



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Darvy J. Alpuche, Jr.	Project Number S0301
Project Title Effects of Alcohol on Mice	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The experiment consists the measurement of a mouse intelligence while crossing a maze. I did my investigation on what alcohol can do to the human body and how mice live.</p> <p>I have an interest of how the human body functions. Also I know people who have a problem with alcohol and by investigating and performing this experiment; I do hope that I will be able to help them by providing a more depth of information.</p> <p>Methods/Materials 2X4, floor moldings thing long board of Wood; Lots of Nails, screws; 6 white feeder mice of the same sex; Laboratory Notebook; 1 Pencil; 1 Pen; 1 Ruler; 1 Hammer; 1 bag of Mouse Food; 3 Mouse Cages; Science Fair Application; A person who is M.D., D.V.M., teacher, etc. to advise; Plenty of Water; Plenty of Cheese; 1 manual or electric Saw; 2 Goggles; 3 Mouse watering tubes; 1 Timer(stopwatch); 1 Camera; Two small bowls; 2 bags of Bedding; 1 Large Plexiglas; 1 Drill; 1 Measuring Tape; One Drinking Alcohol.</p> <p>Conclusions/Discussion The result of this experiment was recognized when mouse BB#s behavior changed when it drank alcohol and there was a decrease in speed. I am certain that I recognized the results accurately because there is only one way how alcohol can affect external functions, such as body motion which was visible. Before the intoxication, mouse BB was very active and it performed all of the normal body movements and it changed when it gulp down alcohol. I found this result because alcohol goes into the blood stream which lowers down the amount of oxygen which can affect the brain because it is organized with many blood vessels. When the brain is not exposed to alcohol, it can perform its regular body functions and have its usual behavior. Since the brain was exposed to alcohol, it lost some oxygen from the bloodstream and with that loss it changed mouse BB#s behavior.</p> <p>I hypothesized that alcohol will affect the behavior of the mouse and I thought that I will be able to visualize it. Since alcohol affects the brain, I was able to visualize the loss of the mouse#s control of its body movements. Some physical tasks are visible to the eye. Such losses that were visible were the ability to walk, and the simple tasks such as moving its shoulder.</p>	
Summary Statement Mice, in the influnce of alcohol, were challenged to go through a maze.	
Help Received uncle Roberto Peña guided during the experiment; my father helped build 4'x 6' maze.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Kristina R. Arroyo	Project Number S0302
Project Title The Effect of Driving Distractions on Driving Performance of Adolescents	
Abstract Objectives/Goals This study examines the effect of driving distractions on the driving performance of adolescents within the Southern Californian region. Methods/Materials Prac: The subject will have one practice run through a different driving course. simulator. 1: Control stage- The subject will complete the course without any distractions. 2:The subject will complete the driving course while being engaged in the distraction of a passenger conversation. My dialogue composed of typically asked questions. 3:The subject will be engaged in the distraction of dialing a cellular phone. I will read aloud phone numbers simultaneously which the subject will have to dial while driving. 4:The subject will complete the driving course while being engaged in the distraction of finding music to listen to. The subject will locate the CDs and tune the stereo to the designated track number. Materials: Need for Speed: Underground 2004,Playstation 2 System,CD Stereo,InterAct V3 Gas & Brake Pedal, V3 Steering Wheel,Cell phone Results The results of this experiment indicate that the research hypothesis was, indeed, supported. Both the completion times and the number of crashes increased as the necessity for attention increased. The average completion time of adolescents under no distraction was 113 seconds, 123 seconds with a passenger conversation, 123 seconds with cellular use, and 128 seconds with stereo adjustments. The average amount of crashes has also resulted in an increase. The control phase with no distraction averaged three crashes, four crashes during the passenger conversation phase, five crashes while dialing a cellular phone, and five crashes when adjusting the stereo. The results indicate that the addition of distractions significantly affected driving performance. Conclusions/Discussion The research hypothesis was supported with the following information; in the control stage, the average completion time of adolescents was 113 seconds, rose by 10 seconds with a passenger conversation and cellular use (averaging 123 seconds), and adjusting the stereo resulted in 128 seconds.The average amount of crashes increased. The control phase averaged three crashes. Adolescents averaged four crashes during the passenger conversation phase, five crashes dialing a cellular phone, and five crashes when adjusting the stereo.As the necessity of attention increased, the number of crashes and time of completion increased.	
Summary Statement This study examines the effect of driving distractions on the driving performance of adolescents within the Southern Californian region.	
Help Received Conducted research in SDSU library; Teacher guided use of statistics (T-tests, etc.); 100 adolescents participated in project	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Stella Day; Chevi English	Project Number S0303
Project Title Relative Pitch	
Abstract Objectives/Goals Our project was to find out whether musical background and favorite genres of music affect people's relative pitch. Methods/Materials We had two guitars. (Guitar 1 and Guitar 2). We played the same string on the two different guitars, except Guitar 1 was in tune, and Guitar 2 was tuned down a whole-step. We slowly tuned up Guitar 2 until they thought that the two notes matched, then we recorded the frequency of the note on a tuning box. Results We found that the more musical background someone had, generally, the better their relative pitch. Also, we found that people who most often listened to rock did much better than those who most often listened to rap/hip hop. Conclusions/Discussion We believe that people with more musical background did better, because it is possible to train the ear to hear musical notes better. Also, we think that the reason people who most often listened to rock did so much better than those who listen to rap/hip hop, is that rock focuses more on melodies, harmonies, etc., where hip hop tends to focus more on the beat and rhythm.	
