



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Tori Adler; Emily Stephens	Project Number S0301
Project Title The Truth about Childproof	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In doing this experiment we will test young children's capability of opening child proof products in the hopes of discovering if they truly protect today's children.</p> <p>Methods/Materials 1.) First we met and tested subjects, ranging from ages 2-6 years old. 2.) We then individually tested each child, by having them attempt to open a variation of childproof medicine bottles and cleaning products. 3.) After testing the children we recorded the results. 4.) We repeated this many times with each child. 5.) Afterward we reviewed our data and converted it into graphs and charts. Materials: LA's Totally Awesome Cleaner- Bleach; LA's Totally Awesome Plumber- Liquid Drain Opener; Spic and Span- Antibacterial Spray Cleaner; Target Brand- Ibuprofen; CVS Brand- Medicine Bottle; Small Pharmaceutical Bottle; Medium Pharmaceutical Bottle; Large Pharmaceutical Bottle; Children Ranging from 2-6 Years Old.</p> <p>Results From our careful observations and data our results show that children ranging from ages 2 to 3 were incapable of opening the products and were confused by the childproof lids. However they we able to open the Spic and Span which obtained an average screw top. The older children ranging from ages 4 to 6 were more successful in opening the products. The results were very scattered and inconsistent because of each child's differing determination and strength.</p> <p>Conclusions/Discussion After researching and experimenting we have come to the conclusion that today's common household products are insufficiently sealed with proper childproof lids. Although the majority of children could not get past the childproof lid, many accomplished opening the supposedly childproof bottle which could result in a potentially life threatening situation. Our hypothesis was partially correct because although not all the children could open the dangerous products an unacceptable amount were successful. Some minor errors came about during our experiment such as the child's strength and motivation affected our results. If we were to conduct further experimentation on this topic, we would test the same group of children multiple times and compare our results in order to improve accuracy. Our goal for this project is to raise awareness to parents and adults everywhere and prompt them to protect their kids by keeping hazardous products, labeled childproof or not, out of children's reach.</p>	
Summary Statement Our project involved the testing of young children to see if they could successfully open products with childproof caps.	
Help Received Philipa Adler helped by allowing us to use the children at her preschool as test subjects and Adrienne Stephens helped by teaching us how to use Windows XL.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Taylor A. Anderson	Project Number S0302
Project Title Cell Phone vs. Headset in Relation to Reaction Time	
Objectives/Goals The Purpose of the experiment is to determine whether it was reasonable for California to pass a law requiring a hands-free cell phone headset for calls while driving a car.	
Abstract Methods/Materials Method for testing: Prerecord 4 questions on a recorder that resembles a cell phone. Perform a control drop with a yard stick with 100cm closer to the ceiling than the 0cm mark. (the subject must grab the ruler as quickly as possible. Put headset on subject. Press the play button on the message to trigger the question. During the person's response, drop the yard stick. Record their catching point on a form. Repeat for the second question. Take off the headset and instruct the person to hold the recorder like they would a cell phone, and have them press play when they are ready for the question. Repeat for questions 3 and 4. Materials: People to test (some needing a test sign sheet); A recorder with headphone jack and a speakerphone in the shape of a cell phone; An interactive message on a phone (in order to keep a consistent level of focus on the cell phone); A headset; A meter stick; A form to record data; A calculator for finding averages.	
Results When the drop was performed with the hands-free device, I found that the test subject dropped the ruler 37.7 cm average, and with the cell phone in hand, 45 cm average. When calculated, this equates to 26 milliseconds which on an average car travelling at 50 mph, means that it can stop approximately 25 feet earlier when the driver is using a headset rather than holding the cell phone while driving.	
Conclusions/Discussion I concluded that reaction time is improved using a hands free cell phone headset, compared to the traditional holding method. On average, the subjects reacted 26 milliseconds faster with the hands free cell phone device than if holding the cell phone, which equated to 25 feet less stopping distance needed for an average car that can stop in 141 feet traveling initially at 50mph. From my analysis of the data, the reason for this outcome was that the sensory, mechanical, and visual aspects of holding the cell phone were lessened, therefore allowing the brain to recognize and react to stimuli more quickly than without the hands free device, resulting in a decreased reaction time. Using a headset instead of holding a cell phone while driving a car really can improve reaction time.	
Summary Statement Using a headset can save lives when talking on a cell phone.	
Help Received none	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Sarah B. Bellingham	Project Number S0303
Project Title Is a Picture Worth a Thousand Words?	
Objectives/Goals The goal of this experiment was to figure out if students would pick up new vocabulary in a foreign language faster when the vocabulary was associated with a picture, or with a translation.	
Abstract	
Methods/Materials Methods: 1. Pens, surveys, and envelopes containing flashcards are set out at each seat. 2. Subjects are brought in and seated. 3. Subjects fill out surveys, and surveys are collected. 4. Subjects study flashcards for 7 minutes. 5. Start and stop times are recorded. 6. Tests handed out before the study time is up. They are placed on the far edge of the table in front of the student, facing down. 7. Students put the flashcards back into the envelopes, place the envelopes in front of them at the far edge of the table, and begin taking their test. 8. After about 3 minutes, the students finish the tests and the tests are collected. 9. Subjects then switch rows and repeat steps 4-8 with the opposite set of flashcards. 10. Subjects take the flashcards back out of the envelope in front of them, put them back in order for the next round of testing, and are excused. Materials: 1. Flashcards; 2. Tests; 3. Surveys; 4. Pens; 5. Satellite Clock; 6. Testing space.	
