



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Ali A. Bajwa	Project Number S0701
Project Title Blind Aide	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Blind people have limited resources to help them in daily lives. Guiding dogs and white canes are the main ways for blind people to get around at the moment. My device is designed to be worn by a blind person and is used to warn the blind if there is an object or obstacle in their way.</p> <p>Methods/Materials My device is composed of a microcontroller, an infrared ranger, a sonar range finder, and a buzzer. I wrote a program loaded onto the microcontroller that takes samples from the infrared ranger and the sonar range finder and if the data values from the sensors cross a certain threshold, then the buzzer will sound to warn the blind person that there is something in his way.</p> <p>Results After connecting the sensors to the microcontroller, I was successfully able to write code to make the buzzer sound when something came in the way of the sensors. I set the threshold value so that the buzzer would sound when an object is about 2 feet from an object.</p> <p>Conclusions/Discussion After completing the final code, I tried the device on myself and found it to be a success. My device kept me from walking into a wall and I feel that this can be used by blind people to warn them of obstacles when they are carrying out normal activities.</p>	
Summary Statement My device is designed to warn blind people of obstacles that are in their way.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Zack Brendlen; Sean Miller	Project Number S0702
Project Title One Ring to Rule Them All	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals For our project we wanted to find out what metal would go the fastest when proppelled by a magnetic induction coil launcher.</p> <p>Methods/Materials Method: set up coil launcher, set up computer,hook everything up (Photogate & other instruments), And take data.</p> <p>Results Out of the tree metals that we tested, (copper,steel,and aluminum)we found that if we set up the lab by volume (every projectile has the same volume)that aluminum would go the fastest. If we set up the lab by wieght, then copper would go the fastest.</p> <p>Conclusions/Discussion Our conclusion is that steel went the slowest,aluminum went faster, and copper went the fastest</p>	
Summary Statement For our project we wanted to know what metal, when launched from a magnet induction coil launcher, would go the fastest	
Help Received Used lab equipment under the supervision of Sharon McCorkell and Guy Rowe	



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s) Jason A. Carberry	Project Number S0703
Project Title Hydro-Electrostatic Power Generation	
Objectives/Goals The objective is to determine the feasibility of generating electricity with no moving parts, and its applications in a commercial setting.	
Abstract	
Methods/Materials The materials used in this experiment were: one (1) Water Drop Generator, two (2) liters tap water, and one (1) stopwatch. The experimental procedures are as follows: Adjust the spark gap to 1-millimeter (mm) separation. Fill the top reservoir three quarters full with tap water. Measure the number of arcs over the course of two minutes. Record the total number of flashes. Calculate the number of flashes per minute. Record the number of flashes per minute. Repeat the previous steps for a spark gap separation of 2, 3, 4 and 5 millimeters and with each of the following loads: spark gap, 2 NE2 neon light bulbs.	
Results The charging times of each set of separation lengths were very close regardless of the load applied to them. There was a separation of only 15 seconds when one NE2 bulb was used in comparison to two. This shows that the extra NE2 bulb did not add a large impedance to the Overall Load Impedance (OLI) of the load. In the case of the 1mm separation series, the impedance of the air was not an overwhelming factor in the OLI. This is shown by the 100% difference between the 1 NE2 and the two NE2 test series in the 1mm separation series. The difference between the average value of 20.4 for the one NE2-1mm separation, and the average value of 40, shows that the NE2 bulb is adding significant impedance to the OLI.	
Conclusions/Discussion I have found that it is possible to generate electricity without moving parts. I have also found that the device has potential for use in small-scale power generation, if the device is scaled up and enhanced. I have found that at the upper limits of the charge capacity, the amount of NE2 bulbs that are placed in series, play a smaller role in the discharge time, while the gap size in the spark gap plays a more significant role. This was especially true during the two mm test, where the second NE2 bulb added only 14% to the overall charge time.	
Summary Statement The project is testing the feasibility of using a generator with no moving parts as a power supply.	
