



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Mumtahana T. Al-Amin	Project Number J0401
Project Title Diverse Yogurt	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The principle of this project was to see which combination of powdered milks and liquid milks would make the best yogurt.</p> <p>Methods/Materials The idea of this project was considered due to curiosity of how different kinds and combinations of milk would affect the produced yogurt.</p> <p>It was hypothesized that the whole fat would be the thickest with the lowest pH and density especially when mixed with whole milk powder. Whole fat, and skim powders were dissolved in whole fat, reduced fat, and skim liquid milks and water. These combinations were made in different concentrations of powders 0%, 10%, 20%, and 30% and triplicates. They were heated and incubated at the same temperature for 5 hours after the addition of a certain amount of mother culture. A panel of tasters compared the produced yogurt with the original according to color, mouth feeling, aroma, texture and sourness. The pH was measured using pH meter. A known volume of each yogurt was weighed to calculate the density. To find the total solids, 9mL of each yogurt was centrifuged and weighed with an electrical balance before and after for accuracy. Percentage of the total solids was calculated from the original centrifuged amount.</p> <p>Viscosity was also measured by timing a known density sphere to go through a known height of yogurt in a cylinder.</p> <p>Results The results showed that the density amplified each time the milk powder was added. On the other hand the skim milk yogurt was denser than the whole fat one and the reduced fell in between. The whole milk#s pH values were lower than skim in most cases and increased with concentration increase. The Taste Evaluation proved that thicker yogurt and sour is more preferable than sweet. From examining the viscosity, the thickest yogurt was the whole milk liquid with whole milk powder in the high concentration. Overall, viscosity is directly proportional to fat content as well as concentration and total solids. Similarly the total solids increased by the increase of fat and amount of powder in the yogurt.</p> <p>Conclusions/Discussion In conclusion for thicker, sourer yogurt, whole milk liquid in addition to whole milk powder can be used. In the opposite side, for a less condense product, skim milk without any addition or skim milk powder in water can be used.</p>	
Summary Statement The principle of this project is to test which combination of liquid milks and powdered milks will make the best yogurt.	
Help Received Mother bought some materials; Principal instructed, revised work and supervised; Dr. Lisa from SDSU supervised and instructed; Farhad Akbar, a former student at ISSD helped make the yogurt, Alia Tammini helped make the taste evaluation sheet(s)	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Shabnum Azizi	Project Number J0402
Project Title How Does Temperature Affect the Reaction Rate between Catalase and Hydrogen Peroxide?	
Abstract Objectives/Goals My objective was to learn how certain temperatures affect the decomposition reaction of Hydrogen Peroxide. Methods/Materials First, I extracted catalase from potatoes. Then, I soaked a filter disc in the beaker with the catalase. I filled another beaker with hydrogen Peroxide and placed both beakers in a water bath. When the Hydrogen Peroxide and Catalase got to the desired temperature, I used tweezers to take out the filter disc from the beaker with the catalase and inserted the disc into the beaker with the hydrogen Peroxide. I timed how long it took for the disc to rise to the top of the hydrogen peroxide. I also measured the height of the Hydrogen Peroxide and divided the height(cm) by the time it took the filter paper to rise(sec). Results I found out through this experiment that as the temperature increased, the speed of the decomposition reaction varied. Between ten and fifteen degrees celcius, there was no reaction. Then from fifteen to twenty-five degrees celcius, there was a lot of reaction, because the molecules could bind together, therefore producing a great amount of reaction. At thirty degrees celcius, the speed that the filter paper rose decreased. This was the outlier of my experiment. At thirty-five degrees, the average speed of the filter disc rose to 0.246 cm/sec. At forty-five degrees, the reaction was slowing down to 0.159 cm/sec, because the enzymes were starting to denature. And at fifty degrees celcius, the enzymes were denatured completely, so there was no reaction at all. Conclusions/Discussion The results I got support my hypothesis, however there was an outlier in my results. At thirty degrees celcius, the reaction rate slowed down, when it should've sped up. I think I got this outlier because I reused the catalase and hydrogen Peroxide that I had done another trial with. In this experiment, I learned that catalase is an enzyme that makes chemical reactions go faster. I learned how enzymes work and how they react to certain temperatures. When you first expose enzymes to a cold temperature, they don't do much, however as you continue to increase the temperature, there is more kinetic energy, therefore more reaction. However, around forty-five degrees celcius, the enzymes slow down because they start to loose their native forms and denature. At fifty degrees celcius, the enzymes are denatured completely, so there is no reaction at all.	