Summary Statement We tested relative pitch.	
Help Received Used father's equipment, father provided research materials (books).	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Anna Dewey; Charles Dewey	Project Number S0304
Project Title Infrawaves: Nature's Early Warning System	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of our project was to determine if infrawaves could be used as early warnings for natural disasters, not only by scientists and seismographs, but by people in the danger zones. We worked to determine if humans could sense the infrawaves, and if they could, whether male or female test subjects heard the low frequency tones better.</p> <p>Methods/Materials In order to perform our experiment we needed a Fender Passport Deluxe PD 25(250 watt speakers), an Oscillator, Power Cables, Banana Jack Adapter, Audio Jack Cable, Speaker Cable, Pens, Audio Test Worksheets, A Testing Facility and human test subjects. Using the oscillator to generate low frequency tones, in descending increments of 10 Hz. from 50 Hz. to 10 Hz. ask test subjects to record whether they felt or heard tones.</p> <p>Results Our results proved that infrawaves can be sensed by humans, if with a varying degree of sensitivity. Male teenagers were significantly more sensitive to the subaudible tones than female teenagers.</p> <p>Conclusions/Discussion Not only did we determine that humans can sense infrawaves, we also proved that male teenagers heard the tones better than female teenagers. Also, on later trials, significantly more people sensed the tones, leaving us questioning whether exposure to the tones could provide an early warning system for the public in danger zones, where natural disasters occur frequently.</p>	
Summary Statement We studied human sensitivity to infrawaves to determine if infrawaves could be used by the public as an early warning for natural disasters.	
Help Received Michael Talley for use of Oscillator; Walter Ruggieri for use of Fender Passport and testing facility; Volunteers/Test Subjects for participating in this test	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Megan A. Futscher	Project Number S0305
Project Title Art or Not?	
Abstract Objectives/Goals The purpose of my science project was to find out how what people consider art compares with what is considered art by critics and art museums, and whether this consideration would be affected by art style or the age of the person surveyed. Methods/Materials I chose 21 pieces of modern art by different artists and in different styles. I made up a survey and a slide show of the art pieces. Then I surveyed 45 students and 18 adults. I recorded the results and used them to do statistical analyses. Results I found that younger students tended to decide whether they thought a piece was art based on whether they liked what it looked like or liked its message. Adults tended to have a more general theory on what art was and then made their decisions based on this theory. When I did statistical analyses of the data (using the chi square distribution test), I found that overall there was no significant difference between the responses of adults and the responses of students. However, there did prove to be significant difference between the responses to the different styles of art. More often than not, people tended to consider most of the pieces art, though less so with the more abstract pieces. Conclusions/Discussion People tended to be less accepting of abstract art pieces, though only the more minimalist ones showed a significant difference in the number of people that thought they were art. Overall, students did not have a statistically significant difference in opinion when compared with adults. One of the most interesting things about this science project was reading the comments, and it was amazing to see how similar some of them were. The comments often centered on the apparent amount of effort that went into making a piece (usually to the effect that if very little effort appeared to have been put into the art work, then it was less legitimate). It is possible that if I had had a larger sample of adults a bigger difference from the students would have shown up.	
Summary Statement My project explores what people consider art and how they decide if something is art, especially focusing on modern art.	
Help Received My science teacher helped me develop my project, and helped me do the chi square distribution test. My mother discussed my ideas on the project with me, and helped me to focus them.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Miriam C. Glicksberg	Project Number S0306
Project Title Are There Distinct Categories of Math Ability?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I am trying to identify what causes people to vary in their math ability, with the goal of developing teaching methods to target specific deficits. Math skills are traditionally taught sequentially, in a building-blocks model, and an early deficit is presumed to preclude mastering later math subjects. However, I hypothesize that if there are distinct categories of math ability, then students can become proficient in subjects after an earlier-taught subject in which they have a deficit.</p> <p>Methods/Materials To distinguish between the building-blocks and distinct-categories hypotheses, I designed a 30-minute math test to administer to consenting high school students that includes basic and advanced arithmetic, algebra, graphing, geometry, and word problems, categories already encountered by my 65 participants. I also collected demographic information to identify correlations with math ability. My scoring rubric allows partial credit for correctly setting up math problems even with arithmetic errors; a category score of 50% or less is considered a deficit. I compiled the best methods for solving the problems and recorded a CD of my explanations. Several volunteers listened to the CD and took the re-test, which contained substituted numbers in the problems.</p> <p>Results Twenty students' results (31%) were inconsistent with the building-blocks model, because they were proficient in categories after an "earlier" deficit. On average, correct problem solvers performed higher level math faster than the corresponding incorrect problem solvers, but both groups performed basic math at about the same speed. Finally, I created a CD with step-by-step instructions to teach the struggling students to overcome specific math deficits. This proved successful in 4 of 5 students who retook the geometry portion of the test and improved their scores by 15-40% after listening to the explanatory CD.</p> <p>Conclusions/Discussion A significant proportion of the students, 31% (20/65), demonstrated distinct math abilities that were "out of sequence" for the building-blocks model, supporting my hypothesis. In a pilot study, most participants who listened once to an explanatory CD showed improvement of geometry scores. Therefore, math abilities can be acquired as distinct categories, and it is not always necessary to improve "earlier" math deficits in order to achieve understanding of a "later" math category.</p>	
Summary Statement I discovered that math skills can be acquired out of sequence, and therefore students may improve their math abilities by using category-specific exercises without necessarily mastering earlier deficits.	
