



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Jaidyn Camino; Bonney Shehadey	Project Number J1901
Project Title Which Ingredient Keeps Cut Roses Freshest?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to find which material can help to keep cut roses freshest for the longest period of time. We believe that the flower that uses flower food will last the longest because most florists give the food packets when you buy a bouquet.</p> <p>Methods/Materials Six glasses with cut roses and different ingredients in every one were prepared and placed in a window facing east. Flower A had distilled water, flower B had tap water, flower C had sprite, Flower D had baby aspirin and tap water, flower E had white sugar and tap water, and Flower F had a flower food packet and tap water. Every day we took pictures of the flowers and recorded observations about how each flower was doing until all the flowers except one of them died. In order to determine which one was the freshest we compared the flowers to paint chips so we would have a consistent measurement of how dead or alive the flowers were and watch the gradual changes in color. We repeated this cycle three times.</p> <p>Results Overall, the flower that used distilled water remained freshest for the longest amount of time. The flower that used sprite was the first to die every time.</p> <p>Conclusions/Discussion Our conclusion is that Distilled water is the best ingredient to use in order to keep cut roses alive for the longest possible.</p>	
Summary Statement The main focus on our project was to see which ingredient we could give to cut roses in order to make it stay as fresh as possible for the longest amount of time possible.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Andrew I. Cardoso	Project Number J1902
Project Title Determining the Most Effective Method to Clean a Pacifier	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to determine the best way to wash a pacifier to prevent babies from placing bacteria in their mouth. If parents are going to give a child a pacifier we should find the most effective way to kill the germs on it.</p> <p>Methods/Materials Use gloves to open pacifier, then swab with cotton swab. Apply sample to petri dish treated with agar. Drop pacifier on floor, swab pacifier with cotton swab. Apply sample to petri dish treated with agar. Clean pacifier, swab pacifier, and apply sample to petri dish treated with agar. Repeat steps cleaning with Soap and Water, Baby Wipes, Hand Sanitizer, and Bottled Water. Perform 10 trials per control and each cleaning method. Observe petri dishes for 10 days and perform a quantitative count. Chart number of bacteria each day in data book.</p> <p>Results #Cleaning a pacifier with hand sanitizer after being dropped on the floor showed an average bacteria growth of 3.1 colonies after 10 days. This was the most effective of all methods used. #Cleaning a pacifier with soap and water after being dropped on the floor showed an average bacteria growth of 4.2 colonies after 10 days. Which was effective at eliminating some of the bacteria found on pacifier. #Cleaning a pacifier with baby wipes after being dropped on the floor showed an average bacterial growth of 8.7 colonies after 10 days. This method was slightly effective at removing bacteria from the pacifier. #Cleaning a pacifier with Purified Water after being dropped on the floor showed an average bacterial growth of 9.9 colonies after 10 days. Which, was the least effective method cleaning a pacifier.</p> <p>Conclusions/Discussion After completing this project it has been determined that the hand sanitizer is most effective allowing the least amount of bacteria growth with an average of 3.1 bacteria colonies per petri dish. Hand soap is slightly less effective with an average bacteria colony growth of 4.2 bacteria colonies per petri dish; baby wipes averaged 8.7 bacteria colonies per petri dish, and the purified water is the least effective with an average bacteria colony growth 9.9 per petri dish. In conclusion, hand sanitizer is the best cleaning option of the samples tested for killing germs on pacifiers. Since many illnesses and infections are caused by bacteria it is very important to take reasonable precautions to prevent unnecessary exposure to infants. This will help keep babies healthy and happy.</p>	
Summary Statement This investigation is to determine the best way to wash a pacifier to prevent babies from placing bacteria in their mouth. If parents are going to give a child a pacifier we should find the most effective way to kill the germs on it.	
Help Received Mom helped with photos and board. Dentist help with Experimental procedures.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Aliyah Dost	Project Number J1903
Project Title Operation Combat Cholesterol	
Objectives/Goals For my project, I compared the effectiveness of home remedies and over the counter medication on lowering cholesterol. My hypothesis was that the Niacin 1,000mg capsule would be the most effective in decreasing cholesterol, while the cinnamon water will be the least effective.	
Abstract Methods/Materials The cholesterol I used was pig fat because it is the closest to real human fat/cholesterol. The solutes I used included apple cider vinegar, fiber, green tea, cinnamon water, pomegranate juice and Niacin 1,000mg capsules. First, I added 10g of pig liver to each solute and incubated the jars for 30 minutes at 37 degrees Celsius. Then, I weighed the pig fat and added it to the solute-pig liver combo. After 6 hours of incubation I weighed the jars again and calculated the difference. This process is commonly used in toxicology to mimic liver metabolism.	
Results I conducted 30 trials. The following are the averages at which the solutes decreased the amount of pig fat: green tea by 15.5g, the pomegranate juice at 13.5g, Niacin 1,000mg capsule at 12g, apple cider vinegar at 11g, fiber at 10.5g, and cinnamon water by 8.5g of fat.	
Conclusions/Discussion My results show that the first part of my hypothesis was incorrect because the green tea decreased the most amount of pig fat and not the Niacin 1,000mg capsule. The latter part of my hypothesis was correct because cinnamon water did decrease the least amount of pig fat. With these results I want to better educate people about the effectiveness of home remedies on lowering cholesterol. I would like to also further my research to find a way to add the antioxidants found in the home remedies to the medications to give them an added benefit.	