Results My results showed a large degree of variability in the performance of my subject group, although some trends are clear, for example improved performance with age. Neither picture nor word flashcards could be considered the #best# method of teaching for all students, as 53% of the students scored higher using words, 39% scored higher using pictures, and 8% scored the same on both tests. However, the results also show that some students performed much better with either picture or word associations. This suggests that the optimal sort of teaching styles varies depending on the individual.	
Conclusions/Discussion Over all, the word flashcards were the most successful for all ages, grade levels, and genders. However, there still was a significant portion of students who learned more quickly with the picture flashcards and a small number for whom it did not matter. The conclusion that can be drawn from this is that both written words and visuals should be used in the classroom to teach foreign languages to instill vocabulary in the students# minds. If teaching were to be conducted individually as opposed to in a group lesson, emphasizing one method more than the other could benefit students.	
Summary Statement This project is about how the presentation of material affects language learning.	
Help Received Father and science teacher proofread; Used a classroom at All Saints' Episcopal Day School; Subjects came from the 3rd through 6th grades of All Saints' Episcopal Day School	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Sundeep K. Brar	Project Number S0304
Project Title Are Slender Models More Attractive than Full Figured Models? A Psychological Study	
Abstract Objectives/Goals Slender models and their effect on society has been a hot topic in the media and fashion world lately. The media claims that slender models in fashion negatively effect society especially women by causing eating disorders and low self esteem and are a threat to womens health. The purpose of this survey experiment was to see if the claim media was making really is true. It was hypothesized that if slender models have made an effect on society, then society would respond by picking the slender model over the full figured one in the survey. Methods/Materials This experiment was done by: 1. Picking two pictures of models from magazines. These pictures contradicted each other (a slender model and a full figured model). 2.Four categories were made. Women teen-40, women 40-up, men teen-40, men 40-up. 3. Three survey questions were written. Which model is more attractive? ,Which model looks healthier? ,and Which model looks happier? 4. The survey was given to 200 people (50 from each category) 5.The results are tallied and used in bar graphs. 6. The One Proportion z-Test and the CHI-Squared tests are applied to the survey results. Results The results from the bar graphs showed that in the perception of attractiveness most men (young and old) preferred the slender model while younger women were undecided and older women preferred the full figured model. In the perception of health and happiness, most people regardless of age gender preferred the full figured model to the slender one. According to the statistical analysis of the One Proportion z-Test and the CHI-Squared tests the p-values showed that there was no difference in opinion of one model over the other. These results were surprising and after further analysis it was discovered that there was no difference in opinion because the population surveyed was too small to make any generalizations. Conclusions/Discussion It was discovered that slender models have made an effect on society. As well age and gender do make a difference in the opinion of society. The claim that the media had made is true but not as severe as the media suggested. This experiment is vital information to women#s health concerning self esteem and eating disorders.	
Summary Statement This psychological experiment was a survey testing the attitudes of men and women of different ages toward thin vs. full figured models in the perception of attractiveness, health, and happiness.	
Help Received mom provided transportation, chemistry teacher gave advice, most importantly math teacher taught AP Statistics and helped apply it to the project	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Alex L. Burtson	Project Number S0305
Project Title The Correlation between Religious Maturity and Physiological Reaction Time	
Abstract Objectives/Goals Past studies show that religious maturity and various forms of human perception affect the psychological and physiological aspects of human beings. Religious maturity can affect anyone enough to be a cause depression and distress (Atkinson 1). Religious maturity is a measure of one's independence, ownership, examination/ evaluation, and most importantly, an openness to new experiences in one's own life situation. This means that religious maturity is independent of religion. In this study, teenagers were surveyed in order to determine their religious maturity. They were then required to undertake a program that measured their physiological reaction time. It was predicted that both tests would have a positive correlation, meaning that religious maturity would affect physiology, making one more capable of responding to and reacting with their surroundings.	
Methods/Materials The physiological #MW# test was first requested from Dr. Amodio. Permission was granted to use Gary Leak's religious maturity scale. The survey was created with the scale incorporated, also including demographics such as gender, religion, ethnicity, etc. One hundred forty eight high school students were surveyed and tested. The data was analyzed through creating several X-Y scatter plots and using Excel to calculate the regression lines and the corresponding r^2 values for each subcategory of the demographics.	
Results After comparing all the data from 148 participants, none of the charts showed any correlation. It appeared to be that the larger the sample size was, the more accurate it was, and the closer the results were to having no correlation.	
Conclusions/Discussion The results showed no correlation, despite the hypothesized prediction that there would be a positive correlation (between the religious maturity survey score and the #MW# physiology test score). Perhaps a much larger sample size was needed, perhaps 500 people instead of 148 people. The physiology test could have been longer and more in depth as well. It might have been too short for the participants. After data re-evaluation, it was discovered that participants performed significantly greater on the second half of the physiological test. Another possible reason for my results is that religious maturity might not even affect physiology until people reach adulthood (only teenagers were tested here).	