Help Received I thank my participants, my Science Fair advisor for providing a testing room and stopwatches at school, Recording for the Blind and Dyslexic studio in Reseda for use of equipment to make the instructional CD, and my mother for help with typing, lessons in Microsoft Excel and reviewing literature with me.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Lea Harsha; Miriam Harsha	Project Number S0307
Project Title Memory Lane: A Visualization Study on Short Term Memory	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In the advertising world, people are presented with thousands of products through the various media. This project is an experiment in visualization to see how well short-term memories capture and process quick, random views of certain images of items through the timed viewing of such images and if the items remembered may be based on a personal interest in an item or, perhaps, based on an interest in the item itself. This project also tests in what kind of environment people will remember most objects.</p> <p>Methods/Materials Random, every day objects were chosen and then printed and pasted onto a black poster board. The pictures were non-biased towards any group of people. Forty-two people, age range of fourteen to eighteen years, were tested with about half tested in a quiet library to simulate an environment similar to being at home watching television and having visual cues presented to them. The other half of the sample group was tested in a noisy cafeteria to simulate a busy city with billboards all around. Each person got one minute to look at the poster board with no further information on why looking at it. Then they were given a minute to write down all the objects that they remembered. After the minute was up, they were asked to answer nine questions that would help determine why they remembered what they remembered. The data gathered was diagramed and graphed to chart the objectives of the project.</p> <p>Results Of all objects remembered, 65% were large pictures, while 35% were small pictures. Of all objects remembered, 68% were colored pictures, while 32% were black and white pictures. The black background helped 52% of the people tested remember the colored pictures. 20% of all people tested thought the environment they were in was distracting; however, on an average, these people remembered just as many objects as those who thought they were not being distracted by outside disturbances. Nonetheless, the 86% of the people tested tended to remember the objects that are of a personal interest to them. This is because the memory of the interesting objects, through familiarization or exposure, gets transferred from short term to long term memory.</p> <p>Conclusions/Discussion It is easier for a person to memorize bright colorful objects that are of interest to that person when they are in a quiet room with little disturbances.</p>	
Summary Statement The students constructed a poster board and tested forty-two people to find out how well pictures of objects could be remembered and what it is that attracted people to certain objects.	
Help Received None, other than the volunteers agreeing to be tested.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Sarah Hawkins; Natalie Pulido	Project Number S0308
Project Title What Side Are You? Left vs. Right Brain	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to learn about how your brain dominance (left or right) affects your short term visual memory.</p> <p>Methods/Materials We gave a hemispheric dominance inventory test that determined which side of our girl subjects (ages 15-17) brains' were dominant. Later we allowed them to look at a poster consisting of various random objects, and then took it away. We gave them a peice of paper and a pen and told them to write down as many objects/pictures they could remember.</p> <p>Results After compiling our data, both graphing and organizing it we determined that right-brain dominant girls have better short term visual memory. The right brain dominate girls on average could remember 16.1 objects while left-brain dominant girls could only remember 15.4 objects.</p> <p>Conclusions/Discussion We concluded that being right brain dominant allows you to have a better short term visual memory and that in turn our hypothesis was correct. This knowledge could help teachers better teach their students by knowing what learning process helps their students remember more such as verbal for left brin dominant people and visual for right brain dominant students.</p>	
Summary Statement Our project consists of the study of right and left brain dominate girls and how this affects their short term visual memory.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Alison Helman; Vienna Saccomanno	Project Number S0309
Project Title Testing the Accuracy of Human Lie Detecting Techniques	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The object of this experiment was to discover which indicators that show internal conflict are the most and least effective in detecting lies. The operational hypothesis was: if someone is lying, then one can tell by observing their behavioral traits and comparing them with indicators that show internal conflict.</p> <p>Methods/Materials Materials such as a video camera, ten basic interview questions, six test questions, list of the ten indicators that show internal conflict, an indicator grading sheet, a coin, and 80 participants, were needed. Participants were gathered and separated into four groups, an adult male group, an adult female group, a student male group, and a student female group. The interviewer asked the participant the ten basic interview questions in order to create a control group. Next, the participant was given a coin with a T on one side and an F on the other. The participant was to flip the coin before each of the six test questions. If the coin came up "T" the participant was to truthfully answer the question. If the coin came up "F", the participant was to lie to the question. The assistant recorded the result of each coin flip. This was repeated with each of the six test questions and then with the rest of the participants. Each participant was video taped. The interviewer would then re-watch the interview and, using the list of indicators that show internal conflict and the indicator grading sheet, would try to discern whether the participants were lying or telling the truth. The interviewer would then check with the assistant's records of the coin flips to see if the hypotheses were supported.</p> <p>Results The results show that different indicators work for different groups. However, there were some that remained consistently effective, such as indicators 7(a hand reaching to ear, mouth, or nose), 8(nervous movement of the feet and hands), and 9(blink rate increases).</p> <p>Conclusions/Discussion In all the groups, the total rubric score shows that the indicators are effective in detecting lies. This supports the hypothesis: if someone is lying, then one can tell by observing their behavioral traits and comparing them with indicators that show internal conflict. This experiment is a helpful aid in expanding our knowledge in the field of human lie detecting. It helps bring us one step closer to finding the truth.</p>	
Summary Statement Testing the accuracy of human lie detecting techniques.	
