



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Peter Aoun; Timothy Jones | Project Number S0301 |
| Project Title Spatial-Temporal Reasoning in Mus musculus domesticus Exposed to Mozart | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The term "Mozart Effect" was coined after a study was published indicating that exposure to the music of Mozart had a causal effect on improved brain function. This resulted in worldwide attention and a multi-million dollar industry selling products designed to tap this effect. Despite the public's assumption of the validity of the theory, numerous researchers have explored this issue, but most have been unable to scientifically replicate the original results. After analyzing multiple studies, our experiment was designed to test this theory for ourselves. Our objective was to determine if <i>Mus musculus domesticus</i> (laboratory mice) exposed to Mozart's Sonata for Two Pianos in D-Major perform better in a maze, suggesting improved spatial-temporal learning, than mice exposed to minimalist music or white noise.</p> <p>Methods/Materials 18 mice were divided into 1 of 3 listening groups, exposed to either Mozart's "Sonata for Two Pianos in D-Major," Philip Glass' "Music with Changing Parts" (particularly repetitive music), or white noise. The mice were individually tested in a classic T-shape maze over a 5-day examination period, with every mouse performing 3 trials each day (15 trials per subject). The working time and errors were recorded and analyzed.</p> <p>Results The mean working time improved across all groups at divergent rates. The Mozart exposure group had a more consistent decrease in working time than the other groups, showing the greatest improvement, and the lowest total mean time overall. In our analysis of the percentage reduction of errors, the mice exposed to white noise improved by 66%. In comparison, the Glass mice showed only a 50% improvement, while the Mozart group made a striking 83% improvement.</p> <p>Conclusions/Discussion Our results validate our hypothesis that exposure to Mozart will enhance spatial-temporal performance. It also appears that exposure to other types of music can negatively influence this. Mozart's compositions, in particular, contain an intensity and stimulus complexity that is believed to excite the neuronal firing patterns in the cortical columns of the brain, enhancing spatial-temporal reasoning. If this internal neuronal language can be accurately affected by precise music exposure, the prospective benefits are enormous, both for "average" subjects and those with learning or other cognitive disabilities. The possibilities and the potential for further study are endless.</p> | |
| Summary Statement Our objective was to determine if <i>Mus musculus domesticus</i> exposed to Mozart perform better in a standard maze, suggesting improved spatial-temporal learning, than mice exposed to minimalist music or white noise. | |
| Help Received None. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Jonathan L. Arenson | Project Number S0302 |
| Project Title What Are the Effects of Different Colors on Short-Term Memory in Humans? | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of the experiment was to observe the effects of different colors on short-term memory. I hoped to prove that colors have a greater impact on short-term memory.</p> <p>Methods/Materials The independent variable for the experiment was the color of the images while the dependent variable was the qualitative score that the person received on the test. I tested 20 high school students (10 females and 10 males). The subjects were shown four images consisting of twelve alphabet letters each. Each image contained twelve letters of the same color but each of the images was a different color. After five seconds, the image was removed and they were asked to recreate the image to the best of their ability.</p> <p>Results The blue images received the highest mean score with 3.05 and the green images came in second with 3. The red images received an average score of 2.85 and the black images received the lowest with 2.35.</p> <p>Conclusions/Discussion I used a t-test to compare the mean qualitative scores that the subjects received with the colored images to the mean qualitative score that the subjects received with the black images. The results of the t-test showed that there is not a significant difference between the mean score of the colored images and the mean score of the black images. I used a 95% confidence level to determine whether I would reject my null hypothesis which stated that the mean scores of the colored images were not statistically significant from the mean scores of the black images. Their standard deviations showed that there is not much variation between the different data sets. Therefore, the blue, red, and green images were not remembered any more clearly than the black images. My hypothesis was not supported by my data.</p> | |
| Summary Statement The project tests the effects of different colors on short-term memory in humans. | |
| Help Received | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|--|---------------------------------------|
| Name(s) Kathrin M. Bosnoyan | Project Number S0304 |
| Project Title Piaget: Children and Growth | |
| Objectives/Goals By studying Piagetian psychology, an interview form was set up to test two different age groups and enable how the thinking patterns change as the child grows. | |
| Abstract | |
| Methods/Materials Materials 1. 3 Piagetian Tasks in Question Format 2. Pencil/Pen 3. Notebook 4. 24 Notebooks 5. Different colors of m&m's (atleast 10 of each) Methods Interview each child one-on-one and ask each child, the series of three tasks. As each child answers, record all interesting occurences. | |
| Results The results proved the hypothesis correct. As children grow from one age group to another the responses given change from constructive and egocentric answers to logical and knowlege based answers. In task No. 1 of the children in age group (5-7) 82.4% is dependent on parent while only 17.6% are dependened on parent. Of the children in the (10-12) age group, 90.5% of children are independent,while only 9.5% are dependent on the parent. Task No.3 tested among both age groups varied in that, the observation of the amount of pennies was either based on a blunt guess or a thought out counting response. In the (5-7) age group children guessed, while in the (10-12) children thought about answering and counted. In Task No.5, children in (5-7) age group picked out colors and explained that this was a result of favoritism(favorite color), while the (10-12) age group explained that the colors were resluts of probability. Answers were knowlege based and thought out as a child grew. | |
