana Boat proved to block the largest amounts of ultraviolet radiation. Banana Boat was 51% better in blocking the ultraviolet radiation than the plastic wrap alone. Aveeno was 45% better in blocking the ultraviolet radiation than the plastic wrap alone, Coppertone was 41%, and Neutrogena was 29%.</p> <p>The wavelength results concluded that Banana Boat was the best sunscreen in blocking ultraviolet radiation out of the four different brands. Banana Boat had an average wavelength of 416.75, Aveeno had an average wavelength of 460.17, Coppertone had an average wavelength of 500, and Neutrogena had an average wavelength of 601.17. The lower the number of the wavelength, the better the sunscreen brand was able to block the ultraviolet radiation.</p> <p>Conclusions/Discussion Although the hypothesis of the experiment was that Aveeno would have been the best sunscreen in blocking ultraviolet radiation, the experiment results did not support the hypothesis. Instead, Banana Boat proved to be the most effective in blocking ultraviolet radiation. This project helped me become more knowledgeable on ultraviolet radiation, how it impacts the skin, and the importance of protecting the skin with an effective sunscreen lotion.</p>	
Summary Statement To identify which sunscreen brand is most effective in protecting against ultraviolet radiation.	
Help Received Used UV meter from school and received guidance from my science teacher	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Kate A. Harrington	Project Number J2011
Project Title The Effect of Sunscreens' Sun Protection Factor (SPF) on Ultraviolet (UV) Solar Beads	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to find out if a sunscreen with a high Sun Protection Factor (SPF) is put on Ultra Violet (UV) color-changing beads, then the color of the beads will not change to a dark color when exposed to the sun's UV rays. The color intensity of the UV beads will decrease the higher the SPF value.</p> <p>Methods/Materials Sunscreens with SPF 15, 30, 55, 100 containing chemical active ingredients and SPF 30 with the physical active ingredient, Titanium Dioxide, were tested on Solar Active UV beads. Three runs with 5 trials each were conducted for a total of 15 trials. I put the UV beads in clear plastic bags and applied the different sunscreens to each bag and observed the color of the beads after being exposed to the sun. A control bag with no sunscreen applied to it was used on each trial to compare with the other beads' results. The color intensity scale: 4=Dark, 3=Medium, 2=Light, 1=white, was used to record the results.</p> <p>Results If the beads were a dark color, according to the color intensity scale, then the sunscreen did not work well. The lighter the beads' color the better the sunscreen worked. Sunscreens with SPF 100 and 55 worked the best with an average color intensity of 2.0 and 2.2 respectively. However, sunscreen with SPF 100 had the most consistent results. Sunscreen with SPF 30 and the sunscreen with SPF 30 containing only the physical active ingredient, Titanium Dioxide, had the same average UV bead color intensity of 2.8. The control beads color intensity was 4.0. No beads remained white in color.</p> <p>Conclusions/Discussion My results supported my objective because the experiment's results showed that the highest SPF sunscreens (SPF 100, SPF 55) resulted in a light bead color and the lower SPF sunscreens (SPF 30, SPF 15) resulted in a medium bead color. The sunscreen containing chemical active ingredients worked better than the sunscreen containing the physical active ingredient. This information could benefit people by helping them select the most effective sunscreen.</p>	
Summary Statement My project was to find out what sunscreens' Sun Protection Factor (SPF) works the best and to see if the physical ingredient in sunscreens work better than chemical ingredients in sunscreens using Ultra Violet (UV) color-changing beads.	
Help Received My mother helped me learn Excel to produce my charts and graphs.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) John C. Howell	Project Number J2012
Project Title Is Green as Clean?	
Abstract Objectives/Goals The objective of my project is to find out if green disinfectants are as effective at killing bacteria as regular disinfectants. Methods/Materials Five different disinfectants were used in this experiment, three green and three non-green. The green included Clorox Green Works, Vinegar and water, and Clean Well. the non-green included Lysol, Formula 409, and Windex. Each disinfectant was sprayed on a counter top with raw chicken on it then swabbed and put in an incubator. This was repeated five times and then the average area of bacteria was calculated and analyzed. Results I found that out of my six disinfectants, Formula 409 worked the best, but overall, green disinfectants were more effective than non-green disinfectants. Conclusions/Discussion My hypothesis had two parts to it. It said that Formula 409 would work the best and that chemical disinfectants would be more effective than green disinfectants. However, I found that even though Formula 409 worked the best, green disinfectants were more effective, so my hypothesis was partly correct. Information from this project informs us that we don't have to use harsh chemicals to get rid of bacteria, we can use healthier, safer products to get the job done.	