Help Received My father supervised me when I was using the power tools and table saw to cut the acrylic sheets. I would like to thank Mr. Jett for his advice and support that was needed to complete this project on time.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Austin Clow; Nathan Poppelreiter; Nemo Smith	Project Number S0704
Project Title Take a R.I.S.C.	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals We wanted to see if we could build a RISC (Reduced Instruction Set Computer), which is in the realm of current research.</p> <p>Methods/Materials We used many standard and advanced Boolean Algebra techniques. It was critical that we researched each process for best results. We used microchips such as: adders, inverters, clocks, and tristate buffers; wires, and a proto-board.</p> <p>Results We could build a Reduced Instruction Set Computer. In many stages of our debugging we had very low accuracy rates. We fixed these problems by researching more efficient ways of processing commands and eliminating all processes that were not needed.</p> <p>Conclusions/Discussion We concluded that this can actually be done and is a legitimate and efficient way processing data.</p>	
Summary Statement Our project was about building a true R.I.S.C. processor.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Philip N. Combiths	Project Number S0705
Project Title Changes in Volt/Strength Proportions in Electromagnets	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Problem Statement: Does the proportion of voltage to strength of an electromagnet change as the amount of volts of electricity increases?</p> <p>Hypothesis: I believe that the proportion of voltage to strength of an electromagnet will begin to lessen as the voltage increases.</p> <p>Methods/Materials Materials: 1 iron Allen wrench; 2 battery holding devices; 2 copper clips; 5 m. insulated aluminum wire; 2 m. non-insulated copper wire; 100g. iron fillings; 1 voltage meter; 1 electronic scale; 1 magnetic field probe</p> <p>Procedures: A. Construct an electromagnet from an Allen wrench, batteries, and wire. B. Voltage of batteries used was measured. C. Magnetic force of electromagnet was tested with probe. D. Electromagnet was placed over iron fillings for five seconds. E. Electromagnet was moved onto electronic scale and fillings were dropped. F. Fillings were measured. G. Experiment was repeated with a different voltages.</p> <p>Results Results: The proportion of voltage to weight got smaller as the voltage increased.</p> <p>Conclusions/Discussion Conclusion: My conclusion is that as the voltage increases, the electrons in the wire become crowded and work less efficiently, forcing the increase in the electromagnet's strength to lessen.</p>	
Summary Statement It compares the propotional changes in electromagnet strange with varying voltages.	
Help Received My parents drove me to stores to buy equipment.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Amreeta K. Gill	Project Number S0706
Project Title Energy Crisis! Is Hydrogen the Solution?	
Abstract Objectives/Goals My objective is to determine if the efficiency of a solar hydrogen system can be improved to produce and use hydrogen effectively as an energy carrier, using the natural and renewable resources of solar energy and water. Methods/Materials -The control experiment was conducted with four solar panels at an angle of incidence of light of 0 degree, and a fan and a car as the load on the fuel cell. This determined the efficiency of the control setup. -In the experimental setup, the angle of incidence was varied from 0 degree to 90 degrees and the voltage and current was measured to determine the optimal angle of incidence. -Keeping the optimal angle of incidence and the output load on the fuel cell constant, the number of solar panels was increased from one to four and the efficiency measured. -Finally, with the optimal angle of incidence and four solar panels, the output load on the fuel cell was varied, and the efficiency was once again measured. -Materials: Solar panels, an electrolytic cell, a hydrogen storage tank , a fuel cell with a Nafion 117 PEM with platinum coating, a miniature car, fan and multimeter etc. Results The efficiency of the system in the control setup was determined to be 13.08%. In the experiment setup, an increase in the input voltage to the electrolytic cell increased the efficiency by 50.23% as compared to the control setup. Increasing the load on the fuel cell resulted in an increased efficiency of 18.73% compared to the control setup. Conclusions/Discussion My experiment shows that increasing the input voltage to the electrolytic cell resulted in an increased efficiency as the increase in the electric charge promoted the decomposition of water. Increasing the output load on the fuel cell increased the efficiency, since more of the electrons were utilized in the electrical circuit of the fuel cell.	
Summary Statement My project involves the use of natural and renewable resources of solar energy and water to produce and utilize hydrogen and attempts to determine if the efficiency of the solar hydrogen system can be improved.	