| Conclusions/Discussion This project was designed to see the different thinking skills of different age groups and how the child develops (mentally). The different results showed the change in the different age groups. As a child grows, his/her brain develops and takes on logical tasks. The project can be further extended to get more accurate results, and I plan to persue this. It was a great experience working with each child and listening to their responses. Based on Piaget's psychology, I was able to understand the mentality of children. | |
| Summary Statement I learned about psychologist, Jean Piaget's psychology, and constructedan interview to see how children grow from one age group to the next, based on their responses. | |
| Help Received | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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| Name(s) Maria Reynoso; Alicia Carrillo | Project Number S0305 |
| Project Title Got Stress? | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Question: Which gender, grade, and ethnicity have the most stress? In school we found out that the lots of students had stress and we wanted to see which group had the most stress. Then we got interested and wanted to know what grade, gender, and ethnicity had the most stress. We also wanted to do this project about stress because both of us have high levels of stress. Stress has been one of the things that we have always wondered about. We wanted to know if there was a pattern with ethnicities most of all. That#s why we made up stress test with the help of a web site.</p> <p>Methods/Materials Materials List 1. Paper; 2. Pencil; 3. Pen; 4. Highlighter; 5. Scoring sheet ; 6. List of names and their numbers to know who we've tested.</p> <p>Results Our hypothesis was way off. We thought that the Latin, females in the ninth grade would have the most stress, but our results and data proved us wrong. The results for Anglo, male freshmen showed the most stress. This was really surprising to us, so we went back to the group of males showing the most stress. When we asked what area caused them such stress, they said they feel much pressure to impress girls. This is interesting because they#re the youngest males in the high school population. We thought that the senior class or any other class older than freshmen would have the most stress. We think that the freshmen class had the most stress because it#s the class that is going through many changes and sometimes they can#t handle them. They often show depression, anger, or sadness.</p> <p>Conclusions/Discussion From doing our project about stress we learned things that we were aware of but never took the time to think about. Since the freshmen class was the class with the most stress we think it#s because it#s the class with the most problems. The freshmen class has to deal with family, relationships, friends and school. It#s the class that has to learn to fit into a new school. Everything is different. There are new classes, teachers, and new changes. We learned that the freshmen class was the class that had the most stress because they have to deal with all those problems and sometimes can't handle it.</p> | |
| Summary Statement Our project was about finding which class, gender, and ethnicity has the most stress? | |
| Help Received School Counceler gave us ideas on our project; Our science teacher help us organize our information; Our english teacher from last year corrected our spelling and grammar. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Daniel Chang; Chris Chen; Ryan Huang | Project Number S0306 |
| Project Title Memory Retention | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of the project was to determine how many factors a person could store in short term memory and the correlation between the difficulty and the accuracy of doing so. Our hypothesis predicted that as number of objects increased, the difficulty would increase as well.</p> <p>Methods/Materials Laptop computer. Computer software (programmed ourselves) for memory testing. Human subjects.</p> <p>Results Humans in our test group were able to store about 4-6 digits in short term memory.</p> <p>Conclusions/Discussion Humans in our test group were able to store about 4-6 digits in short term memory and difficulty in storing that information increased as the number of objects increased. Thus, the hypothesis was supported.</p> | |
| Summary Statement Memory Retention is about the accuracy and storage of memory. | |
| Help Received | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

| | |
|--|---------------------------------------|
| Name(s) Angela N. Crawford | Project Number S0307 |
| Project Title Anchoring and the Power of Suggestion | |
| Objectives/Goals In this experiment, whether or not the power of suggestion affects people's decision making was tested. Specifically, the experiment sought to see if anchoring (a technique used to anchor, or control the way in which people form their decisions concerning numerical uncertainty) affected an estimate of an unknown amount. | |
| Abstract The experimental strategy that I used to conduct my experiment was making sure that all the anchoring that was done was very subtle so it wouldn't cause my subjects to become suspicious of the purpose of the questions. I used very few materials in this experiment. Since I was only asking people questions, it was not necessary for me to have any materials in order to conduct the experiment. The only materials I used were a pen, paper, computer and calculator. | |
| Methods/Materials The experimental strategy that I used to conduct my experiment was making sure that all the anchoring that was done was very subtle so it wouldn't cause my subjects to become suspicious of the purpose of the questions. I used very few materials in this experiment. Since I was only asking people questions, it was not necessary for me to have any materials in order to conduct the experiment. The only materials I used were a pen, paper, computer and calculator. | |
| Results For the first question which asked, "What percent of teens do you think own their own car?" the average percent (without an anchor) ended up to be 28.9%. With an anchor increased 25% (the anchor was 36%) the average ended up to be 38.4%. With an anchor decreased by 25% (the anchor was 22%) the average ended up to be 32.6%. For the question, "What percent of students do you think graduate with a 3.5 or higher?" the average percent ended up to be 36.1%. With the higher anchor (45%) the average ended up to be 43.3%. With the lower anchor (27%) the average ended up to be 32.1%. Using the question, "What percent of teens do you think play an instrument?" the average percent was 46.2%. With the higher anchor (58%) the average was 38.2%. Using the lower anchor (35%) the average was 31.5%. | |