Help Received Dad loaned video camera; Participants who were interviewed	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Ranae Jabri	Project Number S0310
Project Title The Effects of Audio-Visual Skew and Background Sounds on Human Perception of Video Content	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals "User Content Generation"(e.g. YouTube, MySpace) is attracting huge interest world-wide and growing rapidly as an industry. Since user generated content (UGC) undergo significant processing (transcoding, transrating, etc) before being published, two important challenges face the UGC industry:(1) Media processing introduces audio-visual skews;(2) When users record their own videos, background sounds can be introduced (similar to the cocktail party effect). This project and experiments measured the effects of audio-visual skew and background sounds on human perception. The goal was to understand the limit of audio/video skew on human perception and the combination effects of audio/video skew and background sounds on human perception.</p> <p>Methods/Materials Three amounts of delays were tested (0 sec, 0.5 sec and 1 sec). Also, background sounds (BG) were added to simulate real-life recording conditions. The human subjects watched a video clip, then completed a human perception survey. To create the (6) clips, I used ULead Video Studio 10. The clips with BG were produced using exactly the same clips, with a song fused in the audio channel. Materials: Original clip of an Emma Watson interview, original music clip of "Let's get loud", ULead Video Studio 10 editor, Derived video clips described above, Laptop, Headphones, and the Test Survey.</p> <p>Results The experiments show that audio-visual skews greater than 0.5 seconds or more significantly degrade human perception. Also, BG degrades human perception further. The importance of lip synchronization was significantly amplified when BG were added. With degraded lip synchronization, the lag of mouth shape information not only fails to help resolve ambiguity introduced by BG, but also distracts humans from attending to audio while they are trying to resolve past ambiguities (current visual with past audio).</p> <p>Conclusions/Discussion As video communication technologies advance, this research provides valuable insight as to the effect of audio-visual delay and BG on human perception, a starting point for further technology development on how lip-synch can be maintained well below 500ms. Perhaps, a better expression of time-stamp of audio and video in the streams and better specification on the actual transformation and mapping of time-stamps during the media processing stage could be a better approach to maximize audio and video alignment.</p>	
Summary Statement This project studies the effects of audio-visual skew and background sounds on human perception of video content, which is important for the improvement of user experience within the user-generated content and video blogging industry.	
Help Received Help with creation of video clips	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Noe L. Klein	Project Number S0311
Project Title Chocolate Challenge	
Abstract Objectives/Goals This study looks at the effect of ingesting chocolate on the ability of its participants to perform a simple mental task, addition of single digit numbers. Methods/Materials Three test groups were studied, children in first grade, adolescents in ninth grade and adults 25 to 60 years old. Participants were tested before and after consuming a commercial chocolate product, sugar or blank control. Blood Pressure and pulse were also monitored. Results The average first grader completed 4.2 more problems in a minute and got 4.55 more correct, after eating chocolate versus completing 1.6 fewer problems after the sugar solution. Freshman decreased by 0.1 in the number of problems they completed and decreased the number of problems correct by 0.2 after consuming chocolate. Freshman completed 3 more problems and got 2.2 more correct after receiving the sugar solution. After eating chocolate the average adult completed 1.75 more problems in a minute and got 1.4 more correct, but after consuming the sugar solution they completed an average of 2.8 more problems a minute and answered 11 more correctly. The control groups, who consumed neither chocolate nor sugar, in both first graders and adults averaged about 1.1 more problems a minute and 1.5 more correct, so there were no extremely significant difference in their scores. Freshman, on the other hand, completed 2.7 less problems but correctly answered 4.2 more in the control. Conclusions/Discussion First grade students performed significantly better after consuming chocolate than with either sugar or consuming nothing. Adolescents scored essentially the same with chocolate, while adults scored only slightly higher; both groups also performed somewhat higher with consumption. This project suggests that chocolate may positively influence the test taking abilities of young children while adolescents and adults would appear to have little to no expected improvement.	
Summary Statement Does ingesting chocolate influence human ability to perform a simple mental task.	