Summary Statement Do home remedies or over the counter medication work better to lower cholesterol?	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Nadia Farooq; Elizabeth Sun	Project Number J1904
Project Title Glucose in Fresh Fruit	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of our science fair project was to test five different types of fresh fruit juices determining which types of fresh fruit juices had the highest and lowest levels of glucose.</p> <p>Methods/Materials In our experiment, we tested the glucose levels of watermelon, pineapple, apple, orange, and strawberry juices. We conducted the experiment using Diastix glucose test strips for three trials.</p> <p>Results The results showed that watermelon juice had the highest average percentage of glucose at 1.67% and orange juice had the least average percentage of glucose at 0.67%.</p> <p>Conclusions/Discussion Therefore, we concluded that Glucose Index was one of the main factors in determining the glucose levels of a food/ drink, and that watermelon juice has the highest glucose levels, and orange juice the least.</p>	
Summary Statement We try to help people with diabetes, to understand which fruits are better for them to stay at the ideal blood sugar level.	
Help Received Our moms bought fruits and taught us how to use fruit juicer. Pharmacy provided glucose test strips.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Natalie G. Helms	Project Number J1905
Project Title Chickens + Carotenoids = Quality Eggs?	
Abstract Objectives/Goals The objective of this experiment is to determine if adding fruits and vegetables rich in carotenoids to a chicken's normal, daily diet of egg layer feed it will improve the quality of the eggs. Methods/Materials Eggs from thirteen hens were collected for 25 days. The first four days were used as the control group. On day five carotenoid rich foods were added to their daily layer feed. Five hens received pumpkin and eight received spinach. Collected eggs were weighed in grams with the shell and without. Then each egg was cracked open into a white dish. The shade of the yolk was then determined by using a DSM Yolk Color Fan. Finally, the eggs were put into small disposable containers so they would not be wasted. Results Vegetables containing high levels of carotenoids were fed to laying hens to see if the quality of the eggs improved based on the yolk color. The group of chickens that were fed spinach had a beginning control yolk color of 6.5 (averaged). After feeding spinach for 14 days, the highest yolk color that was recorded was 12 (individual). The average increase in yolk color was 3 shades on the DSM Yolk Color Fan. The group of chickens that were fed pumpkin had a beginning control yolk color of 6.75 (averaged). After feeding pumpkin for 14 days, the highest yolk color that was recorded was also 12 (individual). The average increase in yolk color was also 3 shades on the DSM Yolk Color Fan. Conclusions/Discussion Based on data, research and testing it can be concluded that feeding chickens a supplement diet of carotenoid rich spinach and pumpkin can improve the quality of eggs. On the average the egg yolks increased in color by three shades on the DSM Yolk Color Fan. The chickens fed pumpkin scored between ten and twelve. The chickens fed spinach scored between nine and eleven. The quality of the egg has improved because of the increase in carotenoids. Studies have shown that supplementing the daily feed of egg-laying chickens with foods high in carotenoids increased egg yolk color and carotenoid contents. This means that the chicken deposits the nutritious carotenoids in the egg making them higher in quality.	
Summary Statement The objective is to determine if adding foods rich in carotenoids to the daily diet of a chicken will improve the quality of their eggs.	
Help Received Mom drove me to feed chickens. Friends let me use their chickens. Mom helped with typing.	



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Isabella U. Hurvitz	Project Number J1906
Project Title What Does It Take to Make Clean Water in a Contaminated World?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of the project was to determine which inexpensive water treatment method was most efficient by looking at its ability to reduce water turbidity and bacteria. The project compared the methods with the purpose of finding a treatment that filters water effectively and is also well suited for the economic capabilities of the people in developing countries.</p> <p>Methods/Materials The treatment methods that I tested were: the LifeStraw media filtering straw, the Sawyer MINI media membrane device, Potable Aqua Iodine Tablets, the Steripen Emergency UV Purifier, and boiling. Water from Lake Los Carneros was treated using each method and compared to samples of untreated lake water and Kirkland Drinking Water. The turbidity of all collected samples was measured using a Hach 2100AN Turbidimeter. Then, bacterial colonies were grown on agar plates with swabs of each sample and counted after 24 hours. The efficiency of the methods was judged by the change in turbidity and the amount of bacteria colonies grown due to treatment.</p> <p>Results The Sawyer MINI is the overall most effective treatment with a 99.62% average difference, while all of the other treatments did not achieve an average difference greater than 60%. Individually, however, the device that was able to reduce bacteria most efficiently was the Sawyer MINI which had a 99.65% difference after treatment and the device that had the best results with reducing turbidity was the LifeStraw media filter straw which had a 99.87% difference after treatment. None of the treatments were able to reduce the quality of the lake water to that of the Kirkland Water which had a 99.99% average difference.</p> <p>Conclusions/Discussion The initial question of the experiment asked which kind of inexpensive water treatment method is most efficient at reducing water turbidity and total bacteria. The results determined that the Sawyer MINI filtering device was the overall most efficient treatment. The second part of the question asked how method and design affect treatment efficiency. This is answered by looking at the design and method of the Sawyer MINI treatment which is a media filter that uses a hollow fiber membrane. A real-world application for the results of the experiment would be to provide Sawyer MINI devices to people in developing countries and if the research continued, a better option could be found with the potential to benefit many lives.</p>	
Summary Statement The project compared the efficiency of different inexpensive water treatment methods by judging the treatments' effects of reducing the turbidity and bacteria of lake water.	
Help Received Samantha Nguyen- UCSB grad student answered questions about microorganisms and culturing bacteria; Dr. Mark Morey provided access to the 2100AN Turbidimeter; Chemist Juliet Znovena reviewed report for appropriate scientific technique	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Corinne J. Jabba	Project Number J1907
Project Title Water You Filtering?	