Summary Statement My project investigates the relationship between the temperature of catalase used in a decomposition reaction and the rate of the reaction.	
Help Received Mother helped me by holding the thermometers in place	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Patricia G. Borges	Project Number J0403
Project Title Antibodies Bind to Proteins in a Very Specific Manner	
Abstract Objectives/Goals The objective of my project was to determine how specific an antibody is when presented to proteins with similar amino acid sequences. Methods/Materials The antibody I used for my study was isolated from mice immunized with a protein called Keratinocyte Growth Factor Receptor (KGFR or FGF2RIIIc). This protein is part of a family of related cell surface receptors that bind to fibroblast growth factors. These receptors are called Fibroblast Growth Factor Receptors (FGFR) and there are several different ones known as FGFR1IIIb, FGFR1IIIc, FGFR2IIIb, FGR2IIIc, FGFR3IIIb, FGFR3IIIc, and FGFR4. These receptors have very similar amino acid sequences, but there are regions within the protein unique to each receptor. To test the specificity of my antibody I used a technique called Western Blotting. First, I ran all the FGFR proteins on a gel. Second, I transferred them to a nitrocellulose membrane. Then, incubated the membrane with the primary antibody (anti-KGFR antibody), then a secondary antibody coupled to an enzyme that creates light, and finally exposed the membrane to film to detect the light. In any regions of the membrane where the secondary antibody was bound to the anti-KGFR antibody, the light created by the secondary antibody showed up as a dark band on the film. Results I observed that among all of the proteins my antibody only recognized one specific variant of the FGFR proteins and none of the others. This variant was KGFR, the protein that was used to immunize mice to generate my antibody. When I used a different primary antibody that recognized a common antigen among the proteins I used in the Western Blots, all the proteins on the membrane were detected on film. Conclusions/Discussion In conclusion, antibodies recognize specific antigens on proteins. If those antigens are unique to a single protein the antibody will only recognize that protein. If the same antigen is present in multiple proteins the antibody will recognize all those proteins.	
Summary Statement I tested the specificity of antibodies against proteins.	
Help Received Used lab equipment at Amgen under the supervision of Dr. Luis Borges.	



CALIFORNIA STATE SCIENCE FAIR 2006 PROJECT SUMMARY

Name(s) Lauren A. de la Puente	Project Number J0404
Project Title The Process of Fermentation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to determine if different varieties of sugar affect the amounts of carbon dioxide to be released during the process of fermentation. The hypothesis is that brown sugar, raw sugar, and sugar substitute, will have the same effect on the carbon dioxide production as white sugar.</p> <p>Methods/Materials The ingredients, sugar, yeast, flour, and salt, are mixed together. All sugars are used for three trials. Heated water is added to the mixture. After that, flour is added to make the liquid mixture pull away from the sides of the bowl and turn into a soft dough. The resulting dough must be kneaded for about five minutes. The dough then is placed into a container for rising. The amount has to be equal for all the trials. After that, the dough is put into the oven, that had been preheated to 300 degrees F, then turned off, to rise for 45 minutes. The height of it is recorded. This process is repeated three times, then the average of the heights is determined and recorded. The above procedure is repeated for brown sugar, raw sugar, and sugar substitute.</p> <p>Results After two of the trials for the white sugar were finished, the salt was forgotten to be put into the mixture. Also, the plastic melted, so that trial had to be done over. It was also determined that in order for the dough not to stick, the container must be greased thoroughly with vegetable oil. After all the trials were done, I took the averages of all the sugars, and I concluded that the brown sugar mixture, which had an average height of 18 centimeters, had risen the most and had the most carbon dioxide production. The white sugar had an average height of only 15.5 centimeters, the raw sugar had an average height of 17.5, and came close to the brown sugar, and the sugar substitute had an average growth of 10.5 centimeters. Therefore, brown sugar is the best sugar to use during fermentation.</p> <p>Conclusions/Discussion The hypothesis was rejected by the data. The hypothesis was that the type of sugar used would not affect the amount of carbon dioxide produced during yeast fermentation. But the brown sugar actually caused the dough to rise more, an average of 18 centimeters. The brown sugar is the sweetest and has the most glucose in it, according to the ingredients, and because of that, more food is provided for the yeast, which causes the dough to rise more. Breadmakers could use brown sugar for their bread, since the dough rises more.</p>	
Summary Statement My project is about determining which of four sugars produces the most carbon dioxide during the fermentation process.	