Summary Statement This is an attempt to demonstrate the effects of close-mindedness on human physiology.	
Help Received Parents helped brainstorm; Dr. Vavra gave guidance and suggestions; Dr. David Amodio permitted the use of his physiological program; David Leak permitted the use of his survey/scale; IT at High Tech High assisted in solving technical computer problems.	



CALIFORNIA STATE SCIENCE FAIR 2008 PROJECT SUMMARY

Name(s) Marian M. Fam	Project Number S0306
Project Title The Effect of Multiple Intelligence Strength on School Performance	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The topic for my science fair project is #Which strength of the theory of multiple intelligences contributes to higher school performance?# My project focuses on the 9 different strengths of the Multiple Intelligences theory, which are: naturalist strength, musical strength, logical strength, existential strength, interpersonal strength, kinesthetic strength, verbal strength, intrapersonal strength, and visual strength. I wanted to use the theory of multiple intelligences to help me understand why schools and culture focuses most of their attention on linguistic and logical-mathematical intelligence when intelligence consists of a number of different strengths. I think that this project will help society change their traditional view upon intelligence; and to grasp the concept of multiple intelligences. Therefore, I want to see how the other 7 intelligences are compared to logical and verbal intelligences.</p> <p>Methods/Materials The procedure for my project was to hand out 300 surveys to students all over school. The data from the surveys was collected and organized by question. Computer generated graphs will be made based on the results of the surveys. The results from the questionnaire would indicate interesting things about the concept of multiple intelligences.</p> <p>Results My interpretations of the results confirmed that the school system is too narrow in assessing true school performance. Neither the logical-mathematical intelligence nor the verbal intelligence had the highest average percentage value in all the graphs; therefore, these two strengths do not dominate and determine a person's intelligence level. The intelligence of intrapersonal strength had the highest average percentage value. The intelligence of naturalistic strength had the lowest average percentage value.</p> <p>Conclusions/Discussion After much analysis, I formally accept my hypothesis, #If students perform better on strengths of multiple intelligences in categories other than logical-mathematical and verbal, then the school system is too narrow in assessing true school performance.# The category of intrapersonal intelligence did tend to have the highest percentage value in most of the graphs. The average percentage of students scoring in the logical strength and the verbal strength was similar to all other strengths. The logical strength and the verbal strength were not any higher than that of any other strength.</p>	
Summary Statement This project is about which strength of the theory of multiple intelligences contributes to higher school performance.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Tarah Franklin; Kaitlyn Kennett	Project Number S0307
Project Title Pump Up the Volume, Bring Down the Grade? The Effects of Audio Stimulation on Mathematical Test Performance	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals If 40 individuals [indivs.] take 4 similar math tests, each test taken while listening to a louder volume [vol.], then each indiv. will receive the highest % w/ the lowest vol. (52-72.8dB) & receive the lowest % w/ the loudest vol. (68-85.3dB).</p> <p>Methods/Materials The project began by recording chatter in the cafeteria. Next, 40 subjects [subjs] were tested in 4 timed trials, each on a different day in a semi-secluded room consisting of the test taker & the supervisor. The subjs were given a math test consisting of 4 math principals(+, -, *, ÷). The 1st trial was in silence to set a control grade & time for the rest of the test. In the 2nd trial, subjs were introduced to a low vol. (52-72.8dB) of the pre-recorded noise through speakers (6" apart), in the 3rd trial the vol. increased to a moderate vol. (63.6-80.6dB) & in the 4th trial the vol. increased to the loudest vol. (68-85.3dB). Each test was then individually graded, timed, & compared to the subj's control test [ct] to evaluate the change [chg] in % correct on each test. If the subj's % was the same for 2 tests, then the faster time (if present) was considered a higher %.</p> <p>Results The data was analyzed in 4 categories: overall mean %, % of subjs w/ the highest % per test, largest % increase from each test & the ct, & largest % decrease from each test & the ct. The mean score was 88% correct for test 1, 78% for test 2, 83% for test 3, & 85% for test 4. 28% received highest % in silence, 15% in a low vol., 20% in a moderate vol., & 38% in the loudest vol. Using the formula (# correct on vol. test - # correct on 1st test/# correct on 1st test) we found the chg in % from the control to the 3 tests. When compared w/ the ct, 15% of tested subjs had a greater pos. (+) % chg in test 2, 20% in test 3, & 38% in test 4, 28% showed a neg. (-) chg only. 39% got highest (-) % chg in test 2, 24% in test 3, & 15% in test 4, 20% showed (+) chg only. Due to classifying 1 person in more than 1 group, the calculations for largest % decrease used 41 subjs rather than 40. The person was categorized in both due to a same score & time on test 2 & 3.</p> <p>Conclusions/Discussion 95% showed that indivs. do not score the highest w/ the lowest vol.(52-72.8dB) & score the lowest w/ the highest vol.(68-85.3dB). Overall, each test varied in respect to the indiv., rather than a pattern.</p>	
Summary Statement Testing the effects of noise volume on mathematical test performance.	