Help Received My science teacher, Mr. Kirkpatrick, provided guidance and feedback on the project. My parents helped me in buying and assembling the equipment and assisted in constructing the display board.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Michael T. Helmeste	Project Number S0707
Project Title Galvanic Cells: The Limiting Factor in Recharging	
Abstract Objectives/Goals Given the observation that galvanic cells tend to stop recharging over time, my hypothesis was that galvanic cells stop recharging over time due to deterioration of their electrodes. Methods/Materials Materials included a PC Interface board, recharging module board, controlling board (all constructed by me), ferric chloride solution, aluminum chloride solution, beakers, agar, and a U-shaped glass tube. Methods: 1. A microcontroller-based recharger and data sampler with a computer interface for data recording and control of the experiment, was designed and constructed by me. 2. 1M solutions of each ferric chloride and aluminum chloride were placed in separate beakers. 3. 1M salt and agar was melted in the U shaped glass tube to connect the two solutions. 4. The electrodes were immersed in their respective solutions attached to the recharging unit. 5. Charging and recharging of the galvanic cell was controlled using a microcontroller based circuit of my design and construction. Results The constructed Aluminum/Iron galvanic cell eventually stopped recharging due to deterioration of the electrodes through oxidation. Conclusions/Discussion Galvanic cells eventually stop recharging due to oxidation of their metal electrodes. The data recorder and controller I constructed worked well to control the experiment and collected the data needed.	
Summary Statement This project focuses on the use of microcontroller-based circuitry of my design and construction for the observation and manipulation of galvanic cell charge and discharge properties.	
Help Received Mr. Ferrazi, my science teacher, provided the glass U-tube and chemicals. I assembled all the electronics myself.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) An T. Ho	Project Number S0708
Project Title In Search of Photon Distributions	
Abstract Objectives/Goals The problem of my project is how will I construct a simple light-sensing robot? This project's purpose is to fill in the need for a robot that is NOT alive but responds to light. To sum up, I theorize that a relay will utilize light and determine the location of the light source. Methods/Materials The experiment included designing and constructing a robot using a solar cell, 2 motors, 3 wheels, four batteries, and wires in addition to the relay. I designed eight models, constructed a total of four prototypes and recorded the weight and cost of the last prototype. Using the light meter, I measured the energy of the light source for the robot to response. I also noted the voltage used to power the robot. Other experiments included recording the time it would take for the robot to locate the light source, and observing the numbers of spins needed to find the light source. Out of the four prototypes, the fourth prototype cost the least, weighed the least, required the weakest light source, and required the least amount of time to locate the light source. Results The information to build the robot resulted from my experience in constructing three prototypes and through information I had acquired throughout the year. Each prototype used a different electrical processing component. My Last successful prototype was successful in reaching the light source quickly and efficiently. The robot weighted approximately half a kilogram, cost \$10.75, required six volts to power up, and took 17 seconds to reach the source of light. Although, my robot used fewer parts, it was slower to respond to the light source. Conclusions/Discussion After creating four prototypes, I successfully built a stable and efficient prototype, based on the mistakes and improvement of earlier prototypes. I had discovered that a relay could be used to search for light. The completion of a good prototype led me to conclude that I have taken the first step in building a seeing robot. Future projects include designing and constructing a robot that can search for certain color and sound frequencies with certain modifications.	
Summary Statement After successfully constructing a light-sensing robot from mistakes and improvements of earlier prototypes, my robot can understand the difference between light and dark, and can respond by moving toward the light.	
Help Received I would like to acknowledge the help from the following people: my father, who bought all the materials to build the prototypes; and Ms. Miller for her constant support.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Nicholas A. Hosein	Project Number S0709
Project Title Demonstration of the Shape Memory Properties of Nitinol through a Simple Robot	
Abstract Objectives/Goals To demonstrate the shape memory property of nitinol and its possible application to artificial limbs as well as robotics. To show the advantages of nitinol over standard servos used in artificial limbs and robots. Methods/Materials Through the use of Nitinol's linear motion an angular motion can be created by attaching the Nitinol wire close to the joint of the leg allowing for a small amount of torque. The angular motion of the leg will push the robot forward. The Nitinol wire will have a rubber band as a bias force stretching it out again so that it can repeat the stepping motion repeatedly causing the robot to walk. Results The nitinol has a contraction percent of 5% on average. It moved the robot leg as intended and proved to operate for long periods of time. The longer the wire the more current needed to cause it to contract. If I didn't give the wire enough current then it would not contract very much. If I heated it too much the wire would burn out quickly. Conclusions/Discussion The robot worked very well. The Nitinol wires were able to handle very little torque, which verifies that it must be very strong. Some problems faced were that the Nitinol wires would burn out quite often when controlling the robot manually. I solved this by using a basic stamp to turn on and off a switch, which sent current through the Nitinol wire. When building the robot the Nitinol was very hard to work with because of the fact that it was the thickness of a human hair. It was very interesting working with nitinol because it is amazing how strong and durable it is. My conventional wire cutter could not cut the nitinol. I believe that nitinol has a lot of potential and I plan on doing further research into it.	