Help Received My parents helped edit my writing, brainstorm ideas, do research, and supervised the experiment. My science teacher, Ms. Fisher, also helped edit my work and gave me tips for my board. My language teacher, Ms. Valle, helped me edit my research report.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Miranda D. Fang	Project Number J0405
Project Title A Leaf's True Color	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this project is to investigate whether the pigments in leaves that produced their autumn color are present while the leaves were still green.</p> <p>Methods/Materials To carry out my project, paper chromatography was used. Using this technique, the pigments in the leaves would travel up the chromatography paper ceasing at different heights. Different colors of leaves from a red maple and a dogwood trees were collected. Leaves were placed into jars after crushing and grinding them well. By soaking it in 70% isopropyl alcohol it lets pigments dissolve into the solvent. A strip of chromatography paper were then placed into each jar, letting the solvent rise. This experimental procedure was repeated five times for each type and each color of leaves.</p> <p>Results Once the solvent front reaches to a certain height, several leaf's pigment bands were visible and heights were recorded accordingly. Different bands were seen at various heights, but some bands were found at the same height for each type of color of leaf, which were green, yellow and red.</p> <p>Conclusions/Discussion Different color bands were seen and different shades were visible. But because the bands of the same shade of color stopped at the same distance, one can conclude that it is the same pigment that showed up on the chromatography strips. For example, a dull vibrant yellow band at a height ratio relative to the solvent front of 0.30 appeared on all green, yellow, and red of red maple leaves. Therefore, the pigment that produced the leaves' yellow and red colors exists in the green leaves before it changes color.</p>	
Summary Statement The pigment that produces the leaves' yellow and red colors exist in the green leaves before it changes color.	
Help Received Chromatography paper was donated by the science lab in Colina Middle School.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Samantha L. Harrison	Project Number J0406
Project Title DNA the Onion Way	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goals of this experiment are to compare the weights and lengths of different onion species DNA. The objective is that through this experiment it will be proven that species can be specified by their DNA strand itself. It was hypothesized that in wieght, the white onion DNA would be heaviest, followed by red, brown, and green onion DNA. The green onion DNA would be longest, followed by brown, white, and red onion DNA.</p> <p>Methods/Materials This experiment required the method of extracting DNA. This began with the blending of the onion along with sodium cholide and warm water to speed up the breaking down of cell walls. Liquid soap is then stirred in to break the cell membranes because it's a lipid or type of fat. Filtration leaves the larger particles behind. Then, Mono sodium glutemate, meat tenderizer is added. It is an enzyme which breaks down proteins like the nuclei. Finally Isopropyl Alcohol is poured in allowing the DNA to rise from the Onion layer to the alcohol above.</p> <p>Results The experiment resulted in the red onion DNA weighing the most, followed by white, brown, and green onion DNA being lightest. The red onion DNA was also the longest, followed by brown, white, and green onion DNA being shortest. This indicates that the objective was correct.</p> <p>Conclusions/Discussion The results did not support the hypothesis. The white onion DNA, hypothesized to weigh the most, weighed an average of 1.96 grams while the red onion DNA weighed 2 grams. The green onion DNA, hypothesized to be longest, was only 10.72 mm, while the red onion DNA was 12.04 mm. These results can help inform that the DNA strand does physically change from secies to species.</p>	
Summary Statement This experiment demonstrates the differences between different onion species DNA by length and weight.	