Help Received Dayl Thomas helped convert our pre-recorded chatter into decibel levels, Mr. Grubb helped prefect our board and abstract	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Arman Ghorbani	Project Number S0308
Project Title Believing Is Seeing	
Abstract Objectives/Goals My objective is to see why some groups are affected by suggestion and others are not. My goal is to figure out why certain groups are more easily persuaded to see something that isn't happening, while other groups are immune to persuasion. Methods/Materials Materials consist of wood to make a box, a laser pointer, 20 motor sounds, people of all ages and genders, fake wires and switches, blankets to cover all light, pitch dark room, paper and pencil, and materials to construct box (such as screws, drill, tape, etc.). To carry out the experiment follow this method: 1. First I took wood and constructed a box with an open side and the opposite side with holes, big enough for sound to transfer clearly, but small enough so no one sees inside. 2. Get blender motors or motor sound clips or anything similar and put inside the box. 3. Add the laser pointer and switches and wires to make the box look high tech. 4. Use people of all ages and genders in a dark room and shine the laser on the wall. Make sure the laser dot is the only thing visible. Tell them the laser point on the wall will move and to draw, on the provided paper, the design the laser makes. The laser, however, never moves. 5. Record the number of drawings each individual drew. 6. Repeat many times with different people of different ages and genders. Results It ended up being that either people kept seeing the laser move all 20 times or didn't see it move at all. All the younger children and older adult females did see it move. All the teenagers, adult males, and younger adult females saw no movement. The laser never moved once, however. Conclusions/Discussion My conclusion is that younger children are more susceptible to persuasion. Teenagers undergo puberty which releases hormones from the hypothalamus which affects the way the thalamus sends signals to the parietal lobe, which perceives information, making them not see the laser move. Adult males continue to not see the laser move but older adult females do see it move. This is due to the hormones that are no longer being release when they begin to undergo menopause. Their perception is reversed to the original because the hormones that were being secreted are no longer being released because the ovaries shut down. This reverts the changes caused in the way the thalamus interprets the information the eyes, ears, etc. present it with. If they believe it, they will see it.	
Summary Statement If an individual is persuaded to believe to see something that isn't real, they will see it anyway due to the power of suggestion, depeding on their hormone levels.	
Help Received My father helped me saw the wood for the box. My past teacher allowed me to use his resources to do research.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Merle L. Howard	Project Number S0309
Project Title The Effects of Tempo and Language on Human Focus	
Abstract Objectives/Goals To find how the tempo and spoken lyrics of songs affect a person's cognition. Methods/Materials I had subjects individually try to perform a task while providing task-irrelevant music. I recorded how long it took a subject to finish a task and how many errors made while completing the task. Results Fast tempo music has no significant effect compared to no music on completion time. Slow music has an inhibiting effect compared to no music on completion time. Language has no significant effect on a person's completion time of a cognitive task. The data for amount errors was inconclusive in all cases. Conclusions/Discussion Music of faster tempo should be listened to if you desire music while performing a cognitive task. Music of a slower tempo should not be listened to in a situation where you wish to complete the task faster.	
Summary Statement Speed of music affects a person doing a cognitive task.	
Help Received Mr. Linke revised my writings.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Kehly D. Kirk	Project Number S0310
Project Title Integrity First: Does Formal Ethics Training Affect Teens' Ethical Decision-Making?	
Abstract Objectives/Goals This project was designed to determine if formal ethics training provided by the U.S. Air Force Junior Reserve Officer Training Corps (AFJROTC) curriculum increases cadets' ethical knowledge and ethical conduct when compared to the general high school student population as demonstrated by scored responses on an anonymous ethical decision-making survey. Methods/Materials An anonymous survey was distributed to 32 high school students enrolled in AFJROTC and similar organizations (experimental group) and 34 students not enrolled in AFJROTC (control group). The survey contained 14 short statements to assess ethical knowledge and 8 hypothetical situations to assess ethical conduct. Demographic data were also collected. Answers to the survey questions were assigned 1-4 points each with 1 being the least ethical and 4 being the most ethical response. Responses to the survey questions were scored, entered into an Excel spreadsheet, and analyzed. Results In assessing Ethical Knowledge, the benchmark score was 3.17; the experimental group score was 3.05; and the control group score was 3.03. In terms of Ethical Conduct, the benchmark score was 2.87; the experimental group score was 2.57; and the control group score was 2.77. For the Composite Score, the benchmark score was 3.02; the experimental group score was 2.81; and the control group score was 2.90. Using Descriptive Statistics: (Mean, Std Dev, 95% Confidence Level); t-Test: Two-Sample Assuming Unequal Variances (Alpha=0.05); and z-Test: Two Sample for Means (Alpha=0.05) it was determined the three (3) null hypotheses (i.e., no difference between experimental and control groups) could not be rejected. Conclusions/Discussion Experimental Group (AFJROTC) and Control Group (Non-AFJROTC) ethics scores DO NOT differ enough to statistically rule out chance sampling error. Therefore, data collected from this experiment DOES NOT support the hypothesis that formal ethics training results in greater ethical knowledge and ethical conduct among teens.	