| Conclusions/Discussion From the final data that I collected from my experiment, I have found that it does support my hypothesis. My hypothesis was that the power of suggestion will have an influence on people's. My experiment shows that when I provided people with a high anchor, the average answers were closer to the suggested answer. And when I suggested a low answer, the average answers were closer to that anchor. | |
| Summary Statement In my experiment I tested to see if anchoring and the power of suggestions effects peoples' answers of an uncertain numerical value | |
| Help Received My father helped me design the graphs. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Erynn Donlon; Desiree Moore | Project Number S0308 |
| Project Title Fear Factor | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our goal is to reduce the fear of our subjects by exposing them to their fear of archnophobia.</p> <p>Methods/Materials A video of spiders A book full with pictures of spiders. A dead spider in clear jar. Live spiders</p> <p>Results The results of our experiment were that everyone improved from their fear.</p> <p>Conclusions/Discussion After testing we were happy to find out the results. We had helped our subjects with their fears and we felt good about helping them and making a difference in the world.</p> | |
| Summary Statement Our project is about testing certain people with their fear of spiders and exposing them to the arachnids. | |
| Help Received We received helped from our counselor, Mrs. Barber and our vice principal, Mrs. Green for imformation regarding phobias. Also we received help from the Donlon and Moore families for taking us to get supplies. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Elizabeth Garcia | Project Number S0309 |
| Project Title Remember This! | |
| Abstract Objectives/Goals My objective for doing this project was to prove there is no difference in the short-term memory between the males and females. My goal for this project was to find statistical data to prove that it is correct to say there is no difference between the short-term memory of males and the females.] Methods/Materials The way I went about doing this was by formulating a test that would allow me to observe is there was any difference in the results between the males and the females. I randomly chose ten letters (k, y, a, f, m, x, g, b, l, q,) and placed them in this random order typed on a sheet of paper. I then went around tested 200 individuals (100 males, 100 females) attending high school (ages 14-18) and showed them the sequence for ten seconds and then recorded the amount of letters remembered. I then went on to expand my project with a second test using a color sequence (red, yellow, purple, orange, blue, brown and green) in place of the letters sequence. Then I repeated the rest of the steps from the first test. Again testing 200 random individuals (100 male, 100 female).Then I observed and analyzed my data. Results After I analyzed my data I formulated my means. For the females a got 8.48 and for the males I got 8.32.I also calculated the standard deviatuion of my results. For the females it was 0.54 for the males it was 0.32. Conclusions/Discussion My hypothesis was correct. My data proves there is no difference in the short-term memory between the males and the females. I would have to increase my sample size a great deal to reduce the chance of variation even more. Then perhaps I may find a tiny difference. This likely would still turn out to be insignificant. | |
| Summary Statement My project poves there is no significant difference in the short-term memory between males and females. | |
| Help Received | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Ashish Gupta | Project Number S0310 |
| Project Title Stress, Stress . . . Got the Solution! | |
| Abstract Objectives/Goals To compare the degree of relaxation through Yoga, Music, and a Nap. Hypothesis-Yoga would work the best because it relaxes your mind and your body. Methods/Materials Informed consent was received from a 100 people. These 100 people were regular subjects, hypertension patients, or regular yoga practitioners. A 12 minute, nap, musical relaxation with a music cassette or a Yoga technique was administered to the hypertension patients and regular subjects. Only nap or yoga was administered to the regular Yoga practitioners. Blood pressure (bp)and heart rate was measured before and after each technique. Results In all three groups the most significant results came with the reduction of bp in yoga. In the regular yoga practitioner group while doing yoga the sbp went down by 12 points and dbp by 2 points while the p reduced by 3 points. In the normal subjects for yoga, the sbp went down by 6 points, dbp down by 3 points and pulse by .5 points. In the hypertension patients group for yoga, sbp went down by 10 points, dbp by 4 points, and p by 3 points. More extensive results are given on the board. Conclusions/Discussion Yoga has led to the most significant changes in blood pressure (bp) in all of the groups. The regular yoga practitioner group has the best reduction rates from yoga. So, practicing yoga regularly leads to a less chance of suffering from hypertension problems. Yoga has been proven helpful to remain healthy. It will help patients and even normal people who carry the load of distress and anxiety with them. The mechanism of stress reduction through yoga has been proven through the autonomic nervous sytem, deeply explained in the project. | |
| Summary Statement To find out the best method of stress reduction. | |
| Help Received Uncle Dr.VK supervised going to his office (The Heart Center) and performing my project on patients there. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Caitlin A. Killmer | Project Number S0311 |
| Project Title Back to Basics: How Color Affects Short-Term Memory | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to see if and how color affected short-term memory of two syllable nouns.</p> <p>Methods/Materials I obtained consent from 105 subjects and gave them one list with twelve words (4 of each blue, yellow and red) to memorize. For my first trial, they were given 2 minutes to memorize the words. For the second trial, they were given ten seconds. After the set amount of time, the list was taken away, they were given another, longer list, this time in black and white (that contained similar words), and they were instructed to pick out the words that were on the previous list. I repeated the procedure 35 times (out of 105) with a black and white list to serve as a control.</p> <p>Results There was a small difference between the percentage of words remembered per color, but with the small sample size I had, I considered it within the margin of error. The average number of words remembered per color all hovered around my control, which gives me a reason to think that color does not affect memory.</p> <p>Conclusions/Discussion My results did not support my hypothesis. I thought that red would be remembered the best because it is an advertising color and very bright. In my study, I found that color has no significant affect on memory.</p> | |