Abstract Objectives/Goals Aquarists perform bothersome and time-consuming biweekly 20% water changes to remove nitrates, keeping their fish tanks clean and healthy. Unfortunately, colonies of beneficial nitrifying bacteria are removed in the process. I have always wondered if there was a type of filter medium I could use to filter my water that would remove nitrates but not nitrifying bacteria, eliminating the need for water changes. The objective of this experiment was to determine which type of filter media most effectively removes nitrates from cycled aquarium water while preserving nitrifying bacteria. The main goal was to eventually develop an aquarium filter that removes nitrates but not nitrifying bacteria, therefore saving water. Methods/Materials After the original water sample was tested for nitrates three times using an API Nitrate Liquid test kit, the water was run through each different type of filter and tested for nitrates three times. A drop of the filtered water sample with the least nitrates and a drop of the original water sample were Gram stained and tested for the presence of nitrifying bacteria by observation using oil-immersion microscopy. Results The original water sample contained 5 ppm of nitrate. The BRITA filter removed 2.5 ppm of nitrates, the ZeroWater filter removed all measurable nitrates, and the paper coffee filter and diatomaceous earth filter removed no nitrates. Colonies of Gram negative nitrifying bacteria were present in both the original and ZeroWater filter water samples. Conclusions/Discussion The ZeroWater filter most effectively removed nitrates from cycled aquarium water while preserving nitrifying bacteria. The results from this experiment could be very useful to aquarists, as filtering aquarium water with ZeroWater filters or eventually a customized nitrate filter eliminates the need to conduct time-consuming biweekly 20% water changes. The results from this investigation also support water conservation, as aquarium water can now be filtered rather than dumped and replaced. With more than 20 million fish tanks in the U.S., water conservation estimates exceed 750 million gallons per year. Two main questions arose when performing the experiment: how the results would be affected if the original water sample had a much higher level of nitrates (e.g. 40 ppm) and if there could have been a more accurate way to measure nitrates, possibly with a digital or photometric nitrate detector.	
Summary Statement This experiment tested 4 types of filter media to determine which most effectively removed nitrates from cycled aquarium water while preserving nitrifying bacteria, with the intent to improve overall aquarium health and conserve water.	
Help Received I received help from my father, who assisted me in the Gram staining process and helped me contact his friend who lent me his microscope and camera attachment.	



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Matthew R. Jarecky	Project Number J1908
Project Title 50 Shades of Yellow	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals For this year's science fair project, I chose to investigate what substance is most effective for cleaning teeth exposed to stain producing liquids. I am interested in this question because I've always seen that all the people I meet use a different type of substance to clean their teeth. I think this project will be fun to experiment with and I hope to find through this project, what substance is most effective for cleaning teeth. So my hypothesis is, if tar-tar control toothpaste is used on a person's teeth, then it will remove stains the most effectively.</p> <p>Methods/Materials For my science fair project I will have 14 petri dishes, half of them filled with coffee the other half filled with pomegranate juice. I will then take 14 molars and put each molar into its own petri dish. Then every 96 hours for three weeks I will brush each molar with a certain substance. I will also give each molar a rating between one and ten. One, being the tooth mostly white and ten, being the tooth really discolored every 96 hours for three weeks. Then at the end of the three weeks I will round up all the data and get my answer to my science fair question.</p> <p>Results The data I found after experimentation was that the overall best substance for the molars soaked in the coffee was the whitening toothpaste. The overall best substance for the molars soaked in the pomegranate juice was the fluoridated toothpaste. Finally, the overall best substance for both the coffee and the pomegranate juice was the baking soda.</p> <p>Conclusions/Discussion The conclusions I have drawn are that baking soda is the overall best tooth cleaner, followed up by whitening toothpaste. My hypothesis was incorrect. Baking soda was a better tooth cleaner than tartar-control toothpaste. The changes I would make if I were to do this project again is that I would somehow refrigerate my petri dishes filled with the liquids so mold would not be able to grow on the liquids. This project is real world because people could finally know what type of substance they should use to get discolorations out of teeth. Also, dentists could use that substance to brush patients teeth most effectively. For further work on this project, I can add much more substances, so there is more experimenting to do.</p>	
Summary Statement My project is about how I soaked molars in stain producing liquids and brushed them with certain substances to see which one cleaned the discoloration off the teeth most effectively.	
Help Received Orthopedic surgeon gave me 14 teeth for my experiment; my teacher gave me ideas on how to write my Science Fair Write Up.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Jeremy M. Marcin	Project Number J1909
Project Title Archenemy: Acne	
Objectives/Goals This project aimed to demonstrate the range of effectiveness of acne treatments in preventing the growth of <i>Bacillus subtilis</i> (<i>B.subtilis</i>) bacteria. The experiment was carried out using two types of over-the-counter acne medication: a 10% Benzoyl peroxide ointment and 2% Salicylic acid treatment pads, as well as, natural remedies dating back to 2500 B.C. The natural remedies included: calendula oil, distilled white vinegar, lemon juice, Manuka honey, sulfur, tea tree oil, and urine. It was hypothesized that both over-the-counter acne treatments and some natural remedies would inhibit the growth of bacteria but that benzoyl peroxide would result in the largest zone of inhibition.	
Abstract Methods/Materials The experiment involved using the Kirby-Bauer disk-diffusion method to measure the effectiveness of each treatment. Sterile discs saturated with various treatments were placed on agar plates where bacteria were growing. Acne treatments effective in stopping bacteria growth formed circular areas around the discs (inhibition zones) where bacteria did not grow. The diameters of these zones were measured and recorded.	
Results Of the nine treatments tested, all but two were able to inhibit the growth of the <i>B.subtilis</i> with the zone diameters ranging from 0.0 to 18.3mm. Benzoyl peroxide showed the largest mean inhibition zone diameter.	
Conclusions/Discussion While the findings confirmed the hypothesis with regards to OTC (over the counter) acne medication, they also indicate that alternatives could be used with almost the same result.	