Summary Statement Using an anonymous survey, this project was designed to determine if formal ethics training provided by the AFJROTC curriculum increases cadets' ethical knowledge and ethical conduct when compared to the general high school population.	
Help Received My parents purchased the materials for this project. My father assisted me in understanding the statistical analysis methods used in preparing the graph and data tables.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Ayan B. Kusari	Project Number S0311
Project Title The Effect of Breakfast Consumption on Test Results	
Abstract Objectives/Goals The effect of ingesting a morning meal was measured quantitatively on mathematic performance. While the subject matter was simple, consisting of elementary arithmetical operations. Folk knowledge has lauded the virtues of breakfast consumption in the past, but at University High, many students starve themselves in the morning. I wanted to see the true effect of breakfast on something that affected all of us in school: math test grades. Methods/Materials The materials used in this project were kept to a minimum. The most important element of this project, the quantitative math test, was simple to design and was triple checked with a calculator to ensure accuracy: Elementary Self-Made Arithmetic Worksheets (20), Pencils . Procedures 1. I decided to create an arithmetic worksheet which was difficult enough so that changes in speed and accuracy would be clear. 2. I included long addition and varying degrees of multiplication and division. 5. After stapling packets of the tests, I handed ten packets of one first test and one second test. I decided to keep the gender ratio 1:1 in case it would cause any distortions. 6. I instructed my subjects to complete one packet on a day they did not choose to eat breakfast. For those who regularly eat breakfast, I suggested they complete one packet before eating breakfast and the other packet after eating. 7. I made an answer key and graded everything. Results Breakfast was conclusively proven to bring a consistently faster and more accurate result in the test. Conclusions/Discussion University High is in the center of Irvine, a small thousand by thousand roughly square grid of land surrounded by mauve buildings from the seventies. But inside the campus, trends rage on a monthly basis, brewing in the hearts of unsettled and curious teenagers unknown to the very counselors who guide them. Academic performance is key. We were once the highest scoring high school in the county. Is it so implausible that mass misconception of this fundamental morning meal is the cause of our decreased performance?	
Summary Statement The Effect of Breakfast consumption on math test speed and accuracy was tested.	
Help Received My mother helped me buy the backboard and my father drove me several places.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Nitish Lakhanpal	Project Number S0312
Project Title Spreading the Word: Simulating the Effect of Population Influence Structure on the Propagation of Ideas	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Though the propagation of ideas in human society is among our species' most unique and valuable characteristics, little quantitative attention has been devoted to understanding factors that might influence it. My objective is to - by analogy to processes used in mathematical population biology - conceive and write a computer simulation of a process that transmits ideas seeded in a population according to a stochastic weighted-consensus rule and to develop a numerical approximation technique. The process occurs on an underlying population influence structure represented as a directed and weighted graph. With this model we analyze the effect of various population influence structures on the likelihood and speed with which a new idea will spread throughout a population.</p> <p>Methods/Materials 2.5 GHz Personal Computer, 1 GB RAM. Simulation coded in C++: Establish a population of size N=100 (each member is in one of two states - "0" for the old condition, "1" for new) that begins with some "1" entries. Create a population influence structure as a graph in which each node is an individual and each directed, weighted edge represents the level of influence of one member on another. Repeat 10,000 times to generate a reliable average fixation probability and time: choose a random individual to consider changing status with a probability equal to the proportion of overall inward influence that comes from individuals in the different state.</p> <p>Results Both regular and non-regular structures with symmetric influence generate behavior equivalent to a fully-mixed population. The presence of a single agent who is insensitive to all makes a dramatic impact on the fixation probability. The presence of several agents who are relatively insensitive to their neighbors' influence protects ideas that originate among those agents. Finally, when considering how best to use a certain quantity of influence to promote an idea's progress, we found an interesting dependence on the nature of the population, suggesting that success requires an understanding of the population and use of the most appropriate strategy.</p> <p>Conclusions/Discussion Overall, the results from the simulations performed in this project offer support for our hypotheses. A population's influence structure does exert an effect on idea propagation. Further, numerical approximations by Markov processes very closely matched the simulation results, providing an efficient alternative.</p>	
Summary Statement We used a stochastic weighted-consensus rule akin to the Moran process in Biology to simulate the effect of population influence structure on the likelihood and speed of an idea's propagation. A numerical approximation was also developed.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Laura S. Levy	Project Number S0313
Project Title Hear It, Say It, Spell It: Investigating Nonvisual Pathways in Spelling	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals About 20% of the English speaking population has a spelling disability. This study was conducted to determine if auditory and verbal pathways in the brain could be used to learn how to spell, instead of the visual pathway usually emphasized in school.</p> <p>Methods/Materials Adults were given a classifying test of 29 frequently misspelled words, followed by a pretest of 20 pseudowords (pretest 1). Subjects then studied these words by listening to the spellings repeated 3 times /day for 4 days. A post-test was given on the 5th day. The process was repeated with a second set of words (pretest 2), but the subjects were asked to listen to and repeat the spelling aloud. All tests and instructions were carried out via email using sound files. The subjects were never allowed to see the spelling of the pseudowords.</p> <p>Results Box plots with 95% confidence intervals (CI) were used to evaluate learning. The median score for pretest 1 was 5% (CI=0, 8.75) vs. 80% for post-test 1 (CI=8.75, 95), indicating a 75% improvement using the auditory study method. The median score for pretest 2 was 10% (CI= 0, 15) vs. 70% for posttest 2 (95% CI = 65, 93.75), indicating 60% improvement using the auditory and verbal study method. Two-tailed paired t tests showed that the difference between the medians for each set of pretests and post-tests was statistically significant ($p < 0.0001$).</p> <p>Conclusions/Discussion Both methods were successful, but those who scored poorly on the classifying test seemed to benefit most by combining two pathways. It is possible that those who are chronically bad spellers have an under developed section of the brain that processes spelling visually, or that visual connections to the "spelling center" were not developed. It may be possible to improve spelling ability by bypassing the visual connection and making connections to the "spelling center" using alternative sensory pathways or multiple sensory pathways. Better understanding of this could lead to the development of alternative methods for teaching spelling that bypass the visual pathway.</p>	
Summary Statement Can spelling ability be improved by using nonvisual sensory pathways?	