| Summary Statement My project is about how the primary colors affect short-term memory. | |
| Help Received Math teacher helped make graphs, Science teacher helped edit written components | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|--|---------------------------------------|
| Name(s) Marci O. Kirchberg | Project Number S0312 |
| Project Title The Bitter Truth about PTC and Broccoli | |
| Abstract Objectives/Goals My objective was to find out if people who can taste PTC strongly would be more likely to dislike broccoli than those who cannot taste it at all. Methods/Materials First 122 subjects, between the ages of 10 and 45, were tested with a taste paper called PTC. They were then given surveys inquiring about their sex, ability to taste PTC, and preference in certain vegetables, including broccoli. The surveys were then tallied and the results were determined. Results There is no correlation between the ability to taste PTC and the preference of broccoli. Ten percent of non tasters disliked broccoli while 20% of the very strong and strong tasters disliked it. This difference is not significant in supporting or rejecting my hypothesis. Conclusions/Discussion My conclusion is that the data is not sufficient to support or reject my hypothesis. I believe that other factors, such as personal taste, may contribute to the preference of broccoli more than the ability to taste PTC. Even though broccoli tastes bitter to many people, it appears that this does not necessarily mean that these people will also taste the bitter PTC. | |
| Summary Statement My project was designed to discover whether the genetic ability to taste the bitter PTC paper affects individuals preference towards broccoli. | |
| Help Received teacher helped issue surveys | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Julie Lee; Tina Lee | Project Number S0313 |
| Project Title Remember Me | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our goal is the understand the brain's functions in regards to short term memory and recall.</p> <p>Methods/Materials Materials: Paper,pencil,computers,books,timer,red pen, glue,scissors, and consstruction papers. Procedure: Gather information, Creat list, creat spread sheet, get volunteeers, give out survey, collected data, analyze data, and draw up conclusion.</p> <p>Results Our hypothesis 7 +/- 2 words was supported. The influenceing factors of gender was rejected and grade level/age was supported.</p> <p>Conclusions/Discussion Our hypothesis was supported and our goal of understanding the functions of the brain in regards to the ability to recall was achieved.</p> | |
| Summary Statement Our project is about short term memory. | |
| Help Received Mr. Andazolo, Ap Psychology teacher, Mr Fred Easton, Probability and statistic teacher, and Mr. Levy, AP Biology teacher. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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| Name(s) Jennifer McCaw; Jamie Taylor | Project Number S0314 |
| Project Title Do You Hear What I Hear?! | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of our project was to test and see if subliminal messages have an effect on one's behavior and decisions.</p> <p>Methods/Materials First we had to research the idea and decide how we wanted to conduct our experiment, therefore we had to use a computer .Then we had to get permission from the Bailey principle, along with the teachers permission. Then we had to collect the permission slips from the students and purchase the materials such as blank tapes, Skittles, music, etc. Next we had to make the two different tapes, each one with two songs on them, the first one with no hidden messages and the second song with the hidden message "eat purple skittles". Finally, we conducted our experiment and tested the first graders to see if the messages actually worked or not. By that we set two children at a time on different sides of a room, not facing eachother, and had them listen to their own personal cassette player while they ate out of a bowl of skittles in front of them.</p> <p>Results Our results showed that in the first tape without subliminal messages the boys ate a total of 18 purple skittles while the girls ate 26. But in the second tape with the subliminal messages the boys ate 25 and the girls ate 34. And all together without the subliminal messages the students ate 44, and the tapes with the subliminal messages 59 skittles were ate.</p> <p>Conclusions/Discussion So in conclusion to our project, our experiments did work, but the subject of subliminal messages actually working is still unclear. There was a number of factors that could influence the outcome. Other real subliminal messages may not work, and that is what many do believe.</p> | |
| Summary Statement Our project is about the effects of subliminal messages on first graders. | |
| Help Received Help with the students and staff of Bailey Elementary. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|--|---------------------------------------|
| Name(s) Daniel S. McLaughlin | Project Number S0315 |
| Project Title Is the Death Dip Real? An Examination of California Death Records | |
| Abstract Objectives/Goals To test the hypothesis that humans are able to postpone their own death until after some landmark occasion, in this case their own birthday. Methods/Materials I wrote a Perl script to download 2 million of the 9 million California Death records available at vitals.rootsweb.com . I also used Perl scripts to filter out records with ages of less than 1 year or no birth date. Then I calculated the expected values of deaths per day using contingency table techniques. I then totaled the observed and expected values for each amount of difference between birthday and deathday, from death 182 days before the birthday to death 183 days after the birthday. By comparing the observed and expected values, I was able to see any differences. Data was also examined for other factors that might affect the ability to postpone death such as age, gender and ethnicity. Results I found very little difference between the expected and observed number of deaths per day, relative to the birthday. There were more deaths in the month after the birthday than would be expected if there were no effect. However, this difference was quite small. Deaths in the month before the birthday differed by only 0.1% from what would be expected if there were no effect. Conclusions/Discussion The purpose of this project was to find out whether humans can and do postpone their own deaths until after their birthdays. In the data that I examined, there was no decrease in the number of deaths before individual's birthdates (as predicted by the death dip hypothesis of Phillips and Feldman, 1973) and there was little or no support for the hypothesis. | |