Summary Statement My project is trying to find the most effective/alternative treatment(s) for acne.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Katherine S. Matsukawa	Project Number J1910
Project Title Photobioreactors vs. Raceway Ponds	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project was designed to discover which of the two most common commercial methods of growing algae helps it grow fastest. The two commercial methods, a photobioreactor and a raceway pond, were compared to a replication of a natural pond, which was the control. The hypothesis was that the algae would grow fastest in the photobioreactor, followed by the raceway pond then natural pond.</p> <p>Methods/Materials The type of algae used was a combination of Spirogyra and Desmodesmus serratus, more generally known as types of common pond algae. I constructed the photobioreactor by using pinewood for the frame and 3 acrylic tubes, the raceway pond by using a 68L bin, a motor, and a paint mixer, and the control pond using a 30L container, 2L of pond mud, and pond organisms. For taking and measuring samples, silicone baking cups, 10ml syringes, and a grams scale were used. Each baking cup was pre-weighed, and then 3 10 ml samples were taken from each environment. I recorded the wet weight, dried the algae in a 150° oven for 2 hours, then recorded the dry weight. Lastly, the grams of algae per liter of water were calculated.</p> <p>Results After 23 days of testing, the samples taken from the photobioreactor had an average of 5.8 g/L, the samples from the raceway pond had an average of 5.8 g/L, and the samples from the natural pond had an average of 1.14 g/L.</p> <p>Conclusions/Discussion My hypothesis that algae would grow fastest in the photobioreactor, followed by the raceway pond then natural pond, was not supported by the results. The algae in the photobioreactor did not grow as fast as hypothesized because of a nitrogen and CO(2) deficiency, long light path, and lower than optimal pH level. Reasons for the lowest growth in the control pond were the combination of susceptibility to contamination from bacteria and other organisms, no mixing regime, and no thermal management.</p>	
Summary Statement My project was designed to discover which of the two most common commercial methods of growing algae, photobioreactors and raceway ponds, helps it grow fastest.	
Help Received David Romero helped construct the raceway pond and photobioreactor, Mauricio Gonzalez provided the algae and pond components as well as information on the growth of algae, and Katiana Junes-Gill helped with identification of the algae.	



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Rachel Meyer; Jasmine White	Project Number J1911
Project Title Marinas: Toxic or Safe?	
Abstract Objectives/Goals Antifouling boat hull paint contains biocides and copper which can harm sea creatures and even humans. There are other kinds of boat hull paints that are environmentally safe and not toxic to the environment. However, these environmentally safe boat hull paints are not considered as effective as the copper based boat hull paint. Is there anything we can add to environmentally safe boat hull paint to make it as effective as anti-fouling copper based boat hull paint, and keep it nontoxic to the marine environment?	
Methods/Materials When first setting up the project we cut the marine grade plywood into a rectangle that is 1.67ft. by 2.5 ft. We then add the vanilla extract, lemon extract, and cayenne pepper to the environmentally safe paint. From personal communication with a local marine store worker we found out that some commercial fisherman add cayenne pepper to boat hull paint (Richardson C. pers. comm. 2015). Next we painted five equal rectangles, 0.5 ft. by 1.5 ft. on the marine grade plywood, one rectangle with copper based paint, one with environmentally safe paint, one with lemon extract, one with vanilla extract, and the fifth with cayenne pepper. Every week for four weeks between January 20 and February 7, again on February 28, and on March 14 we checked our project. Each week we counted the marine life observed on each of the Paint Patches.	
Results We only observed silt and invertebrates on Paint Patches in the first four weeks. However, we observed green algae and seaweed on Paint Patches B and C, and green algae on Paint Patches D and E during our last two visits. Current algae coverage on Paint Patches is as follows: A = 0%; B = 91%; C = 68%; D = 72%; and E = 35%.	
Conclusions/Discussion As of March 14, 2015 our hypothesis was correct. The environmental safe boat hull paint that contained cayenne pepper (Paint Patch E) had the best results out of the four environmentally safe paint patches. The copper based boat hull paint (Paint Patch A) still had no algae growth and the least amount of life overall. Both Paint Patch A and E did a really good job keeping invertebrates off the marine grade plywood. However, green algae did cover 35% of Paint Patch E on March 14.	
Summary Statement Our project is about trying to find a replacement for copper based boat hull paint.	
Help Received My father helped us cut the board and drove us to the marina to set up and check our experiment every week or two.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Denico M. Nieves	Project Number J1912
Project Title Effects of Produce Washes on Pesticide Residue and Brine Shrimp Mortality	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project investigated pesticide residues from produce with fruit waxes and without fruit waxes effects on non-target organisms and explored if fruit and vegetable wash helped to eliminate pesticides. I hypothesized that the samples with commercial produce and no produce wash would have the highest pesticide residue levels, resulting in the highest brine shrimp mortality rates, while the samples with organic produce would have the lowest concentration of pesticide residues and the lowest brine shrimp mortality rate.</p> <p>Methods/Materials I used a digital gram scale and 144 samples tested for seven types of produce, both organic and commercial. The produce was weighed, and some washed with produce wash, then soaked in 2% salt water. The organic produce was my negative control and unwashed commercial produce was my positive control. 30 ml. of the produce water was placed in a Petri dish along with five brine shrimp each. The Petri dishes were monitored for five hours. The three produce washes tested were "Veggie Wash", "Trader Joe's Wash" and "Fit All Natural Wash".</p> <p>Results In two trials of the experiment, I tested 144 Petri dishes, and 720 brine shrimp. The two trials involved 21 hours of preparation and washing, 68 hours of produce soaking, and 10 hours of observation and tabulation. "Veggie Wash" had the highest mortality rate, averaging 30% brine shrimp mortality. "Trader Joe's Wash" averaged 27% mortality. "Fit All Natural Wash" averaged a 24% mortality rate. The commercial produce had an average of 19% brine shrimp mortality rate. The organic produce water averaged a 3% mortality rate. The neutral control of 2% NaCl with no produce water had no brine shrimp mortality.</p> <p>Conclusions/Discussion The commercial produce had a lower mortality rate than all of the produce washes. Since pesticides are not very water soluble, the washes may have loosened the pesticide molecules and attached the pesticides to the wash molecules. The produce may need to be rinsed multiple times. Produce with fruit waxes appeared to have higher mortality compared to the other produce tested.</p>	
Summary Statement My project tested the effectiveness of produce washes in removing pesticide residues from commercial produce.	