Help Received Mother taught me the necessary statistics and helped find subjects.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Kelsey K. Morton	Project Number S0314
Project Title This Is Your Brain. This Is Your Brain on Music	
Abstract Objectives/Goals My objective in doing this experiment is to determine whether music made from the frequencies of Beta brainwaves will help improve concentration. Methods/Materials The following materials were used in my experiment: a pen and paper, a "High Focus - Music & Beta Frequences" CD, stereo headphones, test subjects, a computer and the "superfocus" website. Essentially, my experiment was to compare the my ssubjects' results from the Mental Processing Speed and Attention Span tests on the superfocus website with and without the music. I sat one of my subjects down at the computer and had them take both tests in silence. I then had them listen to the music for five minutes and then had them take the tests again and recorded their scores both times. Results My results fairly consistently showed that concentration did improve with the music. The average improvement in the Mental processing Speed Test was about 5-6 second and the average improvement of the Attention Span Test was about 3-4 rows. Almost all of my subjects showed an overall improvement. Conclusions/Discussion to conclude, Beta brainwave music does in fact improve one's ability to concentrate.	
Summary Statement The Beta frequency is that which the brain enters during a concentrated state; I am testing whether music converted from these frequencies will aid in concentration.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) D. Valle Rogers	Project Number S0315
Project Title Screen Time vs. GPA	
Abstract Objectives/Goals My goal was to show a correlation, if any, between a student's electronic media usage on a school night and his/her GPA. Methods/Materials I asked my school principal to give me the grade sheets of the 8th-10th graders. To maintain privacy she cut out all the names on the sheets and left only the student identification numbers. I had each student I was testing find his/her grade sheet and write down his/her gender and how many hours he/she spent on electronic media on a school night. I defined electronic media as using any kind of electronic screen that had nothing to do with school work. T.V., video games, and computer use were the most commonly used. Results The calculation coefficient that I calculated from my data showed no significant correlation. Conclusions/Discussion My conclusion, based on the correlation coefficient from my data, is that there is no correlation between electronic media use on school nights and GPA in 8th-10th graders.	
Summary Statement I tested to see if there is a correlation between a student's electronic media usage on a school night and his/her GPA.	
Help Received Erin, my science teacher, helped me calculate the correlation coefficient.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Joyce L. Rushton	Project Number S0316
Project Title Concentration	
Abstract Objectives/Goals To study and determine which is the best test taking method- to listen to music through a CD/ Mp3 player, or to have a quiet atmosphere? Methods/Materials All students were tested from an Advanced Math course at Ukiah High School to control for math level. Each personal listening device, ie CD player, Mp3 player, was prepared with a copy of a CD. The songs on the CD were of mixed genre, to produce a variety of songs high school students might listen to. The test was recommended for the project by the teacher of the course, and was considered level appropriate. The students arrived to take the test on a voluntary basis. The students were divided into two groups, one group was assigned personal listening devices, and the other group took the test without any devices. Results The scores from both groups of test takers were generally poor, likely because students didn't study for the test. There were eight students who took the test, resulting in four students per group. The maximum amount of points a group could have earned on the 25 question test would be 100. Out of 100 points, the students who listened to music earned 36 points, and the students who did not listen to music earned 30 points. It was observed that the test takers without music generally finished faster than the test takers with music. The first three students to finish their tests were in the non-music group. Conclusions/Discussion The students with music performed better. This was possibly because they were more motivated to continue studying. The test required motivation for success, as the test was on a completely voluntary basis, different from a test taken during class. The students not listening to music could have been considering where else they could be at the same time students with music were tuning out all outside interest. The test takers who didn't have music finished too quickly to have given the test much thought, whereas the test takers with personal listening devices were the last to finish. Many people would agree that music is a distraction, but perhaps in this case it proves to be a positive distraction enabling us to tune out all our other interests.	
Summary Statement The objective of my project is to study the impact of listening to music on math related test performance.	