| Summary Statement To test the hypothesis that humans are able to postpone their own death until after some landmark occasion, in this case their own birthday. | |
| Help Received Nancy and Walt Custer advised me and let me use their computers. Tom Smith loaned Ethernet card. Parents helped prepare board. Ken Custer obtained journal article. | |



**CALIFORNIA STATE SCIENCE FAIR
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|---|---------------------------------------|
| Name(s) John P. Milcovich | Project Number S0316 |
| Project Title Does Human Affection Affect Mus musculus's Performance while in a Maze? | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The intent behind this experiment was to determine if human affection alters Mus Musculus's (common house mouse) performance in a maze. My hypothesis stated that mice given human affection would perform better in a maze than mice given no affection.</p> <p>Methods/Materials I prepared two cages in like fashion with red cedar bedding, exercise wheels, food containers, and water bottles. Randomly, I split the mice into two groups of 6, one group that was to receive affection, and the other, a control group that would remain isolated with very little human interaction. Each day I played only with the first group of mice giving lots of attention. The control group I left isolated in the garage where they would have little stimulation from the family. I then constructed a maze using a diagram from the Internet. The experiment was conducted over a ten-week period. Once a week for ten weeks, I measured each mouse individually and recorded their weights in grams. After starving the mice for two consecutive days each week, I ran each mouse through the maze and recorded how long it took to reach the end and retrieve their food reward.</p> <p>Results Analysis of the results proved my hypothesis to be correct. The isolated group of mice on average took about 37 minutes to complete the maze. In contrast, the group receiving human affection took an average of only 8 minutes to complete the maze. This is about 4 times faster than the isolated group of mice! Additionally, the average weight gain for the group receiving affection was 20 grams compared to the isolated group's average weight gain of 3 grams.</p> <p>Conclusions/Discussion My conclusion is that human affection has a positive affect both on the mice's performance in a maze and on growth.</p> | |
| Summary Statement My project is about how human affection impacts mus musculus's performance while in a maze. | |
| Help Received I received help in the following areas: my neighbors helped design my board, take digital photographs; my parents paid for my project expenses which amounted to about \$75, my dad helped me construct my wooden maze. | |



**CALIFORNIA STATE SCIENCE FAIR
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|---|---------------------------------------|
| Name(s) Kat Olthof; Britney Ritenour | Project Number S0317 |
| Project Title Comprende? | |
| Abstract Objectives/Goals The objective of this project was to determine the most efficient learning method of grades 1, 4, 7, and 9. This can assist teachers in incorporating the abilities of their students into their curriculum. In knowing their students' best ways to learn, they can teach using that specific method according to their capability. For example, the first grade students are shown to have excelled in reading comprehension. Therefore, the teacher can now know that she may challenge the students with a slightly higher level. Methods/Materials Classes of 1st graders, 4th graders, 7th graders, and 9th graders were taught three different ways. They had to read a passage, look at a picture, and lastly, listen to a speech that was read off a previously written passage. They, then, were given tests appropriate to the subject they learned about after each method of learning. The tests were graded from a key and averaged. Results Overall, auditory proved to be the most efficient method of learning. The 1st grade averaged 97.5% on the auditory. The 4th grade averaged 84% on auditory. The 7th grade averaged 75% on auditory. Lastly, the 9th graders averaged 84% on auditory. Conclusions/Discussion In conclusion of this project, the hypothesis was proven incorrect. The hypothesis stated that students would perform better on the visual test. Auditory learning proved to be the most efficient method of learning for all students. Therefore, the students perform best on tests given after a lecture rather than learning and deducing information themselves. This conclusion shows that if teachers do the teaching then students learn and perform better. | |
| Summary Statement This project determined the most efficient learning method, whether it be visual, auditory, or reading comprehension. | |
| Help Received All teachers helped keep their classes under control and to encourage participation. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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| Name(s) Stephanie M. Paulus | Project Number S0318 |
| Project Title I Can Read: Is There Really a Difference Between the Reading Levels of Second and Third Grade Students? | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine if there is a difference between the reading level of second graders and third graders as determined by the Oral Diagnostic Reading Tests from the Phonetic Reading Chain by Ruth Worden Frank.</p> <p>Methods/Materials Nineteen second graders and eleven third graders were given four tests, two oral and two written to determine if there is a difference in their basic reading skills. Test #1 is pairs of short vowels that the teacher sounds out and the students respond to as "same" or "different" on their paper. Test #2 was the letters of the alphabet in random order read by the teacher; each student wrote down the letter they heard. Test #3 is also letters of the alphabet in random order, but the students read them aloud. The last test, Test #4, is administered in the same way as the third, but with a list of sight words instead of letters of the alphabet. The tests are graded and analyzed using the chi-squared statistical analysis.</p> <p>Results Results show that there were only slight differences in the scores- and reading level as determined by the tests used-. This was confirmed by the chi-squared statistical analysis.</p> <p>Conclusions/Discussion There is no difference between the reading level of second graders and third graders when determined by the Phonetic Reading Chain Tests by Ruth Worden Frank. The data was confirmed by a chi-squared statistical analysis. Further experimentation should be performed to determine how much progress is made from start to finish of elementary school by testing the same group of students every year.</p> | |