Help Received I recieved help through the borrowing of equipment.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Leah A. Hatayama	Project Number J0407
Project Title The Effects of Honey on Longevity of Fruits and Vegetables	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine the effects of honey on extending the shelf life and preserving fruits and vegetables.</p> <p>Methods/Materials I purchased strawberries and tomatoes from the grocery store and raw honey from the health food store. I made 3 different honey dilutions: a 1% honey solution, a 5% honey solution, and a 10% honey solution using honey and sterile water. I labeled each piece of fruit and separated them into groups of 10. I sprayed each of the honey dilutions on both the strawberries and tomatoes and made a control group that I did nothing to. I let the berries and tomatoes dry overnight, stacked them in a bowl, and left them at room temperature. The next day I started checking for signs of soft spots, dark spots, or mold. I observed the strawberries and tomatoes until all the strawberries showed signs of rot and the tomatoes until it was time for my school science fair (21 days).</p> <p>Results The 1% honey dilution coated strawberries were preserved 50% more (or twice) as long as the control group and had an attractive bright red color. By day 5 only 40% of the 1% honey coated strawberries showed signs of decay, compared to the control which was 100% decayed. By day 5, both the 5% and 10% dilutions showed 80% of the berries decayed. The 1% and 5% honey dilutions did an equal job preserving the tomatoes compared to the control, 0% decay in these two groups compared to 30% decay in the control. In fact, the tomatoes coated with the 1% honey dilution are still sitting on my kitchen counter and are just now showing signs of getting wrinkled!</p> <p>Conclusions/Discussion After completing my investigation on the effects of honey on preserving fruits and vegetables, I found that my hypothesis was correct and the 1% honey dilution sprayed on strawberries and tomatoes will keep the fruits and vegetables fresh much longer. This is a way to preserve perishable fruits and vegetables without chemicals. The fruit also looks better, the color was much redder for the strawberries. This could help farmers, fruit packers, and grocery stores as well as people allergic to chemicals.</p>	
Summary Statement Investigating whether or not honey could be used to preserve and extend the shelf life of fruits and vegetables.	
Help Received My teacher read over my project and my mom helped type it and helped me with my board display.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Adel M. Kamal	Project Number J0408
Project Title Feel the Burn	
Abstract Objectives/Goals My goal was to research what is more effective in reducing acidity in the stomach: avoiding acidic food, or taking an antacid? My Hypothesis was that avoiding acidic foods was more effective. Methods/Materials I blended hamburger, fries, and water. I measured the pH of that mixture with a pH meter. I added acidic foods such as Coke, Orange Juice, Milk, Coffee and Advil to the mixture and measured the pH. Lastly, I added Mylanta, a hydroxide, measured the pH again, and compared it to the original reading of the food mixture. If the pH reading after adding the Mylanta was higher i.e. less acidic, then taking Mylanta was more effective, but if the Mylanta fails to do so then avoiding the acidic food is more effective. Results The results depended on the acidity of the food. In the case of Coke and Advil, Mylanta brought the pH to a higher level than the original pH of the food mixture and in Orange Juice it did not. Conclusions/Discussion My Hypothesis was partially correct. It was interesting to see that the pH of the sandwiches ranged from 5.4 to 5.67 and that the most acidic food I used was Advil (2.75). pH is an acronym for Potential Hydrogen. It is a measurement of acidity. The more hydrogen ions there are in a substance the more acidic it is. I learned that the Hydrogen Oxide from a base will neutralize the Hydrogen ion from an acid thus reducing the acidity. In my research I learned about causes, diagnosis, and treatment of Gastro-Esophageal Reflux Disease (GERD). It occurs when gastric acid goes to the esophagus causing heartburn. It affects 8% of Americans. If left untreated it could lead to esophageal cancer.	