Summary Statement My project is about the effectiveness of "green" disinfectants versus regular disinfectants	
Help Received Mom helped with display board, Dad assisted with collecting samples	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Emily Huang	Project Number J2013
Project Title Which Soap? Comparing the Effectiveness of Taiwan and American Bar Soap in Killing Bacteria	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to compare two countries bar soap and see how effective they were in eliminating bacteria. The goal was to see whether Taiwan bar soap, a natural soap, would be more effective than American bar soap, a commercially made soap.</p> <p>Methods/Materials This experiment was split into three trials. For each trial, 8 subjects washed their hands and followed the same process. First, all the subjects printed their palm into a TSA agar plate and it was incubated at 37 degrees Celsius. The first four subjects put gloves on their right hand and washed their left hand with American bar soap and then, they put gloves on their left hand and washed their right hand with Taiwan soap. For the next four subjects, they did the reverse of the other subjects. The subjects were timed for twenty seconds and they dried their hands. Their palm was printed into a plate and incubated. 16 colonies of bacteria were gram-stained to see what gram the colonies of bacteria were.</p> <p>Results The results show that American bar soap killed around 75-80% of the bacteria and Taiwan bar soap killed around 70 to 75 percent of the bacteria. The bar soaps killed a great amount of the bacteria on the hands but did not kill as much as expected. It was originally hypothesized that bar soap would kill around 90-95% of the bacteria but the bar soaps that was used for this experiment only killed around 70 to 80 percent.</p> <p>Conclusions/Discussion The data collected from testing proved that American bar soap is more effective in killing bacteria than Taiwan bar soap. American bar soap killed about 5 to 6 percent more bacteria than Taiwan bar soap. American bar soap is able to eliminate more bacteria than Taiwan bar soap because it has chemicals that kill off the bacteria.</p>	
Summary Statement The project is about whether American bar soap or Taiwan bar soap killed more bacteria.	
Help Received Dr. Doran provided lab; Parents provided transportation; Czarinah Paco and Lindsay Bradford helped guide the project; Neighbor helped get project started	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Amos Khasigian	Project Number J2014
Project Title Is Darker Better?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine which color tray will decrease raisin drying time without effecting raisin quality.</p> <p>Methods/Materials Obtained/picked approx 500lbs of Thompson seedless grapes. Obtained butcher paper and cut out 4 trays (27#x33#) of Black, blue, brown, green, pink, and poly coated trays. Weigh out 21lbs of grapes and place it on a tray. This process was repeated for all 24 trays. Weighed trays periodically, until they reach approx. 5lbs. Have raisins analyzed by USDA inspection service to determine quality.</p> <p>Results Grapes on dark brown and black trays reached the 5 lb threshold faster then other colors. Raisin quality was highest for the poly coated tray followed by black.</p> <p>Conclusions/Discussion My conclusion was that while the black tray did not dry the fastest nor have the highest quality raisins, it was second in both areas but not by much. This suggest that the darker tray could provide a farmer with an opportunity to consistently decrease drying time while still providing high quality fruit. This decreases the farmers risk of crop loss while maximizing returns.</p>	
Summary Statement To determine which color tray will decrease raisin drying time without effecting raisin quality	
Help Received Used USDA dried fruit inspection service to analyze raisin quality Had help picking 525lbs of grapes. Used electronic scale borrowed from FOWLER PACKING COMPANY	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) William C. Mrdjenovich	Project Number J2015