| Summary Statement The project seeks to determine if there is a significant difference statistically between the reading level of second graders and the reading level of third graders. | |
| Help Received Richard Bartel perfected the methods used; elementary teachers allowed time for testing students; elementary students graciously allowed themselves to be tested; dad taught me the chi-squared statistical analysis; mom helped with the backboard; Ruth Worden Frank wrote the tests used for the Phonetic | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Anthony J. Perry | Project Number S0319 |
| Project Title Contrasting Cardiac and Old Brain Responses to Aldehydes and Phenols | |
| Abstract Objectives/Goals The objective is to determine whether the mental connotation of smells correlates with the heart's response to the scents of aldehydes (primarily fruit and flower based) and phenols (primarily leave, bark, or root based). Methods/Materials Create 25 surveys, for an equal amount of test subjects, ranging in age from 14-83. Choose 7 common scents ensuring that each subject would be familiar with them. Use coffee to serve as a scent neutralizer. Apply scents to wood pieces to keep the subject oblivious to the smell until inhalation. Use a stopwatch to control length of inhalation. Measure the collective blood pressure and pulse of the subjects with a Sphygmomanometer. Results Collectively, emotional and mental response was more positive to the aldehydes (vanilla, orange blossom, and rose). The aldehydes were more reminiscent of perfumes and the home (e.g. breakfast, candles, etc.) Most aldehydes kept levels blood pressure and pulse rates constant. The phenol scents (eucalyptus, cinnamon, peppermint, and pine) were usually perceived as cleaners, medicines, or unknowns, ultimately creating a stressing or putrid image. The stronger phenol smells actually served to lower blood pressure. The addition of genetic hypertension and hypoglycemia subjects showed even greater extremes in the lowering of blood pressure. Conclusions/Discussion My conclusion is although people may be conditioned to distaste certain smells, the body has reactions dissimilar than what one feels that they can ultimately control. Mesopotamians used of incense and fragrance to create feelings of security and mask the undesirable in life. The impact of scents has been able to manipulate emperors (Antony and Caesar) and promote general health benefits for all social groupings. The further understanding of human anatomy has led to using smells to promote consumerism, increase job productivity, and increase metabolic desires. Continued awareness has encouraged medical research to look into the benefits aromatherapy. Current studies including increasing memory in Alzheimer's patients; lowering hypertension levels; and using smells to aid the blind. | |
| Summary Statement To discover neurological and cardiovascular individual human response to specific smells this research was conducted. | |
| Help Received My family/Biology teacher Steve Levy- edit/layout/focus; Bev Simmons/Bill Gordon/Persis Newland/Lori Paley- expert advise on aromatherapy; Susan Mokhtari, (Administrative Research Assistant at the American Heart Association)/Dr. Michael Steppe/Dr. Richard Sugarman- medical implications. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Jazmin Pinchem; Rachel Wheeler | Project Number S0320 |
| Project Title You Are Getting Sleepy... | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective was to determine what causes high school students to be deprived of sleep (out of the five main contributors that we are focusing on: depression/anxiety, stress, late night eating, relationships, and lack of exercise) and whether the student#s gender and grade had something to do with their lack of sleep.</p> <p>Methods/Materials Human volunteers Board (paper, Velcro, wood, hinges, and screws) Resources (Books and Internet) Three 3-ring binders</p> <p>Results After our first round of surveys, we were not able to support our hypothesis that homework is a main contributor in sleep loss for Sophomores and Seniors and stress is a main contributor in sleep loss for Freshman and Juniors. After our second round of surveys, we were able to support our first hypothesis that the student#s gender affected their sleep loss, but we were not able to support second hypothesis that the student#s grade affected their sleep loss.</p> <p>Conclusions/Discussion Our conclusion is that the gender of the student affects their sleep loss. Now that we know this, my partner and I plan on surveying more people in order to find out which main contributor affects each gender the most and how. Over all, through our surveys, we have found out that the students get an average of 6.5 hours of sleep when they should be getting about 7-8 hours of sleep.</p> | |
| Summary Statement Our project focuses on the causes and effects of sleep deprivation among high school students. | |
| Help Received Rachel#s father helped build our board; Rachel#s mother helped type our research paper; various teachers, about 9, helped distribute surveys among their students | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Cortney S. Shegerian | Project Number S0321 |
| Project Title Mate Guarding | |
| Abstract Objectives/Goals The objective of my project, was to determine which sex has greater levels of "mate guarding" (jealousy) in a relationship. Methods/Materials Informed consent was obtained from 50 randomly selected high school students. There were 25 men and 25 women ranging from ages 15-18. Each couple was seperated and the subjects were observed (by me), while each person watched their mate interface with another "potential mate". To get a reading of the person's level of mate guarding, I counted how many times the mate looked over at their mate and the "potential mate". I also did extensive research on this subject, which involved reading previous abstracts and other human behavior research. Results The average level of mate guarding in males and females was almost the exact same. The average level of mate guarding (number of looks), was 8.4 for males, and 8.3 for females. This means the research and the experiment, the level of mate guarding in males and females is equal. Conclusions/Discussion My colclusion is that the average level of mate guarding in males and females is the same. They have equal levels of mate guarding. | |