Summary Statement The focus of my project is to demonstrate the importance of changing eating habits of individuals with Gastro-Esophageal Reflux Disease (GERD).	
Help Received Mother helped with buying and preparing the food mixture.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Jenna D. Morris	Project Number J0409
Project Title Catalase Kinetics: The Effect of the Temperature of Catalase Enzymes on Hydrogen Peroxide	
Abstract Objectives/Goals The objective is to determine at which temperature the enzyme catalase generates oxygen from hydrogen peroxide at the maximum rate. I believed that the catalase would exhibit its maximum enzymatic activity at 37°C. Methods/Materials Catalase was extracted from ginger root. Reactions were tested at 0°C, 23°C, 37°C, and 50°C. When the hydrogen peroxide was added to a constant volume of enzyme solution, the volume of oxygen generated was measured at 30 second intervals by the displacement of water for five minutes. There were six identical trials for each temperature. Results The 23°C catalase preparation produced oxygen maximally at an average rate of 9.2 ml/sec. The hypothesized optimum temperature of 37°C had an average rate of 7.1 ml/sec. At 0°C the enzymes produced oxygen but at a significantly slower rate of 2.3 ml/sec. At 50°C the catalase denatured with only an average rate of .2 ml/sec. Conclusions/Discussion My results differ from my hypothesis because I based my hypothesis on an anthropocentric preconceived notion. My thoughts were based on what I knew of human catalase and its optimum temperature of 37°C. However I used enzymes from the ginger root which grows in the soil at 25°C or lower. To further this study in biochemistry I might experiment with human catalase and learn if the normal human body temperature, 37°C, is in fact the optimum temperature of the catalase.	
Summary Statement I tested the effect of the temperature of ginger root catalase activity and found it to be maximal at 23°C.	
Help Received I received frequent long-distant e-mail advice from Dr. Carl W. Vermeulen, Retired Professor of Biology, The College of William and Mary, Williamsburg, VA, and now webmaster of Science-Projects.com.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Carolina A. Palmer	Project Number J0410
Project Title DNA Testing: Commercial Kits vs. Household Methods	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Is there a difference between the quality and quantity of DNA extracted from kiwi, wheat germ, and white onion using a commercial kit vs. household methods? Based on my research, I believed the DNA extracted would vary in amount and appearance. The kit results might provide purer, larger quantity DNA extracts. The commercial kit would also offer simpler procedures. The household methods would require many more ingredients and steps, and would extract less DNA. The household methods would also provide less pure DNA due to cell debris and proteins present, especially in the wheat germ extract samples.</p> <p>Methods/Materials I began following directions on the DNA kit. I cut up the biological material, mixed it with the lysis reagent, and poured a bit of this mixture into a test tube containing the precipitation reagent. All the household methods followed the same basic procedure: the mashing and heating breaking down the cell walls, then adding detergent to break open the cell membranes. Sieving the paste removed most of the unwanted material, including cell debris and proteins. Finally the alcohol was carefully layered on top. These procedures were repeated in the numerous repetitions of trials I performed.</p> <p>Results The kit results varied greatly. The kiwi DNA usually appeared a day later; the wheat germ immediately formed large amounts of white, frizzy DNA with many strings intertwined, and the onion produced very small strands of DNA. The household methods all produced a substantial amount of DNA. The onion, once stirred, quickly showed many DNA strands. The wheat germ formed medium sized clumps. The stirred kiwi extract formed quite a few strings of intertwined DNA each time.</p> <p>Conclusions/Discussion If you're looking for pure results and an easy, relatively quick way to extract DNA, the kit may be the way to go, although it did not guarantee a good amount of DNA produced each time. The household methods require more steps and time, but produced substantial amounts of DNA in each trial. So why spend all of that money, when you have ingredients handily stashed away in your kitchen that can produce results equal to a scientific kit? For teachers who could not afford to purchase expensive DNA extraction kits, this might be especially important, since they could still perform successful DNA extraction experiments using the household methods.</p>	
Summary Statement The goal of this project was to discover if there was a difference between the quality and quantity of DNA extracted from kiwi, wheat germ, and white onion using a commercial kit vs. household methods.	