Project Title Sound Hygiene: Is an Ultrasonic Toothbrush More Effective at Killing Bacteria?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this experiment was to find out which toothbrush performs the best by observing bacterial growth rates before and after brushing for multiple age groups.</p> <p>Methods/Materials Working with 3 test subjects, ages (13, 50, and 59) using 9 prepared Petri dishes per experiment each trial included 3 full experiments. Each experiment collected morning samples before eating or brushing and exposed 1 Petri dish per subject. Each subject then brushes with assigned toothbrush and 2 oral collections were taken and 2 Petri dishes per subject are exposed to post-brushing collections. Each experiment was observed and digital photos taken every 24 hours for 3 days. The experiment repeats 2 more times rotating the brush selection between test subjects so each trial collects data on each subject using each brush. 3 full trials were completed. OpenCFU(c) software was used to count colonies and provided data for comparison. 81 sterile cotton swabs and sterile Petri dishes with nutrient agar; 1 closable container to store exposed Petri dishes in darkness; 1 Emmi-Dent# Ultrasonic toothbrush with 3 heads; 1 tube of Emmi-Dent# Nanobubble toothpaste; 1 Sonicare# toothbrush with 3 heads; 1 manual (hand-held) toothbrush ; 1 tube of Colgate toothpaste; High resolution digital camera, computer, and colony counting software; Gloves for hand protection, tape to seal Petri dish and Sharpie to label.</p> <p>Results The Emmi-Dent(R) ultrasonic toothbrush was least effective at killing bacteria while the Sonicare(R) toothbrush, that used vibrations, killed the most bacteria. The Emmi-Dent(R) ultrasonic on average had a 9.17% colony loss, the Sonicare(R) toothbrush on average had a 21.08% colony loss, and the Manual toothbrush on average had a 10.07% colony loss.</p> <p>Conclusions/Discussion The Sonicare(R) toothbrush was the most effective at killing bacteria for each age group. By safely increasing intensity of the Emmi-Dent(R) ultrasonic toothbrush it might be able to destroy more bacteria. Combining the Emmi-Dent(R) ultrasonic toothbrush with vibration would make a more effective toothbrush. It was also noticed that each test subject had a different toothbrush that was most effective for them. The Manual toothbrush worked best for the 50 year old, the Emmi-Dent(R) ultrasonic toothbrush worked best for the 59 year old and the Sonicare(R) toothbrush worked best for the 13 year old.</p>	
Summary Statement This project compares an ultrasonic toothbrush against an electronic toothbrush using vibration and one that is hand-held to investigate how effective ultrasound is at killing bacteria.	
Help Received Science Teacher: Mrs. Elaine Gillum provided support during this experiment and helped the researcher decide on what direction to pursue. Jamie Curtis (mom) and Charles Mrdjenovich (Dad) both participated in this experiment as test subjects and purchased required materials.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Matthew S. Ng	Project Number J2016
Project Title Perfect Pancake	
Abstract Objectives/Goals My objective in this project was to find the best milk product that would retain moisture and thickness in pancakes over time. Methods/Materials I used buttermilk, whole milk, almond milk, and skim milk in Central Milling Six Grain Waffle and Pancake Mix and made each batch in the same manner. The pancakes in each batch were cooked for the same amounts of time and then weighed and measured for height. I then simulated the pancakes sitting in a buffet tray by baking them in the oven for 1 hour 30 minutes at 200 degrees F. After that time I re-weighed and re-measured the heights of the pancakes. Results Pancakes made with buttermilk and the mix produced the thickest pancakes. Almond milk made the most moist pancakes. Conclusions/Discussion While the buttermilk pancakes had the most thickness, the almond milk held in the most moisture. Both fat and sugar content affect the texture of pancakes. I believe this is because the sugar creates the moisture while the fat creates a balloon making a pancake thicker.	
Summary Statement My project looks at the effects the components in different types of milk have on the moisture of pancakes.	
Help Received Mom supervised cooking on the stove.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Aisha N. Patel	Project Number J2017
Project Title Don't Get Burned!	
Abstract Objectives/Goals The purpose of my project was to observe the impact of various pharmaceutical agents in prevention of damage to the skin cells against UV radiation. I hypothesized that all broad- spectrum sun protecting agents (titanium dioxide, zinc oxide, & avobenzone/oxybenzone) would be effective in preventing damage to the cells, but that the combination of avobenzone/oxybenzone would be most effective because it is chemical blocker.	