Help Received Teachers and mentors helped edit report. Parents helped with board design.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Annastasia K. Lee	Project Number S0312
Project Title The Effect of Mozart on Short Term Memory	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In the present experiment, effect of the Mozart's Sonata and music chosen by individual subjects on short-term word memory is investigated. I hypothesize that more words will be remembered while listening to music than in silence and also that more words may be remembered while listening to music of choice.</p> <p>Methods/Materials Materials and Method Eleven subjects aging from 20 to 35 participated in the present study. The participants who carried their favorite music in personal listening devices or computers were asked to take three five-minute tests in a day. In random order, a participant took the tests while listening to nothing, Mozart's Sonata for Two Pianos in D, K448 by W.A. Mozart, and their favorite music. The participant was asked to relax and listen for two minutes then to memorize 20 easy Korean words in one minute. One of three word lists was given in a random order. In the next one minute, the participant wrote down as many words as he or she could remember. In order to maintain similar testing environments, participants, when asked to take the test in silence, were in a room alone. When listening to either the Mozart sonata or music of choice, the participants listened with headphones to minimize any background noise.</p> <p>Results Results The average number of words remembered for people who were in a quiet environment was 9.1; listening to the Mozart sonata 11.5; and listening to their favorite music 10.1.</p> <p>Conclusions/Discussion Discussions A more variety of music should be tested. And lastly, EEG or fMRI studies can be done to record brain activities of the participants and determine if the effect can be seen at the physiological level. In the present experiment, there were some limitations that may have affected the outcome. Although the experimenter tried to create a similar environment for all the test takers, the participants did not take the tests together. And the participants' musical and academic backgrounds varied. More standardized testing conditions and larger group of participants can provide more convincing results. Nonetheless, the results showing a significant improvement in word memory while listening to the Mozart K448 sonata concur with results of many previous studies and offer valuable considerations for future studies.</p>	
Summary Statement The effect of mozart music K448 on short term memory	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Quinn O'Connell; John Paula	Project Number S0313
Project Title Capsaicin Killer	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our goals were to find what to drink that best cools your mouth after drinking something spicy.</p> <p>Methods/Materials We used a 1 to 20 scale. Materials: soda, half and half, lemon juice, mineral water, habanero hot sauce, graduated cylinders, and test subjects. We had the testers drink the hotsauce and after consuming the liquid, half and half, soda, etc., tell us how they felt every 15 seconds until it reached one minute.</p> <p>Results Half and half best soothed the pain. Half and half contained the most fat which helps dilute the capsaicin. Soda was the worst liquid to consume after eating or drinking something spicy. After drinking soda the pain got worse before it got better.</p> <p>Conclusions/Discussion The liquid with the most fat is the best liquid to drink if you would like to eliminate the burning sensation. The fat that is in milk and half and half best dilutes the capsaicin and gets rid of the pain the most sufficient and the quickest.</p>	
Summary Statement Our project is about finding something to drink or eat after eating something spicy that eliminates, or best eliminates, the pain.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Ketaki M. Panse	Project Number S0314
Project Title Math: Are We Born with It?	
Abstract Objectives/Goals The purpose of my project was to see if preschoolers with no formal math education are born with innate math abilities such as visual comparison and visual addition. Methods/Materials I tested 61 preschoolers using a Powerpoint presentation with red and blue dots and numbers. The students were tested in the areas of visual comparison, visual addition, symbol comparison, and symbol addition. There were 12 trials for each visual test, varying ratio of red to blue dots and dot size. The symbol groups consisted of red and blue numbers, and there were 6 trials each. Results The average score for visual comparison was 77.60%, 75.89 % for visual addition, 49.72 % for symbol comparison, and 53.46 % for symbol addition. In the visual tests, the average score for the ratio(red to blue dots) of 4:5 was 66.81 %, 78.28 % for 7:10, and 84.84% for 3:5. Conclusions/Discussion My results support my hypothesis and show that humans have innate mathematical skills. Still, many children in school have trouble with math. The educational system should include our preexisting math skills to help these students have more confidence and view mathematics as something they can do. If computer games like the one I made for this project are used alongside the math curriculum, symbolic arithmetic will be easier for students. In conclusion, my project has proven that humans are born with innate mathematical abilities.	
Summary Statement I tested preschoolers with no formal math education and found that they are born with math abilities.	
Help Received Mr. Post helped with data table, bar graph; testing centers let me test students; parents helped with revision and board.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Kelsey C. Paulus	Project Number S0315
Project Title Is Your Kitchen As Clean As You Think It Is?	
Abstract Objectives/Goals Seven different kitchens were tested to see if they were perceived to be clean and if they were actually clean. Eight different surfaces were tested. Petri dishes were inoculated and incubated for eleven days. Results show that a persons perception of how clean their kitchen is does not match how clean their kitchen actually is. Methods/Materials Introduction: Sample: Kitchens. Independent Variable: Perception of cleanliness. Dependant Variable: Amount of harmful bacteria. Control: Test the same surfaces in each kitchen. Materials: Mackonkey agar plates, sterile swabs, camera, scotch tape, a white background and an assistant. Methods: 1. Obtain materials. 2. Find 7 participants who are willing to let you test their kitchen for bacteria and are willing to cook a meal and clean between testings. 3. Create a form for the participants to sign that indicates their perception of how clean their kitchen is, for each testing that is preformed. 4. Have the participant sign the form. 5. Swab the pre-selected surfaces without the participants knowledge of what these surfaces are. 6. Label the petri dishes in order to identify the participants house and surface. (i.e. House 1 Surface A) 7. Have the participant cook and clean his/her kitchen as he/she normally would. 8. The participant, after cooking and cleaning, will sign another form stating his/her perception of how clean his/her kitchen is. Results Results show that a person's perception of how clean their kitchen is does not match how clean their kitchen actually is. Conclusions/Discussion Results show that a person's perception of how clean their kitchen is does not match how clean their kitchen actually is. This can help others realize that they need to clean smaller surfaces along with bigger surfaces. Their perception might be good, but that does not mean that their kitchen is actually clean.	