Help Received Thanks to my parents for purchasing the "DNA: I CAN DO THAT!" kits and other ingredients. Thanks to my science teacher for her advice and for providing test tubes, stirrers, and other supplies.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Allison P. Reed	Project Number J0411
Project Title Did a Mutation in the p53 Tumor Suppressor Gene Cause a Cancer in My Dog?	
Abstract Objectives/Goals Since my dog developed, was professionally treated, recurred and died in the professional care of a vet clinic of a rare form of bladder cancer at the young age of 2 years old, perhaps if I can find a genetic reason for Sassy's unfortunate cancer, her puppies can be genetically tested and monitored for early detection and treatment in the future. Methods/Materials A) Obtain Sassy's released tissue once approved by LACOE Safety Review Committee B) Review Sassy's Life History. C) Call the Breeders and puppy owners of Sassy to obtain family information. d) Isolate Genomic DNA from tumor. e) The Sassy p53 gene was amplified using polymerase chain reaction (PCR). f) The Sassy p53 PCR amplified gene was sequenced by sending it to MCLAB. They sent it via email to me. g) The sequence data was analyzed using a software program called Sequencher. Results None of Sassy's parents siblings or offspring have cancer. Sassy's DNA had mutations in the p53 gene which would change the p53 protein. Her p53 exon 6 had 6 mutations. Her p53 exon 7 had seven mutations. Conclusions/Discussion Sassy tumor had a mutated p53 gene within its DNA. Some of these mutations are the same as scientist publish for other dog tumors. The mutation I found in exon 6 are new unreported mutations. Since none of Sassy family has cancer, her tumor may be the result of environmental factors. Her family may already have silent p53 mutations.	
Summary Statement To find out if my dogs tumor has p53 mutations which may relate to cancer.	
Help Received Rosa Nagaishi Helped with science practice. John Levy helped with lab work. Mom helped with my Poster.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Wesley I. Soo Hoo	Project Number J0412
Project Title Hydrogen Bonds: Important in Biology, but Does Antibody Care?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project is a continuation of an earlier study I performed that involved the use of different substances to break the hydrogen bonds in water. The goal of my current project is to find out how different types of solutions can affect the hydrogen bonding between antibodies and the antigens they bind to. This specific binding is the biological function of all antibodies. Since nearly all biological molecules contain hydrogen (and/or electrostatic) bonds, my hypothesis predicts that disruption of these interactions would result in the loss of biological function.</p> <p>Methods/Materials A standard enzyme linked immunosorbent assay (ELISA) was used to measure the biological function of antibody binding. Various chemicals were added to test whether they would disrupt the binding of specific monoclonal antibodies to the antigen. Substances were chosen according to their different chemical properties and how they might affect hydrogen bonds. The substances tested were varying concentrations of glucose, hydrochloric acid, sodium chloride, bleach, sodium hydroxide, and SDS detergent. Binding was quantitated using a BioRad 680 Microplate Reader.</p> <p>Results The data supported the hypothesis. The substances that were tested can be arranged into three categories: substances that affect pH, detergents, and charged and noncharged substances. Initially, the substances that affected pH were the most potent, eliminating almost all the antibody binding at the lowest concentrations. The detergent was able to significantly reduce antibody binding, and finally, charged and noncharged substances had effects at low concentrations on antibody binding.</p> <p>Conclusions/Discussion The results of this study bear out the hypothesis that hydrogen bonding is important for antibody binding. On the whole, the higher the concentration of the test substances, the less antibodies were able to bind. The extent of disruption depended on the substance tested, indicating that some chemicals are more efficient at breaking hydrogen bonds than others. These experiments indicate that hydrogen bonding is critical for the function of biological macromolecules, and therefore, for maintenance of living organisms.</p>	
Summary Statement Demonstrated the importance of hydrogen bonds on the biological function of antibodies using different chemical substances.	