Methods/Materials *I used bacterial cells to simulate skin cells.* Tryptic soy agar plates were streaked with diluted bacterial cells using a calibrated loop. *I built an incubator at home using a Styrofoam box and a heat lamp.* Part1-agar plates were exposed to UV light for a specified time period. The control was not exposed to UV light. After exposure, plates were incubated for 48 hours. Number of simulated cells were observed and counted. Part 2- titanium dioxide, zinc oxide, and avobenzone/oxybenzone were spread onto separate plastic wrap sheets, which were then placed over the plates as a protected covering. Two controls were created. The plates were then exposed to UV light for specified time lengths. After exposure, plates were incubated for 48 hours. Number of simulated cells were observed and counted. *The experiment was repeated for three trials.*	
Results After incubation, simulated skin cells not exposed to UV light were observed to have grown. Simulated cell growth decreased significantly with increasing time exposure to UV light. After covering the plates with titanium dioxide, zinc oxide, and avobenzone/oxyebnzone, simulated cell growth significantly increased compared to the plates which did not have any pharmaceutical agents. However, the plates covered with zinc oxide were observed to have the most simulated skin cell growth. All pharmaceutical agents are very effective in preventing damage to human skin cells from the ultraviolet radiation of the sun and need to be used daily.	
Conclusions/Discussion The results proved my hypothesis partially correct. All of the pharmaceutical agents had a great impact in preventing sun damage to the cells. Zinc oxide had the greatest impact. Zinc oxide is recognized as a physical agent because it reflects and scatters sunlight. However, it also absorbs UV radiation by a process of electron excitation called band-gap absorption, and turns it into harmless infrared light which is disposed as heat, thus causing no damage to skin cells.	
Summary Statement I compared the effectiveness of different broad-spectrum pharmaceutical agents in preventing damage to the cells against UV radiation.	
Help Received Received help from parents.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Annaliese N. Rupp	Project Number J2018
Project Title One Flush Is Not Enough	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine the number of flushes that are required to remove microorganisms from toilet water after an episode of diarrhea. To determine the effects of different automatic toilet bowl cleaning products on microorganism removal.</p> <p>Methods/Materials Constant levels of Germ Glo were introduced and evenly distributed in toilet water of three different toilets. Photographs were taken before and after each flush after illuminating the toilets with UV light. Photographs were then analyzed using Image J software. Fluorescence was measured and compared. Testing was also performed after using three different automatic toilet bowl-cleaning products. The toilet bowl rim and surrounding floor surfaces were analyzed for fluorescent aerosol droplets after each flush. Four flushes were performed when evaluating each test condition. Each test condition was tested in triplicate.</p> <p>Results Multiple flushes were required to remove Germ Glo when evaluating each condition. Decreases in fluorescence were seen with sequential flushes. Differences were seen when evaluating different toilets and different cleaning products. The use of toilet cleaning products reduced fluorescence in toilet water. Aerosol droplets were seen on the toilet rim and surrounding areas after most flushes when evaluating each condition.</p> <p>Conclusions/Discussion Toilets should be flushed at least 3 times when a family member is experiencing an episode of diarrhea. Lids should be placed down to limit aerosols contaminating the surrounding area surfaces. Test results also demonstrate the importance and added advantage of using cleaning products. Scrubbing Bubbles Toilet Cleaning Gel appeared to produce the most favorable results.</p>	
Summary Statement Determined the number of flushes required to remove diarrhea from three different toilets and the effects of three different automatic toilet bowl cleaners on diarrhea removal (aerosol production also measured).	
Help Received My teacher, Donna Harbison, and my parents provided support and guidance in performing this project.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Alyssa M. Thue	Project Number J2019
Project Title Oil Spill Clean Up	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my experiment was to determine which type of cleaning product removes the most oil from duck feathers in the case of an oil spill: Dawn Dishwashing Liquid, Witch Hazel or Baking Soda. My hypothesis was that Dawn Dishwashing Liquid would remove the most oil from duck feathers.</p> <p>Methods/Materials In the experiment, duck feathers were submerged in motor oil and then cleaned off with different cleaning products. The results were recorded by weighing the duck feathers on a pan balance before being submerged in oil, after being submerged in oil, and after cleaning off the oil. Three cleaning products were used; Dawn Dishwashing Liquid, Witch Hazel, and Baking Soda.</p> <p>Results It was found that the most effective cleaning product for removing oil from bird feathers was Dawn Dishwashing Liquid. It was also found that Baking Soda was even less effective than the control, water.</p> <p>Conclusions/Discussion In conclusion, my hypothesis was correct. Dawn Dishwashing Liquid was the most effective cleaning product for removing oil from duck feathers.</p>	
Summary Statement My project tested which cleaning product removed the most oil from oiled duck feathers.	