Summary Statement Is a person's perception of a clean kitchen (free from harmful bacteria) really clean?	
Help Received I would like to thank the Lord for giving me the idea for this project and for helping me persevere through it. Thanks mom for helping me by driving me, assisting me and helping me with anything else that was involved in this project. Thanks dad for supporting me, driving me to all of the different houses and for	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Danielle Sanfilippo; Molly Shanks	Project Number S0316
Project Title Four on the Floor: A Comparative Study of the Physiological Effects of Bipedal vs. Quadrupedal Locomotion in Humans	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The theory of human evolution has been a subject of debate since its conception. Recently, scientists stumbled across a family in Turkey that walks on all fours, which some believe is the missing link between bipedal humans & their quadrupedal ancestors. This project was designed to determine whether differences in physiological functions such as blood pressure (BP), heart rate (HR), respiratory rate (RR), and minute volume (MV) are substantial enough to be considered factors contributing to human evolution from quadrupedal to bipedal locomotion.</p> <p>Methods/Materials The project involved 30 subjects between ages 15 & 18. Subjects underwent 2 trials. In the first test, subjects walked with a bipedal gait on a treadmill at 1.3 mph for 2 min. BP, HR, RR, & tidal volume (TV) were measured before & after the trial. Trial 2 was conducted with the same methods as trial 1, except subjects were required to use a quadrupedal bear crawl. The change of before & after measurements in each trial was calculated to determine the degree of physiological change incurred by the different methods of locomotion. Avg. change was calculated for the entire sample, & comparisons were made between subsets according to age, gender, height, and BMI.</p> <p>Results Quadrupedal locomotion subjected the body to more physical stress than bipedal locomotion. The bipedal trial increased systolic BP by 1 mmHg, diastolic BP by 5 mmHg, HR by 3 beats/min, RR by 3 beats/min, & MV by 0.002 L from initial resting measurements. TV decreased by 2 mL. The quadrupedal trial increased systolic BP by 10 mmHg, diastolic BP by 8 mmHg, HR by 39 beats/min, RR by 14 breaths/min, TV by 198 mL, & MV by 0.018 L.</p> <p>Conclusions/Discussion The most significant changes in physiological function occurred in HR, RR, & MV. The increase in BP was not significant enough to suggest that BP acts as an influential factor causing humans to prefer bipedal over quadrupedal locomotion. However, the increase in HR during the quadrupedal trial was much greater than during the bipedal trial, as well as the tested aspects of respiratory function. The data suggest that quadrupedal locomotion is significantly more physiologically exerting than bipedal locomotion in modern humans, indicating that an increase in cardiac and respiratory stress may be a contributing factor towards the evolution of a preference towards a characteristic bipedal gait the present day human species.</p>	
Summary Statement This project was designed to compare the changes in physiological function incurred by bipedal vs. quadrupedal locomotion in humans.	
Help Received No help was received.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Sarah T. Silverstein	Project Number S0317
Project Title Attitudes, Exercise, and Stress: A Longitudinal Study of Dental Students, Year 3	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Dental school is a stressful experience, but there is little research on factors that can mitigate stress. This longitudinal study tests the hypotheses that positive attitudes and exercise will be associated with lower stress in dental students, and that the amount and sources of stress will change over time.</p> <p>Methods/Materials 12 US dental schools were contacted; 4 participated. Students completed the Dental Environment Stress (DES) scale, Perceived Stress Scale (PSS), Stress Rating and demographic questions at the start of school (Year 1), and after 11.7 weeks (Yr 1 Time 2), 1 year (Year 2) and 2.2 years (Year 3) when life satisfaction, optimism, happiness and exercise were also assessed.</p> <p>Results Of 407 students, 234 (142 men, 92 women) responded at Years 1 and 3; 202 responded at Years 1, 2 and 3. Life satisfaction, optimism, happiness ($p < .0001$) and exercise ($p < .05$) were inversely associated with DES, PSS and stress ratings. Life satisfaction, optimism and happiness increased with exercise. Men, married and older students had more positive attitudes and lower stress. Men, single and younger students exercised more. Stress increased between Years 1 and 3 ($p < .0001$ for DES and PSS; $p = .048$ for Stress Rating), but changes in stress varied by school and paralleled changes over time in exercise. Stress from schoolwork sources was high at Year 1, increased at Year 2 ($p < .01$) but decreased at Year 3 ($p < .01$) while school atmosphere items had low ratings at Year 1 but increased over time ($p < .0001$).</p> <p>Conclusions/Discussion My hypotheses were supported. Positive attitudes and exercise were associated with lower stress suggesting possible interventional strategies to benefit dental students. Stress increased over time; variation between schools may reflect differences in exercise patterns. Sources of stress changed with school work items decreasing and atmosphere items increasing in importance over time.</p>	
Summary Statement My project examines how attitudes and exercise affects stress in dental students and how stress changes over time.	