Help Received My parents purchased the Brine Shrimp for me.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Dylan K. Nishimine	Project Number J1913
Project Title Brushing with Bacteria?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This study was designed to determine whether 1) if the bacterial load on toothbrush bristles was greater with prolonged usage and 2) what would be the most effective way to clean toothbrushes after usage.</p> <p>Methods/Materials Oral hygiene instructions were given and toothbrushes were distributed to four subjects. Subjects were instructed to use the toothbrush twice a day for one week and then the toothbrushes were collected for analysis. The same subjects were each given a new toothbrush to use twice a day for a two week period of time and the toothbrushes were again collected and prepared for SEM (Scanning Electron Microscopy) analysis in which each specimen was scanned for bacterial presence and load. For the second objective of the project, the four subjects were given new toothbrushes and asked to brush twice a day for two weeks. The toothbrushes were then collected for analysis. Each toothbrush was cut into 3 or 4 sections and placed into a preparation of hydrogen peroxide, salt water or baking soda water mixtures or received no treatment (control). Bristles from the toothbrushes were extracted and placed onto homemade agar plates to observe bacterial growth.</p> <p>Results SEM micrographs showed a marked increase of bacteria on two week bristles in comparison to one week or new toothbrush bristles. It was then decided to continue to the second phase of the project in which the most effective way to clean toothbrushes were studied. Both baking soda water and hydrogen peroxide were found to have delayed growth and were more effective than the salt water solution. The salt water solution was found to be more effective than the control of no treatment.</p> <p>Conclusions/Discussion The study supports the hypothesis that the more often a toothbrush is used, the more bacteria will accumulate. I concluded that hydrogen peroxide and baking soda are equally effective as supplemental cleaning agents for toothbrushes, while salt water is less effective. This experiment demonstrates how quickly bacteria can be harbored on toothbrush bristles under standard cleaning conditions. It can also be concluded that usage of a cleaning solution on toothbrushes will minimize bacterial growth.</p>	
Summary Statement The project evaluated the bacterial load on toothbrush bristles and the efficacy of toothbrush disinfection with common household cleansers.	
Help Received Dr Michael Tseng provided guidance at the University of Louisville School of Medicine and Mr. Michael Eisenback supervised SEM processing and imaging.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Margaret "Maggie" O'Rourke	Project Number J1914
Project Title The Mystery of Moisturizer	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to determine which moisturizing product or lotion worked best to keep human skin moist.</p> <p>Methods/Materials The hypothesis of this experiment was the Humectant was going to moisturize the best because of the mineral oil and personal use. The hypothesis of this experiment was proven to be incorrect.</p> <p>Results The hypothesis of this experiment was proven to be incorrect. In conclusion, the Occlusive agent moisturized the best. The Occlusive agent was the petroleum jelly. A</p> <p>Conclusions/Discussion Even though my testing results showed my original hypothesis was incorrect, I learned much about how lotions and products keep skin moist. If one things could be changed this experiment, I wouldn't use petroleum jelly as the occlusive agent because it was hard to spread it. The petroleum jelly had to double boil it on the stove in order to spread it thoroughly.</p>	
Summary Statement Testing which moisturizing products and/or lotions work best on human skin.	
Help Received Chris Donohoe, my teachers at Holy Cross School, and my parents	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Elise M. Ochs	Project Number J1915
Project Title Investigating the Spoilage Rate of Different Milks Based on Their Expiration Date	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to find out what type of milk spoiled the quickest before and after the quickest.</p> <p>Methods/Materials The first thing I did was get 2%, whole, and non-fat milk (Producers Milk). Then I measured one cup of milk. After that, I connected my pH to the vernier. I then started testing the milk and recording the results on a data sheet. Finally, I repeated this process, using each milk, ten times. I recorded the milk to days before the expiration date, the day it expires, and 5 days after it expires.</p> <p>Results My final results for the 2% milk was that the spoilage rate drops as it gets older, which was expected. My results for the non-fat milk was that the spoilage rate went up as it expired, which was not expected. Finally, my results for the whole milk was that the spoilage rate decreased as it grew older, and that was expected.</p> <p>Conclusions/Discussion Once I concluded my project I found out that 2% milk spoils the quickest out of all three milks. I also found out that non-fat milk stays fresh for a while after the expiration date. My first hypothesis stated that whole milk would have the largest drop in spoilage rate, but I was incorrect. However, my second hypothesis stated that non-fat milk would not have a large drop in spoilage rates, and that was correct.</p>	
Summary Statement Spoilage Rate of Different Kinds of Milk	
Help Received Mr. Darwin Aalto Science Instructor Sanger High School provided the Verniar and pH Meter	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Lydon S. Olivares	Project Number J1916
Project Title Bite Into Beef: Grass-Fed or Grain-Fed?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to assess subjects' preferences of grass-fed or grain-fed beef.</p> <p>Methods/Materials I Conducted blind taste tests with identically prepared grass-fed and grain-fed beef and documented my results. I repeated the test 3 different times using different subjects. After my third taste test, subjects were asked to complete a survey on cattle husbandry preferences.</p> <p>Results Subjects preferred grass-fed beef to grain-fed beef 2 to 1. In the written survey, i found that subjects did not think they had a preference, but the taste test concluded that 90% did. 80% from that sample preferred grass-fed. I found that almost all subjects think the welfare of food animals is important, cows should live on pasture and eat grass and they do not want antibiotics in their meat.</p> <p>Conclusions/Discussion My hypothesis was that subjects would prefer grain-fed beef because it is what most people are used to, it is cheaper and has a higher fat content. The higher fat content is reported to make the beef tastier. My hypothesis was not supported, but I did find out people's preferences. I'm interested in the environmental and health impacts of both types of beef. Information is conflicting depending on the industry consulted. Only 3% of beef sales comprise grass-fed, while almost 70% of those tested preferred grass-fed over grain-fed in my taste tests.</p>	
Summary Statement My project tested subjects' preferences on grass-fed and grain-fed beef, then survey their husbandry preferences.	