| Summary Statement To determine which sex has greater levels of mate guarding (jelaousy) in a relationship. | |
| Help Received | |



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

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| Name(s) Daniel M. Shumaker | Project Number S0322 |
| Project Title Evolution: Its Teaching and Influence on Personal Opinion | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals This experiment had the unequivocal goal of examining the level of evolutionary teaching at Chaminade College Preparatory School. Equally important is to examine opinion regarding creationism being taught alongside evolution in public schools.</p> <p>Methods/Materials This experiment began with proper research regarding evolutionary teaching in the United States. After the initial research, a survey was compiled that contained an objective portion to test evolutionary knowledge and a subjective portion to relate to the statistics discovered in the objective portion. The surveys were then passed out in a controlled environment where no communication was allowed between students. The proctor then collected the surveys. The data was then correlated and the objective portions scored to give the appropriate data to answer the corresponding hypotheses.</p> <p>Results To begin, the average objective score was 12. The average fervency rating for those who do believe in evolution was 2.86 where as the religious fervency rating for those who do not believe in evolution was 4.16. The actual breakdown of the sample pool reveals that 48.9% of students believe in evolution but support creationism taught alongside evolution in public schools. The second largest pool was 34.4%, which contained students who believed in evolution and who did not support the teaching of creationism.</p> <p>Conclusions/Discussion The data received showed an above average objective score of 12 and an indefinite correlation between knowledge, evolutionary belief and whether or not creationism should be taught alongside evolution in public high schools. However, religious fervency did increase when students did not believe in evolution, and believed creationism should be taught alongside evolution in public high schools. Ultimately, religious fervency does affect evolutionary belief and whether or not creationism should be taught alongside evolution in public high schools. Also, the standard of teaching at Chaminade, while above average, is not totally flawless. Equally important is the realization that knowledge of evolution did not affect the student opinion regarding creationism and belief in evolution.</p> | |
| Summary Statement This project examined the evolutionary knowledge of students, and the relationship between religious fervency, belief in evolution, and whether creationism should be taught in public school. | |
| Help Received Chaminade Science Teachers passed out surveys in class. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Roxanne M. Strohmeier-Ruschke | Project Number S0323 |
| Project Title What Factors Keep Women in Marin County from Having an Annual Mammogram and/or a Monthly Self Breast Examination? | |
| Abstract Objectives/Goals The rates of breast cancer in Marin County are amongst the highest in the nation. The purpose of this study was to determine what factors, if any, keep women in Marin County from having annual mammograms and/or monthly self breast examinations. Methods/Materials I surveyed 80 randomly chosen Marin County women between the ages of 30 - 70, asking them to complete a brief and confidential survey which asks questions concerning their methods of breast cancer detection. Results According to my research, the factor chosen by the most women which discouraged or kept them from having annual mammograms was that they did not feel old enough. The factor chosen by the most women as a factor that kept or discouraged them from performing monthly self breast examinations was forgetting to do so. Conclusions/Discussion Contrary to my hypothesis which stated that women would refrain from mammograms and self breast exams because they did not feel at risk for breast cancer, I found that the discouraging factors depended greatly on age and that all were issues which could be overcome through awareness and education. | |
| Summary Statement Factors that discourage Marin County women from mammograms and self breast examinations. | |
| Help Received Step Mom helped with transportation and Excel pie charts and various computer formatting questions. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Lilia L. Villa | Project Number S0324 |
| Project Title Can Aesthetic Preferences in Visual Art be Biological? | |
| Abstract Objectives/Goals The objective is to find out if preferences in visual art have a physiological link to handedness and brain lateralization. Methods/Materials Procedures 1. 20 paintings picked that have a clear tendency to one side of the composition. 2. Scan or attain the images from any other source, and make the paintings all the same size on the computer. 3. Make a copy of each of the images and mirror/flip them horizontally. 4. Create a web page that contains instructions for the survey and answer submission. 5. For each of the 20 survey questions, include the name of the work and the artist. Also, label the images either A or B, and Number 1-20. 6. Position the original image and its mirror vertically, randomly selecting which one goes first. 7. Place 5 Images and their mirrors on each page, and Label all five of the survey pages. 8. When the web page is complete, send the address of the site out through emails, forwards, and in person. Include the question 'Are you right or left handed?' 9. To survey in person, print out the web site pages & hand the survey out. 10. When results begin to be received, sort by right or left handed survey takers. 11. Make sure to use an equal amount of left & right handed survey takers. 12. Evaluate the results Results There was 80% accuracy predicting the average answer for the right handed surveyed. 20 out of 25 questions were predicted correctly by the premade answer key. 4 out of 5 right handers had a tendency to prefer subject matter and movement towards the right of a composition. There was 60% accuracy predicting the average answer for the left handed surveyed. 15 out of 25 questions were predicted correctly by the premade answer key. 3 out of 5 left-handers had a tendency to prefer subject matter and movement towards the right of a composition. Conclusions/Discussion The data collected supported the hypothesis. The Survey results showed that 4 out of 5 right handed people surveyed had a tendency to prefer subject matter or movement towards the right of a composition. In contrast, 3 out of 5 left handed people surveyed had a tendency to prefer subject matter or movement geared towards the left of a composition. The results of my research supported the hypothesis. Preferences in image composition of visual art have a connection to brain lateralization and handedness | |