Help Received Dr. Stephen Wotman, Dr. James Lalumandier, Mr. Philip Aftoora, Dr. Craig Yarborough, Dr. Richard Simonson, Mr. Wilson Leung, Dr. Charles Shuler, Dr. Navazedesh, and Ms. Ursula Czoik administered surveys.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Kellie K. Stutz	Project Number S0318
Project Title Pretty Patterns: The Study of Pattern Replication vs. Age	
Abstract Objectives/Goals The objective of this project is to test pattern replication vs. three different age groups. If pattern replication is tested on subjects of all ages, utilizing four shapes in eight different colors for fifteen seconds, then children will be more accurate with color, adults with shape, and teens with both shape and color. Methods/Materials Eight colors of four foam shapes were glued to a piece of cardboard. Subjects were given fifteen seconds to memorize the pattern. After memorizing the pattern, it was flipped over and the subjects were asked to replicate the pattern exactly using replicas of the glued foam shapes. The time was accounted for on a stopwatch, and the age and results of each subject was recorded. Results Teens showed that they replicated both shape and color the best with an average of 5.94 shapes/colors that were exactly correct. Adults averaged 4.46 shapes/colors that were exactly correct. Children averaged 3.54 shapes/colors that were exactly correct. The results showed more times than not, the subject would either get nothing correct, or both the shape and the color correct. Conclusions/Discussion The data supported the hypothesis in that teens were more correct in both categories of shape and color.	
Summary Statement This project tested the memorization skills and the difference in ages and how it affected the results of patter recognition and replication.	
Help Received Mrs. Grubb a teacher at Bailey School- allowed her class to be tested. Mr. Moss a teacher at Desert High- allowed his class to be tested. Steven Stutz my father- allowed employees to be tested.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Essa J. Tawasha	Project Number S0319
Project Title Measuring the Threshold of Taste	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine the threshold of taste for sweetness, sourness, and saltiness and to find out what is the lowest concentration of a solution that still has perceptible taste for salt, sugar, and vinegar.</p> <p>Methods/Materials Short Procedure: Test to see whether or not people can taste different concentrations of solutions ranging from 10% to .01% Materials and Equipment: Salt (sodium chloride); Granulated Sugar (sucrose); Vinegar; Water (preferably distilled); Stirring Rod or Spoon; Gram Balance; 100 mL Graduated Cylinder; 10 mL Graduated Cylinder; Cotton Swabs; Plastic Cups; Paper Towels.</p> <p>Results The data showed that people were able to taste the salt solution best at any concentration, proving my hypothesis false. Salt and vinegar tied until the testing of the .1% and .01% concentrations where twenty percent more of the people were able to taste the salt at .1% concentration and 10% more of the people were able to taste salt at .01% concentration. Sugar came in last place, but it tied with salt and vinegar until the testing of the solutions at 1%, .1%, and .01% concentration. Everyone that tested my solutions was required to rinse out their mouths and dry their tongues in between each test to insure the quality of the data.</p> <p>Conclusions/Discussion In concluding the experiment, I determined the threshold of taste for sweetness, sourness and saltiness to find out what is the lowest concentration of a solution that still has perceptible taste for salt, sugar and vinegar. Salt had the greatest threshold of taste proving my hypothesis that vinegar would have the greatest threshold of taste incorrect. Vinegar came in second, and sugar came in third. The most likely reason why salt came in first and vinegar came in second is that there is a greater surface area on the tongue dedicated for salty and sour taste than for sugar. If I were to expand on this project, I would use more sugary, salty, and sour substances like corn syrup and lemon juice. If the quality of this experiment were to be increased, I would have used a more accurate balance to weigh out each substance.</p>	
Summary Statement Determining the threshold of taste for sweetness, sourness, and saltiness and finding out what is the lowest concentration of a solution that still has perceptible taste for salt, sugar, and vinegar.	
Help Received Got some of the materials from my teacher.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Melissa Torres	Project Number S0320
Project Title Aging Memory	
Objectives/Goals Does age affect memory?	
Abstract	
Methods/Materials Procedure: 1. Test first group, one after another 2. Previously record short video and demonstrate to my subjects 3. Test memory with simple questions such as what color was her shirt? (Easy questions relating to the video.) 4. Give second test, flashcard test remember order of colors. 5. Take score and record under age group 6. Calculate average scores of each age group 7. Compare results with hypothesis or other previous test done on this subject Materials: Flashcards Camera 30 People	
Conclusions/Discussion Conclusion: In conclusion, my results proved my hypothesis to be both correct yet wrong. I hypothesized that the age group (26-45), the adults would conclude to be the ones with no memory loss. The ones with which proved to have a tougher time with memorizing were the age group under (5-13), the children. Yet the age group (14-25), the teens, showed to have the best memory. The age group under children finished with an average of 6.1 correct and 3.9 wrong. The group teens averaged at 7.7 correct and 2.3 incorrect. Lastly, the adult group had an average of 6.9 correct and 3.1 wrong. With improvements, I added another age group consisting ages 46-65. With this added, my results proved that the elder age group of (46-65) had the least memory and the age group (14-25) remained with the best memory.	