Help Received Parents drove, paid for beef, helped cook.	



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Evelyn S. Olivarez	Project Number J1917
Project Title Uncovering the Hidden Glucose in Foods and Liquids	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to determine which food or liquid contains the highest amount of glucose among orange juice, cranberry juice, Coca Cola, Diet Pepsi, lemon juice, ketchup, plain sugar water, an apple, and a pineapple. The hypothesis is that honey will have the highest amount of glucose among the selected foods and liquids.</p> <p>Methods/Materials Ten foods and liquids were gathered to test the hypothesis. A digital scale was used for measuring 5 grams of each food and liquid, and glucose test strips were used to measure the glucose levels of these. A timer was set to 30 seconds, and the test strips were compared to the glucose scale on the package.</p> <p>Results The glucose level test strip has a range from 0% to 2% glucose. After three repeated trials, cranberry juice averaged the highest reading, with an average of 1.7% glucose. A 1% glucose concentration was found in the Coca Cola, orange juice, and the mashed apple samples. Ketchup and the mashed pineapple gave a .50% glucose reading. Lemon juice had .25% of glucose. Lastly, Diet Pepsi, honey, and plain sugar water showed negative, or 0% glucose.</p> <p>Conclusions/Discussion Cranberry juice has the highest glucose levels among the tested foods and liquids. The liquids with the second highest levels of glucose were orange juice and Coca Cola, followed by the pineapple, ketchup, and then the lemon juice. Sugar water, honey, and Diet Pepsi showed the least amount of glucose. Therefore, my hypothesis was proven incorrect. I realized that the "fruit group" had the most glucose, along with Coca Cola and ketchup, which both have added sugars. Therefore, cranberry juice, orange juice, and Coca Cola are good "Fast Sugar Foods" to keep on hand for people who have low blood sugar. On the other hand, people with high blood sugar should avoid having these drinks, in order to avoid spiking up their sugar levels.</p>	
Summary Statement My experiment was about finding the glucose level concentrations in ten common foods and liquids.	
Help Received My mother helped me when making the data graphs. My science teacher, Mrs. Gonzalez, answered all of my project questions. My father bought the necessary materials I needed for this project.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Aisha N. Patel	Project Number J1918
Project Title Soap Power	
Abstract Objectives/Goals The purpose of my project was to observe the impact of various active pharmaceutical ingredients, glycerol(GC), benzalkonium chloride(BZK), & triclosan(TC), used in hands soaps as means of maintaining clean hands. I wanted to observe the efficacy of GC, BZK & TC as antimicrobials & in inhibiting bacteria that contaminates human hands. I hypothesized that soaps with TC or BZK would be more effective than soaps with GC. I further hypothesized that soaps with TC would be most effective because it inhibits fatty synthase & interferes with cell membrane formation of the bacteria.	
Methods/Materials I used live bacterial cells which contaminates human hands. Tryptic soy agar plates were streaked with diluted bacterial cells using a calibrated loop. I built an incubator at home using a Styrofoam box & a heat lamp. Constant variables in all trials were the amount of bacteria streaked to each plate, incubation time & temperature, & the amount of active pharmaceutical ingredient used. Manipulated variables in all trials were the active pharmaceutical ingredients in hand soaps. I prepared 2 diluted live cultures. The first 40 plates were labeled & inoculated with live culture #1. The next 40 were labeled & inoculated with live culture #2. The soaps tested were carefully selected so that the only difference in active ingredients would only be GC, BZK, or TC. Blank sterile disks were soaked in water, GC, BZK, or TC. Then the disks were placed on the respective plates. Two control agar plates (C0 & CW) were also created for each live culture. The plates were incubated for 48 hours. Then the zone of inhibition was measured in mm for all plates. The most effective is indicated by the larger inhibition zone. The experiment was repeated for 3 trials.	
Results After incubation, the zone of inhibition was measured & the impact of the pharmaceutical agents as antimicrobials were observed compared to the plates which did not have any pharmaceutical agents. I observed that the plates with disks soaked in GC were observed to have similar zone of inhibition as of TC.	
Conclusions/Discussion My results proved my hypothesis partially correct. All of the pharmaceutical agents had a great impact as an antimicrobial agent in hand soaps. GC & TC had the greatest impact. Furthermore, research into TC's health & environmental impacts shows that TC does more harm than good, despite its wide-spread use as antimicrobial agent in hand soaps.	
Summary Statement To observe the effects of various active pharmaceutical ingredients used in hand soaps	
Help Received My parents helped and supervised.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Annaliese N. Rupp	Project Number J1919
Project Title Mom, Do I Have to Rinse/Scrub the Plates Before I Put Them in the Dishwasher?	