| Summary Statement Finding if there are differences between the visual preferences of left-handed people and those of right-handed people. | |
| Help Received Mother helped with supplies; Ms. Garcia helped proof website; Ms. Scott from UCSD COPC helped with everything relating to the actual paper work for the fair; Ms. Obrien provided her room; Brother helped type. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Amanda M. Weddle | Project Number S0325 |
| Project Title The Effect of Kindergarten Entrance Age among High School Students | |
| Abstract Objectives/Goals This study will correlate academic achievement against entrance age, among high school students. Methods/Materials A survey entailing a total of 31 questions, requesting answers regarding kindergarten education and current academic achievement was developed. High school pupils were randomly selected to complete the survey. Results 54 eligible surveys were collected. Pupils were thus broken into three groups, based on entrance age. 16 pupils started before their fifth birthday, thus being placed into Group 1. Group 2 consisted of 19 pupils who had just turned 5, or were under 5 1/2 of age, when they entered kindergarten. The last group, Group 3, contained nineteen pupils who entered kindergarten at 5 1/2 or older. 56% of Group 1 have moved since entering kindergarten. 31% attended half-day kindergarten. 25% of Group 1 attended preschool. The average Grade Point Average of pupils in Group 1 was 3.32. The average PSAT score was 141. The average SAT score was 1149 out of 1600. The average ACT test score was 22. 58% of Group 2 have moved since entering kindergarten. 72% attended half-day kindergarten. 63% attended preschool. The average Grade Point Average was 3.56 on a 4.5 scale. The average PSAT score was 149. The average SAT score was 1209 out of 1600. The average ACT test score in Group 2 was 23. 74% of Group 3 have moved since entering kindergarten. 47% attended half-day kindergarten. 89% of Group 3 attended preschool. The average Grade Point Average of pupils in Group 3 was 3.97 on a 4.5 scale. The average PSAT score of pupils in Group 3 was 166. The average SAT score of pupils in Group 3 was 1239 out of 1600. The average ACT test score in Group 3 was 25. Conclusions/Discussion It is apparent that pupils who entered kindergarten after the recommended age of five were more academically successful than their peers. Group 3 indicated a higher Grade Point Averages, and scores on standardized achievement tests. Several studies I have researched support my results that children who enter kindergarten at a later age will surpass those who enter around the suggested age or earlier in the area of academic achievement. If a pupil may be at an academic advantage or disadvantage by simply enrolling in school at a particular age, then entering kindergarten later may help further one's academic career. | |
| Summary Statement A study on the effect of kindergarten entrance age on future learning ability among high school students. | |
| Help Received Students completed surveys. | |



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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|---|---------------------------------------|
| Name(s) Stephanie A. Williams | Project Number S0326 |
| Project Title The Eyes Have It, Phase II: Visual Perception in Children with and without Dyslexia | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to determine whether or not children with dyslexia are able to read with more accuracy letters, numbers, and phrases when the positive and negative space is reversed (a black background and white letters).</p> <p>Methods/Materials I created a test consisting of letters, numbers and words that are typically very difficult for dyslexic students to read, as well as two optical illusions. All of these images were represented twice: once normally (a white background with black letters) and once reversed (a black background with white letters). I then obtained informed consents from 86 subjects: 43 dyslexic children and 43 non-dyslexic children all between the ages of nine and eleven. I tested each child individually in a quiet, familiar room. I showed each child every image, asked them to either tell me what they saw or read the letter or phrase to me. I then recorded their answers on the testing sheets. I repeated this procedure for all dyslexic and non-dyslexic children.</p> <p>Results I found that there was no significant difference between the dyslexic and non-dyslexic responses to the letter questions. Furthermore, there was no significant difference between the dyslexic responses to the letters presented on a black background or a white background. However, there was a significant difference in the dyslexic children's responses to the phrases presented on the black and white background. In every phrase more dyslexic children read the phrase correctly when it was presented on the black background than when the same phrase was presented on the white background. I did a Chi-Square test to determine the statistical significance of these results. Using this test I found that the letters and illusions do not have significant results, however, every phrase had significant results.</p> <p>Conclusions/Discussion From this data I can conclude that it makes no difference for a dyslexic student to read single letters presented normally or on a reversed background. However, when those letters are formed in to words, and those words in to phrases there is a significant difference. Therefore, it is advantageous for dyslexic children to read phrases presented on a black background with white letters.</p> | |
| Summary Statement To determine if children with dyslexia are able to read with more accuracy letters and phrases presented on a black background with white letters. | |
| Help Received Mr. Steely showed me how to perform the Chi-square test using Excel and my mother helped me edit my reports. | |