Help Received Borrowed pan balance from science teacher. Parents bought materials and helped with calculations.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Juliana E. Valenzuela	Project Number J2020
Project Title Incredible Jello: Which Additive Makes the Strongest Gelatin?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Many people who are suffering from osteoarthritis, rheumatoid arthritis, and osteoporosis use gelatin to help with their conditions. It also can be used to strengthen bones, joints, and fingernails. Through this project, I will discover the additive that creates the strongest gelatin. Maybe my discovery could help various areas such as medical and agricultural problems. Extracting gelatin from cows could possibly cause diseases. This project might be able to solve these problems. Knowing more about our something such as gelatin can improve our world one step at a time. Gelatin comes from collagen which is what keeps our skin from sagging.</p> <p>Methods/Materials Materials: 1. Small paper cups, 2 needed but have extra incase one is broke; 2. Masking tape; 3. Tablespoon; 4. Gelatin-plain ;5. Saucepan; 6. Spoon; 7. Paving Knife; 8, Scissors; 9. Sand paper, or nail file; 10. 20 quarters; 11. Liquid measuring cup, 1 quart size; 12. Lab notebook; 13. 2 measuring cups; 14. Popsicle sticks; 15. Popsicle molds with lid should be separate from the stick portion.</p> <p>Method: I made gelatin and added sugar, salt and milk to the different popsicle molds. Then I tested the strength/thickness of the gelatin by putting a dixie cup and added quarters to see how much weight each gelatin could carry.</p> <p>Results After doing the experiment, I have come to realize that my hypothesis was correct. Sugar was the additive that was able to beat out the other two because of its many traits. Concentration is a factor which helps determine what state the gelatin will be in, and sugar is an additive that is able to harden when concentrated. Also, bacteria are not found in places with a lot of sugar because it is a preservative. For this reason, the bacteria were unable to deposit its own enzyme which would have digested the outside. The average weight the powdered milk was able to hold was 20.79 grams. This additive was unable to create gelatin that was stronger over the other two. For salt, The average weight it was able to withstand was around 29.54 grams. The gelatin made with salt was stronger than the powdered milk but not as sturdy as the sugar. The average weight sugar was able to hold was 40.95 grams. Overall, sugar was the additive that created the sturdiest gelatin.</p>	
Summary Statement I will test what additive will produce the strongest gelatin.	
Help Received my mother helped supervise the boiling water in the kitchen to make the gelatin.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Nolan W. Yamada	Project Number J2021
Project Title The Effects of Pasteurization on the Vitamin C Content of Raw Milk	
Abstract Objectives/Goals To test if the process of pasteurization will effect the levels of vitamin C in raw cow milk compared to the pasteurized milk from the same sample. Methods/Materials MATERIALS 10 dairy cows; 1 Vitamin C testing kit; Pasteurizer; 10 sealed containers for stowing milk; Notebook ; sharpie; Pencil; Stop watch ; Veterinarian. PROCEDURES 1. Gather all materials. 2. Gather milk from cow 1. 3. Place milk container 1. 4. Take testing material and test the raw milk from container 1 for Vitamin C. 5. Record results. 6. Place raw milk from container 1 and put it in the Pasteurizer. 7. Pasteurizer the milk for 30 min with a temperature of 63 °C. 8. Once pasteurized, let cool for ten minuets. 9. Then test for vitamin C levels using the testing kit. 10. Record results. * Repeat steps 2-10 for cows and containers 2-10. Results The pasteurization process did effect the vitamin C content of raw milk. The most that the raw milk vitamin C levels were decreased by was 66% and the low was 20%. Conclusions/Discussion This shows that the process of pasteurization does in fact decrease the vitamin content of raw cow's milk. Compared to store bought cows milk, there was a significant amount in the raw milk but almost no trace in the pasteurized milk. I have concluded that the process of pasteurization majorly decreases the amount of vitamin C in raw cow's milk when pasteurized.	
Summary Statement This project is about testing raw cows milk to see if when pasteurized, the vitamin C content decreases	
Help Received Veterinarian collected milk; Teacher helped with the scientific process.	