Summary Statement The shape memory properties of nitinol.	
Help Received Chris Polous taught about circuitry design	



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s) Jacob L. King	Project Number S0710
Project Title Partial Area Array Flip Chip Methodology and Automation	
Abstract Objectives/Goals Design a methodology to assemble flip chips using standard IO circuits to maximize IO count and minimize implementation time. Develop the methodology to be usable with an existing core requiring IO placement or as a preliminary floor-planning tool. Automate the procedure to further reduce implementation time with self-explanatory graphical user interfaces (GUIs). Methods/Materials The program was written in the interpreted SKILL programming language in the Cadence Opus environment with IP from NurLogic Design, Inc. Terminals used were a local Windows 1998 machine (Intel Pentium II, 64 MB RAM) on a Unix network and a Windows XP machine (AMD Athlon 1.3GHz, 256 MB DDR RAM) remotely connected to the Unix network. This second terminal uses F-Secure SSH Tunnel and Terminal to gain access to the network. The processor-intensive operations were performed on various nodes with dual UltraSparq2 processors running Sun Solaris. Results Algorithms and methodology were developed and several routines were written to design double IO rings, the bump pad array and a multi-function power distribution mesh, capable of being used as a floor plan for a new chip or to conform to an existing core for flip chips. The methodology provides for roughly doubling the IO count, and the automation reduces design time by several orders of magnitude. Conclusions/Discussion Flip Chip technology has been increasing in popularity in recent years due to several electrical, mechanical, and thermal benefits. However, its growth has been limited by a lack of a cohesive methodology for rapid mass development of high IO count chips. Such a methodology, as this project attempts to create, has the potential to greatly expand the viability of flip chip.	
Summary Statement This project includes the development of methodology and its automation to rapidly design high IO count flip chips by using a partial area array and several new innovations such as a secondary IO ring.	
Help Received Technical support, funding and workspace provided by NurLogic Design, Inc.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Gabe Klapman; Peter Lee	Project Number S0711
Project Title Big Array System: A New Low-Cost Technology for Directional Hearing Aids	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Hearing loss inhibits millions of people around the world from enjoying normal social group interactions. To counter this problem, a new directional hearing aid system is proposed which uses a large two-dimensional non-linear microphone array processed with a digital delay-and-sum beamforming algorithm to maximize the user's ability to understand sound in a noisy environment.</p> <p>Methods/Materials A prototype hearing aid array was built as a proof of concept of this technology. Its directionality was tested at various frequencies of the human voice. A computer physics model was created to analyze different array designs, to verify that the prototype was functioning properly, and to evaluate the capabilities of this technology.</p> <p>Results The array significantly attenuated noises from non-target angles. Results show that an SNR improvement of 6 to 8 dB could be achieved with this technology. Measured results followed the model's predictions closely.</p> <p>Conclusions/Discussion Current top-of-the-line directional hearing aids, delicate and finicky because of their small size, frequently go out of tune and become ineffective. The new technology, however, is robust and does not need to be tuned up. The cost of a hearing aid using this new technology would be only a small fraction of the cost of a current directional hearing aid. If this inexpensive and durable technology were made available, millions of hearing impaired people could benefit.</p>	
Summary Statement An inexpensive and robust technology for directional hearing aids which uses a digitally implemented delay-and-sum beamforming algorithm was developed to help the hearing impaired.	
Help Received Mentored by Michael Lee, Used digital oscilloscope from Semifusion, used parts from Lee Innovations	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Eric A. Leslie	Project Number S0712
Project Title Six Tests of Computer Performance	
Objectives/Goals This project compared different processor and memory sub-systems, to deduce the most efficient test procedure.	