Abstract Objectives/Goals To determine if a pre-rinse or scrub step will help the ability of a dishwasher to clean dishes. Glo Germ(TM) was used as a bacterial surrogate to represent a biofilm that could possibly form if dirty plates were left in the sink over the weekend. Three different automatic dishwashing detergents were evaluated. The effect of using no automatic dishwashing detergent was also determined. Methods/Materials Constant levels of Glo Germ(TM) were introduced and evenly distributed onto the surfaces of plates. Photographs were taken before and after each dishwashing cycle after illuminating the plates with UV light. Photographs were then analyzed using Image J software. Fluorescence was measured and compared. Testing was also performed after using a 5 second pre-rinse step and a scrub step. Results Differences were seen when evaluating the different automatic dishwashing products. Miele, Cascade, and Finish reduced Glo Germ(TM) by 76%, 67%, and 7%, respectively, when no pre-rinse or scrub steps were evaluated. The use of no detergent performed better than Finish and produced a 35% reduction. With the exception of Finish and no detergent, the use of a pre-rinse step did not help in Glo Germ(TM) removal. The use of a scrub step helped all products (including no detergent) remove Glo Germ(TM). Conclusions/Discussion Test results indicate that differences exist between different cleaning products. Miele and Cascade appeared to produce the most favorable results. Pre-rinsing plates did not have an effect when evaluating all of the products. Scrubbing plates helps in Glo Germ(TM) removal and conserves water.	
Summary Statement Determined if pre-rinsing or scrubbing helps the abilities of three different dishwashing detergents to remove surrogate biofilms from plates.	
Help Received My teacher, Cathy Engle, and my parents provided support and guidance in performing this project.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Angelia M. Silva	Project Number J1920
Project Title Toxic Cat Litter: Airborne Cat Litter Dust Spreading Zoonotic Diseases through Litter Box Cleaning	
Abstract Objectives/Goals My objective was to determine which type of cat litter spreads the least amount of zoonotic diseases through airborne dust particles disbursed through litter box cleaning. I tested five types of cat litter (pine, corn, clumping-clay, non-clumping clay, and silica gel crystals), and sand as my control. Methods/Materials I simulated the cleaning of a cat litter box by adding Glo Germ powder to simulate bacteria, and modeling clay and water to simulate cat feces and urine. As I scooped out the #soiled# litter, litter dust carrying the Glo Germ would disburse into the air. I used a UV light to detect and measure the farthest distance the Glo Germ had spread from the litter pan, and recorded where the Glo Germ residue transferred on my body. I conducted a total of ten trials. Results Silica gel litter dust consistently spread the farthest distance in each of the ten trials, and recorded the farthest median distance of 213.63 cm. Clumping clay came in second with a median distance of 163.25 cm, followed by sand (137.13 cm), pine (121.38 cm), non-clumping clay (110.75 cm), and corn (91.13 cm). Silica gel also had the highest number of Glo Germ residue transfers, with a total of 71 transfers. Pine, clumping-clay, and non-clumping clay, all tied for second with 58 transfers, followed by sand with 54 transfers. Corn had the fewest transfers, at 44. Conclusions/Discussion The data did not support my hypothesis that silica gel crystals would spread the least amount of zoonotic diseases because it produces the least amount of dust particles. In fact, silica gel cat litter dust spread the farthest distance through litter box cleaning, while corn litter traveled the shortest distance. This research would benefit cat litter manufacturers who could improve their products through reducing litter dust, and educate consumers about the potential risks of infected cat litter dust, and help them select the cat litter that poses the least risk.	
Summary Statement After testing five types of cat litter and sand (control), silica gel crystal litter spread the greatest amount of zoonotic diseases through airborne dust particles disbursed through litter box cleaning, and corn litter spread the least.	
Help Received Dr. Harold Lin, Chief of Infectious Diseases at Kaiser Permanente Fresno, assisted with my research. My parents purchased supplies for my experiment and project board.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Trysten H. Slack	Project Number J1921
Project Title Turbo Soil: A Comparison of Soil Brands	
Objectives/Goals The purpose of this experiment is to determine which brand of soil produces the best and healthiest plant growth. Three brands were compared: Miracle-Gro Potting Mix, Garden Time Square Foot Gardening, and Kellogg Patio Plus. I predict that the most expensive brand of soil will yield the healthiest plants.	
Abstract Methods/Materials 3 pots, radish seeds, ruler, water, sunlight, 3 different brands of soil Pot 1 (Miracle-Gro) \$.31/qt, Pot 2 (Garden Time) \$.28/qt, Pot 3 (Kellogg) \$.20/qt 1. Fill pots with soil. 2. Plant 4 seeds at same depth. 3. Place all pots by window sill. 4. Water all pots thoroughly when needed. 5. Measure height of growing sprouts (daily).	
Results The height is measured in cm and was measured for 19 days after growth from the base of the plant (soil level) to the cotyledon leaves (first leaves to grow). Pot 1: all four seeds grew, tallest plant measured 9.5 cm, primary leaves grew on all four plants measuring about 1 cm. Pot 2: 3 seeds grew, tallest plant measured 14.3 cm, primary leaves grew on all plants and are significantly bigger, measuring about 5 cm. Pot 3: 3 seeds grew, tallest plant measured 10.4 cm, primary leaves measured about 1 cm and only grew on two sprouts.	
Conclusions/Discussion Does the most expensive brand of potting soil make the plant grow better? No. Even though Miracle-Gro potting soil is the most expensive per quart of the three brands, Garden Time soil yielded the tallest and best sprouts with the biggest leaves and looked the healthiest. I believe it#s because Garden Time has the natural ingredients that the radish plants need. Miracle-Gro has synthetic fertilizers and may cost more because they market their product on television. Kellogg has organic ingredients but maybe did not provide the nutrients for the radish seeds.	