Summary Statement Finding what age group has the best and least memory.	
Help Received	



CALIFORNIA STATE SCIENCE FAIR 2007 PROJECT SUMMARY

Name(s) Michael J. Vredenburg	Project Number S0321
Project Title Patient Safety: Testing the Effectiveness of Patient Medication Information Sheets in Communicating Pharmaceutical Risk	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This study evaluated whether pharmacy patient medication information (PMI) sheets effectively communicate pharmaceutical safety information. Pharmacies rely on PMI sheets to meet state and federal requirements. PMI sheets have few rules about format and content and are supposed to be written at a sixth grade level. Adverse drug events have resulted from patients' limited literacy skills; the elderly are particularly susceptible. Nearly half of Americans face a higher risk of health problems due to difficulty understanding medical terms.</p> <p>Methods/Materials There were 439 total participants: 252 female and 187 male. Ages ranged from 11 to 87. Students ranged from grades 7 through 12. Adults ranged from high school graduates to having college graduate degrees. A Medication Labeling Comprehension test was developed for this study. Participants also completed a commercially available, validated reading level placement test purchased for this study. Both tests were administered together. Student tests were distributed during class. Adult tests were completed at airports by waiting passengers. Test completion time was 20-30 minutes.</p> <p>Results Overall participants were incorrect 31% of the time even though participants could view the PMI sheets while responding to questions. There was a significant increase in performance on the test as age ($F(40,398)=2.393, p<.01$), grade ($F(9,428)=8.28, p<.01$), and reading level ($F(26,410)=10.207, p<.01$) increased. People of all ages and reading levels missed safety-critical items. Females performed better than males ($t(436)=-2.74, p<.01$). Honors English students performed better than students in regular English classes ($t(389)=-6.493, p<.01$). Reading level, gender, and whether participants were honors students predicted 32% of performance variability on the Medication Labeling Comprehension test, $R^2=.324, F(3,386)=61.56, p<.01$.</p> <p>Conclusions/Discussion Performance on the test was lower than expected. Even college-educated participants with a reading level well above the government required sixth grade level made life-threatening errors. Future research is needed to identify factors that will increase comprehension by people with limited English skills and low literacy levels. This study indicates that PMI sheets should be redesigned to have a larger font, well-defined terminology, and explicit instructions written at a level that can be comprehended by people with limited literacy.</p>	
Summary Statement This study assessed comprehension of pharmacy patient medication information sheets and found that they fail to effectively communicate critical pharmaceutical safety information.	
Help Received Professor Michael Kalsher at Rensselaer Polytechnic Institute taught me statistics for this research. Middle school teacher Mrs. Collins, and high school teachers Mr. Walker, Mr. Alexander, and my dad let me test their students. My mom helped me edit my paper.	



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Sarah R. Siskind	Project Number S0399
Project Title The Effect of Incentive on Temporal Perception	
Objectives/Goals Abstract <p>Time is killed, crunched, beaten, made, or wasted. Incentive is likewise as fundamental as time. Incentives and temporal perception influence human behavior tremendously. Consequently, any correlation between the two is essential.</p> <p>How humans record and keep track of time falls under the broad areas of physics, neurology, and even philosophy. Neurologically, the perception of time mostly is controlled by the temporal lobes, or lobus temporalis. In terms of physics, time is relative. For example, time changes with the speed of light in respect to a person who is standing still as opposed to a person moving with the device measuring the time. A very common theory is that time is judged by the succession of events or sensations. Philosophically speaking, Perception of time is how we make routines, organize our lives, and help comprehend existence itself.</p> <p>Some characteristics of an incentive are stimuli that motivate the performer to behave differently. The extent to which one will go for an incentive is attributed to the expectancy-value theory, which is expressed as $B = f(E \times V)$. Humans perform with either a motive for success, a motive to avoid failure, or both. A lot of one's performance with motivation is determined by the expectancy to achieve the goal.</p> <p>Without our temporal perception, we are inept. On September 13, 1848, Phineas Gage, a railroad foreman, was in a freak accident where an iron rod pierced his cheek and protruded from his skull. His prefrontal lobes were severely damaged and his behavior became aggressive and impulsive. His perception of time was also damaged. Without his temporal perception and other key functions, Phineas became irrational and developed behavioral problems like impaired decision making. He survived the accident, but died thirteen years later from epileptic seizures. By understanding the principles of time, perception, and incentive we will further our studies of neurology and physiology and unearth the basis to some of our behavioral impulses.</p>	Abstract
Summary Statement My project is about the effect of incentive on how one perceives time.	
Help Received Godmother helped with the idea, parents and teacher helped edit	