Help Received Father served as advisor during experiments, Telos Pharmaceuticals provided lab space with permission from Dr. DJ Carlo, CEO.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Jane Y. Suh	Project Number J0413
Project Title Converting Fruit Waste into Energy: The Effects of Pectinase on the Degradation of Fruits	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project is to find the most efficient way to minimize fruit waste using enzymes, pectinase and cellulase. Many industries around the world process and sell fruits to consumers, but no attention is being given to the millions of fruits that are being wasted causing harmful problems to our environment. The ultimate goal is to develop a method for converting fruit waste into an energy source.</p> <p>Methods/Materials For my experiments, I first tried to degrade the fruit wastes of the fruits of oranges, apples, lemons, limes, and tomatoes by adding Pectinase and/or Cellulase to the fruit waste, incubating them in a mixture of enzyme and water, then after two hours, measuring the percent decrease from the original mass of the waste. I also conducted similar experiments to determine if changing the concentration of the enzyme and the length of incubation would result in important factors in decreasing the amount of fruit waste.</p> <p>Results Pectinase was found to be the most efficient enzyme in degrading the fruit waste and had an average of 53.6% decrease from the waste's original mass while cellulase had an average of 26.4% decrease from the original mass. In addition, as the length of time and the amount of concentration of the enzyme increased, I found that those factors contributed in degrading a higher percentage of the fruit waste.</p> <p>Conclusions/Discussion My conclusion is that by using pectinase, increasing the amount of concentration of the enzymes, and prolonging the incubation time, large amounts of fruit waste can be degraded. The minimized waste can be converted into ethanol by attacking the cellulose using enzymes to make sugar and to ferment those sugars and convert it into ethanol.</p>	
Summary Statement My project is about minimizing fruit waste using enzymes, so that from the minimized waste, I could convert unnecessary waste into ethanol.	
Help Received Parents helped obtain materials for the experiments.	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Roxanne Y. Sumanga	Project Number J0414
Project Title Tumor Cells Associated in the Lymph Nodes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project is to see if tumor cells could travel through the lymph system to metastasize to other parts of the body and the factors within the nodes that contribute to the spread.</p> <p>Methods/Materials 10 microscope slides, 10 micro-centrifuge tubes, Phosphate Buffered Saline (PBS), 100 micro liter pipette, Gloves, Tweezers, cryosection, fixed ice cold acetone, antibody LYVE-1, antibody Cytokeratine, anti-a4B1, DAPI, dry ice, Ice, cover glass, mounting medium (florescent), florescent microscope. 1. Place 10 slides into two groups. 2. Label each slide: -Lymph node: -HT 29; -week 7. 3. Obtain 10 endorff tubes label each tube: -ING 1; -ING 2; -MES 1; -MES 2; -BRA 1; -BRA 2; -TUMOR 1; -TUMOR 2; -LUNG 1; -LUNG 2. 4. Use 1000 micro liter pipette to place Phosphate Buffered Saline (PBS) in each centrifuge tube. 5. When all tubes are filled with PBS refrigerate to a temperature of 4 C over night. 6. Using a cryosection cut refrozen lymph nodes of tumors into 5 micrometers. 7. Carefully place the node on one side of the microscope slide. 8. Place slides in a 20 C freezer. 9. Thaw slides of the lymph nodes. 10. Using a pap pen mark a square around the lymph nodes on the slides. 11. Apply anti-body that recognizes lymph vessels and cytokeratin. 12. Apply a second antibody that recognizes the first. 13. Place slides in a fixed ice cold acetone for two minutes. 14. Air dry slides for 30 minutes. 15. Rehydrate slides in PBS three times for five minutes each time. 16. Permeabilize slides in trixton for 60 seconds or 1 minute. 17. Block PBS 5% BSA- Place slides in PBS and into a 4 C room overnight. 18. Place slides under the florescent microscope to observe. (same procedures for testing a4 B1 only use antibody that recognizes a4b1).</p> <p>Results Tumor cells can travel through the lymph system to metastasize to other parts of the body. Several factors may also add to the amounts of tumor cells. Such as cytokeratin and the number of lymph vessels. After testing the lymph vessels it is safe to state that a certain amount of lymphatic vessels and integrins do contribute to myriads of tumor cells.</p> <p>Conclusions/Discussion Tumor cells may travel through the lymph nodes to metastasize. Lymphatic vessel play an important role in the spread of tumor cells due to the integrins and amount of lymph vessels found in the nodes.</p>	
Summary Statement My project is about the metastasizes of tumor cells in the lymph system and what factors may contribute to the spread.	