Help Received My math teacher, Mr. Cavender, helped choose a test; Friends lent me CD players; Mr. Shelton, my biology teacher, gave advice.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Hannah B. Sarver	Project Number S0317
Project Title Can I Get a Ride? An Analysis of Carpooling	
Abstract Objectives/Goals To determine the efficiency of automobile use in the area surrounding Carlmont High School, based on length, distance, and consolidation of trips, frequent times of day for car use, and passengers carried. Methods/Materials Create form to track family car use over two weeks. Collect data (39 families, 68 cars, 3700 trips), and enter into Excel spreadsheet, showing total miles driven, total time spent, and passenger-miles driven. Find sums and averages of all categories tallied. Sort data by time of day, distance and length of trip, and passengers carried. Graph, with percentages of total trips by length in miles, average passengers driven per mile, and most congested times of day. Analyze data regarding consolidation of tasks away from home and frequency of carpooling to assess driving efficiency. Results Consolidation of errands: 93% of cars at least twice in two week period, 19% at least half of all trips Carpooling outside of family: 56% of cars at least once, 29% at least 3 times in two weeks Average passengers per mile per driver: approximately 0.72 Distance of trips: 69% of all trips were less than 5 miles, with 60% of these under 3 miles Average weekday most congestion 7:00-8:00 am, weekend higher frequency 1:00-2:00 pm. Conclusions/Discussion Those surveyed seemed to consolidate errands, utilize public transportation (as indicated by comments), and carpool when possible. However, many areas of driving efficiency could be improved, as evidenced by frequent trips within a short distance of the home and a majority of regular commutes driven with no passengers and at the most congested times of day.	
Summary Statement This project aims to analyze the efficiency of car use in a given population by collecting and assessing data based on distance and timing of trips, consolidation of errands, and passengers carried.	
Help Received Mother assisted in data entry and use of Microsoft Excel.	



CALIFORNIA STATE SCIENCE FAIR 2008 PROJECT SUMMARY

Name(s) Parima Shah	Project Number S0318
Project Title The Effects of Breathing Techniques on Test Anxiety	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals It has been found that various breathing techniques have increased immune system functioning, lowered depression, and changed in metabolism, heart rate, etc, basically combating the symptoms of test-anxiety. Meditative and breathing techniques have yet been used to battle test anxiety and so it is only natural that this research project, whose sole quest is to help students reduce this stress of their life, take upon this technique to help students perform to their highest level and receive an education they deserve.</p> <p>Methods/Materials 1.Hand out the first form, which measures the intelligence of the students in the class.2.Administrate the test. It took ten minutes.3.A second form was given out to the class. It is based off the Test Anxiety Inventory developed by Spielberg. It was shorten, however, to fifteen questions. This administration took about 10 minutes. The purpose of this test was to diagnosis for test-anxiety.4.On the day of test, through random numbering of students, the class was separated into two groups.5.The first group, the experimental group was taken into another room where they were given breathing exercises.6.The second group, the control group, would be given the opportunity to review information for the test for these ten minutes.7.After the ten minutes were up, the two groups were reunited and given another test of ten minutes (Form 3 or Intelligence Test 2).</p> <p>Results There were 4 profiles developed: test-anxiety and no breathing techniques, no test-anxiety and breathing tech., test-anxiety and breathing tech, and no test anxiety and no breathing tech.</p> <p>Conclusions/Discussion Because of these intelligence tests, four types of persons are developed Group 1:Test-anxiety and no breathing techniques. They showed large decreases in scores from the first intelligence test and the second. Group 2:Test-anxiety and breathing techniques: Students in this category had an increase in score, although they had test-anxiety. This is not in accordance with the hypothesis because they did better than expected. Group 3:No test anxiety and no breathing techniques. There was no statistical difference in scores proving they were truly the control group. Group 4:No test anxiety and breathing techniques. These students also increased their scores dramatically after taking the breathing techniques, proving this technique truly reduces any level of stress.</p>	
Summary Statement I used breathing techniques to reduce test anxiety in high school students.	
Help Received No one helped me with my project but students and teachers volunteered to be a part of my experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Xiaozhe Shi	Project Number S0319
Project Title Human Speech Component Analysis	
Abstract Objectives/Goals This project's purpose is to explore the components of speech perception, to answer the question #What do humans actually hear when they listen to speech.# This project was done to add more to the speech knowledge base and research methods for speech recognition. Methods/Materials A speech component analysis experiment was conducted. In this experiment, voice samples were filtered so pitch, power, and relative frequency compositions are separated into different samples. The experiment consisted of a multiple choice accuracy of perception test. Results The statistical analysis shows that the fundamental pitch and the relative power of the sound failed as a medium of communication, but the relative pitch compositions allowed subjects to discern almost half of the phrases. Conclusions/Discussion The data supports the original hypothesis. Relative compositions contain much more discernable audio information in relation to speech. The information collected in this project may be used for further speech research. Future algorithmic speech recognition research based on relative harmonics should be conducted.	
Summary Statement This project uses computer science and human tests to determine what basic component of sound is interpreted into speech.	