Summary Statement My project compares three different brands of soil by their sale price to determine how well plants grow in them.	
Help Received My Mom helped purchase supplies, called Gro-Well to ask about the soil analysis for their product, and helped in mounting different parts of my board. A Gro-Well representative helped me conclude why Garden Time SFG worked the best for growing plants.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Aiman A. Soomro	Project Number J1922
Project Title Constant Constipation: Miralax vs. Metamucil. Which Over the Counter Product Better Treats Chronic Constipation?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objectives of my project are to see which one of the medications, Miralax or Metamucil, is better for treating chronic constipation by comparing which has fewer side effects and works faster. Before I carried out my project, I hypothesized that Metamucil will work faster than Miralax because according to research Miralax should take 1-3 days to produce a bowel movement in your body while Metamucil only should take 12-72 hours. I also read online reviews about people complaining that taking Miralax causes too many side effects, therefore Metamucil was a plausible medication to believe is better of the two.</p> <p>Methods/Materials I conducted this project by creating a survey filled with questions regarding recent past experiences with either of the medication. The surveys were given to sixty people, males and females, ranging from ages thirty to eighty years old. Surveys were distributed at different places such as, La Palma Nursing Center, C.V.S Pharmacies, and local clinics.</p> <p>Results After finishing my project, I realized that Miralax turned out to have lesser side effects and worked faster for the participants than Metamucil did. Except for one side effect, which was diarrhea. The group that took Miralax, had a slightly higher percentage of participants who claimed they experienced diarrhea. For my second objective, I found out that Miralax worked in 4-8 hours while Metamucil took 8-12 hours.</p> <p>Conclusions/Discussion This means that the best way for constipation to be treated is using the osmotic laxative which draws water into your colon from surrounding body tissues and increases the frequency of bowel movements and softens stool. Metamucil works by absorbing liquid from the gastrointestinal tract which causes expansion of the stool and the resultant bulk facilitates peristalsis and bowel motility. From my data, I concluded that my hypothesis was incorrect. Even though, both sound like beneficial processes, Metamucil will take a longer time and may lead to worsening of constipation if not taken with enough water.</p>	
Summary Statement I compared Miralax and Metamucil to see which is better for treating chronic constipation.	
Help Received Dr. Shaheen Idries helped me pass out surveys to her patients. RN Michelle Loude gave me access to her patients at La Palma Nursing Center. My parents helped me with transportation.	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Jad Soucar	Project Number J1923
Project Title It's More than a Weed, It's Sun Screen	
Abstract Objectives/Goals This project's objective was to find out if dandelion extract had superior UV protection properties when tested against SPF 15, 30, and 50 Coppertone sunscreens. Methods/Materials For this experiment UV sensitive paper, SPF 15, 30 and 50 sunscreens, Dandelion extract and Ziploc bags were used. 120 UV sensitive papers (papers that start off blue and turn white according to how much UV radiation impacts the paper) were put in to individual Ziploc bags. 0.6 ounces of the Dandelion extract was smeared evenly on 30 papers and the same was done with all the other sunscreens. These papers were then simultaneously taken out and exposed to the sun for 15 minutes, and then soaked in water to stop the chemical reaction. Each paper was then marked a specific number 0-5 (0 being the best) to mark the sunscreens efficiency. Each sunscreen was then given an average from the sun scale, once again 0 being the best. Results SPF 15 had an average of 1.23, SPF 30 had 1.10, and SPF 50 had 0.93, whereas the Dandelion extract had an average of 0.5. The hypothesis was that Dandelion extract would be as effective as SPF 30 sunscreen, but the results showed that the extract was even more effective than SPF 50 sunscreen Conclusions/Discussion The tested Dandelion extract proved to provide better protection against the sun's UV rays than the commercial Coppertone products having SPF 15, 30 and 50.	
Summary Statement Testing whether Dandelion extract provides better UV protection than the sun screen products on the market	
Help Received Parents helped in spreading sun screen on UV sensitvie papers	



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Josephine V. Woldemar	Project Number J1924
Project Title Drinks to Keep Your Teeth Sporty Clean: What Athletic Drink Is Better for Your Teeth?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to determine what athletic drink is better for your teeth. This student discovered that drinks pH levels determine the acidity of the drinks and that higher acidity levels possibly caused more damage to teeth. This student hypothesized that soda would have the worst effect on teeth, energy drinks would have some effect, and sports and water would have little to no effect on teeth and therefore would be better for your teeth.</p> <p>Methods/Materials This student used eggshells to represent teeth, put the eggs in plastic containers filled with each drink and kept them in an unplugged refrigerator to keep the environment the same for all drinks. This student ran 2 trials of each type of drink. Each drink's pH level was tested with an electronic pH gauge to determine the acidity. The drinks were observed each day for changes and recorded in the logbook.</p> <p>Results The results showed that all drinks except for water caused some type of damage by day 5. By day 10, all drinks except for water caused 3 or more types of damage. The pH levels did not appear to make a difference in the amount of types of damage. In the end, the results showed that energy drinks were slightly more harmful than soda, but Coke was still more harmful than a sports drink. Water had no harmful effect on the teeth.</p> <p>Conclusions/Discussion Therefore, this student found that water is the best athletic drink to quench your thirst and keep healthy teeth.</p>	
Summary Statement The focus of this project was to determine which athletic drink is better for your teeth by comparing the difference between the drinks, water and soda which is known to cause damage to teeth.	
Help Received Orthodontist helped by being the first to tell me about pH levels and the effect on teeth. Mom helped me with some of the picture taking.	