Help Received Carmela Arstill Director of the COPC Science Enrichment Program helped drive to UCSD; Used Lab equipment at Moores Cancer Center in UCSD under the supervision of Dr. Judith Varner and Barbara Garmy-Susini; Mr. Ryan Smith, Mrs. May Lualhatti, and Mrs. Easter Finley, help check my work;	



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Patrick D. Webb	Project Number J0415
Project Title DNA: Whose Is Heavier?	
Objectives/Goals The objective of my project is to determine which tested organism produces the most extractable DNA/RNA by weight. I believe that banana will produce the most extractable DNA/RNA, using my simple extraction method, because it is an organism that is neither too moist (meaning that it is not made of large amounts of liquid), nor too dry, and has good density.	
Abstract Ten various organisms, each measured out equally, were added to a blender containing 200ml of water and blended for 15 seconds to separate the cells. The mixture was then strained and a liquid detergent was added to open the cells and remove the membrane lipids. Cellular and histone proteins bound to the DNA/RNA were then removed by adding a protease (meat tenderizer). The DNA/RNA was then precipitated in cold isopropyl, and as DNA/RNA is insoluble in alcohol, it clings together. The DNA/RNA was then extracted from the layer of alcohol and allowed to dry on coffee filters. After drying, the extracted DNA/RNA was weighed on an electronic milligram scale.	
Methods/Materials Ten various organisms, each measured out equally, were added to a blender containing 200ml of water and blended for 15 seconds to separate the cells. The mixture was then strained and a liquid detergent was added to open the cells and remove the membrane lipids. Cellular and histone proteins bound to the DNA/RNA were then removed by adding a protease (meat tenderizer). The DNA/RNA was then precipitated in cold isopropyl, and as DNA/RNA is insoluble in alcohol, it clings together. The DNA/RNA was then extracted from the layer of alcohol and allowed to dry on coffee filters. After drying, the extracted DNA/RNA was weighed on an electronic milligram scale.	
Results In the end, chicken liver produced the most extractable DNA/RNA, beef liver produced the second most and banana produced the third most. Therefore disproving my hypothesis, since chicken liver did the best, and banana was the third best organism.	
Conclusions/Discussion My hypothesis was disproved, since chicken liver did the best, and banana was the third best organism tested. Since the two animal products worked the best, almost doubling some of the other tests, I can conclude that animal products work the best. There is much more to do in this field. For one thing, I could try seeing if different brands of the materials used affects DNA extraction. I could also try using different parts of the same organism to see if some parts work better than others for DNA extraction.	
Summary Statement Trying to find out what type of organism can provide the best source for DNA extraction.	
Help Received Father helped with experimental procedures; Mr. Gary Smith at Ukiah Waste Water Treatment Plant provided electronic milligram scale with instructions; Mother helped with displayed board.	