Help Received Professor He Yingmin and his student Wang Xiujun, in China, helped me with the computer science part of extracting fundamental pitch; Professor Joe Pasquale helped me brainstorm project idea and proposal; Intel helped with a 500\$ scholarship grant.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Nathan K. Tsang	Project Number S0320
Project Title The Effect of Background Noise on Memory	
Abstract Objectives/Goals The objective of my project is to determine if background noise affects a person's ability to memorize words. Methods/Materials Empty classroom, ten copies of the three different memory tests (Each memory test consisting of 20 random words), ten blank sheets of paper, ten sharpened pencils, timer, speakers, and a controlled type of noise. Each participant studied a set of 20 random words for two minutes. After memorizing a set of words, the participants wrote down as many words as they remembered. This process was repeated two more times except different level of background noise were played while the participants studied the words. Their tests results for each set were collected. Results The average test score while listening to no noise was 14 words remembered. The average test score while listening to little noise was 10.9 words remembered, and the average test score while listening to loud background noise was 7.9 words remembered. This data shows that background noise negatively affects the ability to concentrate and memorize words. Conclusions/Discussion My hypothesis, that background noise affects memory, was proven correct by my experiment. Judging by my t Stat and t Critical values, my data is extremely valid. There were no outliers in test scores because the standard deviation for each set of words was below 2.5 words remembered. Almost all of the participants looked for patterns to memorize words when listening to background noise.	
Summary Statement My project is about finding out how different levels of background noise affects memory, the human mind, and the ability to concentrate.	
Help Received Teacher gave feedback on report; Neighbor helped edit report.	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Alexandra L. Tu	Project Number S0321
Project Title Turn Up the Music, Just Mute the Lyrics	
Abstract Objectives/Goals I wondered whether or not listening to music with lyrics or music without lyrics makes a difference when a person is performing a task. I believed that music with lyrics causes a person to make more mistakes on the job they are doing at the time because the lyrics are distracting. Methods/Materials I performed an experiment where I gave 12 test subjects ten different math tests consisting of addition, subtraction, multiplication, and division. Six of the volunteers were adults, while the other six were adolescences. They did these tests while listening to different music with lyrics and without. I chose 5 different genres of music and played each with lyrics and without. Afterwards, I graded the tests and recorded the data. Then I found the mean of the tests each person took with lyrics and without lyrics. I placed the means on a graph to have a visual comparison of each person's results. Also, I put the data into a TI-84 calculator and ran a Sample T Test so I could calculate the statistic. Results The calculation from the Sample T Test came up with $p=0.0678$, which meant my data was significant at the 10% level and that there is some evidence that tests taken while playing music with lyrics made the accuracies worse. Conclusions/Discussion In the end, the results that I collected supported my original hypothesis. Listening to music with lyrics affects the accuracy of a participant's work and makes it worse. This experiment advocates the fact that multitasking is not as efficient as many think it is. My studies show that even little things like addition and division could be done incorrectly when performing more than one task at a time.	
Summary Statement My project focused on whether or not listening to music with or without lyrics makes a difference when a person is performing a task.	
Help Received Father helped print out pictures; Statistic teacher taught me how to run Sample T Tests; Used classroom at Gabrielino High School to run tests/experiments under the supervision of Dr. J, Biology Teacher	



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Christina Zeitountsyán	Project Number S0322
Project Title Remember to Relax and Relax to Remember: Examining the Effects of Meditative Techniques on Cognitive Ability	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This study will attempt to prove that meditative techniques have observable effects on cognitive functioning, such as cued recall, a certain type of memory.</p> <p>Methods/Materials A total of 42 subjects, were tested: 14 different subjects per condition (each subject participated in only one condition). There were 3 conditions: Condition 1 and 3 tested two types of meditation, (Silent meditation, also known as Transcendental Meditation, and meditation with music), and Condition 2, the control had no meditative techniques. The subjects were assigned randomly. After being exposed to the condition for 2 minutes, the subject look at a packet, which had six different pictures of people's faces, with names under each. After looking at each page for 6 seconds each, the subject was asked to complete a distraction maze to make sure we were testing long-term memory, instead of short-term memory. The same images were shown to the subject and they were asked to recall as many names as possible.</p> <p>Results Overall meditative techniques (the average of condition 1 and 3) resulted in a 7% improvement of recall when compared to condition 2, the control. Condition 1, silent meditation, had a 10% improvement over control, while condition 3 had a 5% improvement over control.</p> <p>Conclusions/Discussion My hypothesis was found to be correct by the results of the study. This improvement could decrease the effects of stress on mood and cognition. In the future, we would like to have individual studies done, and, if time allows, do statistical analysis on the results to prove the findings were significant. We believe the difference in the scores of condition 1 and 3, despite the fact that they show improvement, resulted from the New Age, low-tempo music that was played in condition 3. The low-tempo music might have been different than the music the subject usually listens to, and this could've caused a distraction. The purpose of the low-tempo music was to create a quiet, relaxed environment to help the subject focus on meditating.</p>	
Summary Statement Meditation has been recently getting attention as a possible way to reduce stress so this study wanted to test if meditation could also have an effect on cognitive ability, which could then help us deal with stress.	
Help Received My instructor guided me throughout the project, and I used my knowledge from an AP Psychology course I had taken.	