Abstract Methods/Materials A wide range of computers were examined in the twenty three computers I tested; from x486 chips to dual processor servers. I used the program SiSoftSandra Professional to measure 6 aspects of a computer's performance. The six tests are: Integer MMX Memory Bandwidth Floating FPU Memory Bandwidth Integer iSSE CPU Multimedia Float SSE CPU Multimedia CPU Arithmetic Dhrystone ALU (MIPS) CPU Arithmetic Whetstone FPU (Mflops)	
Results The AMD chips tended to provide superior performance at equivalent clock speeds. Processor speed, the most commonly advertised aspect of a computer, by itself is not a complete indicator of overall computer performance. I compared the results of the six tests on the twenty three computers and found that three of the tests were highly correlated with the other three tests (All correlation coefficients greater than .96).	
Conclusions/Discussion In general, the more modern chips with faster CPU frequencies excelled in most testing situations. However, I found that only three tests of the six were required to completely measure computer performance; three tests were found to be redundant.	
Summary Statement Six different ways of measuring computer performance were used on twenty three computers, and the results showed only three of the tests were required.	
Help Received Access to a Variety of computers at San Dieguito Academy, Trex Enterprises Corporation, and several households.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Keerthi K. Prabhala	Project Number S0713
Project Title Adaptive Polymeric Electronic Nose	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective is to show it is possible to electronically mimic the human sense of smell using ordinary polymers and make it adaptive by using Artificial Intelligence. A related objective is to study whether the technology is robust.</p> <p>Methods/Materials Mix 18 combinations of four polymers and six plasticizers in Tetrahydrofuran and add Carbon Black in Ultrasonic bath. Spray onto 18 pairs of conducting elements and dry them. Wire these sensors into an electronic board to multiplex and convert the electronic voltages into digital values. Develop control and Artificial Intelligence software. Setup a system to pass volatile odors onto the sensors and run the system to identify the odors.</p> <p>Results The sensor array presented distinct smell envelopes per volatile analyte. The Neural Net was properly trained by reducing error metrics. The detection of analytes was positive and conclusive.</p> <p>Conclusions/Discussion I conclude it is feasible to build at home low-cost polymeric sensor array to digitize and electronically detect volatile odors. Having tested the system last summer and now, I conclude the technology is robust with long shelf life.</p>	
Summary Statement Under ordinary conditions, it is possible to build low-cost robust polymeric sensor to mimic human nose.	
Help Received Father helped discuss problems and supervised safety. Mother helped in transport. Dr. Shugarman supervised mixing chemicals at Chapman University lab. Dr. Allali helped understand Neural Networks.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Ray Ramirez	Project Number S0714
Project Title High-Density Holographic Data Storage Utilizing High-Resolution Silver-Halide Media	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The project had three objectives. First, to establish the parameters of Slavich PFG-01 emulsion. Secondly, to establish linear and volumetric data storage, thereby increasing the density of the data stored within that area. The third objective was to retrieve the stored data via a laser diode, and transfer such data, via a charge-coupled device (CCD) into a digital environment.</p> <p>Methods/Materials Emulsion parameters were established by exposing a series of six holograms. In each exposure, the percentage of TEA (Triethanolomine) was varied. To accomplish linear data storage, an opto-mechanical setup, based upon a 36"x12" breadboard, was designed. The setup utilized a Fourier Transform to reduce the imagery (35mm slides) to 1mm². The holographic plate was mounted on an XYZ translator. Six exposures were made into a 2.5in.² plate. After each exposure, the X-axis was translated 1mm. To establish volumetric data storage, the translator was rotated on it's center axis in six, 16 (degree) increments. To reconstruct the data, a laser diode recreated the reference angle used to store the image. The data projected onto a diffusing screen, where a CCD forwarded the image to a computer.</p> <p>Results It was observed, plates, which were not presensitized with TEA, yielded the highest diffraction efficiency, satisfying objective one. Linear data storage was successfully established by storing six, 35mm, images in an area 6mm x 1mm. Six images were stored in a 1mm² area, successfully establishing volumetric data storage. A limiting phenomenon was observed during volumetric storage tests. In creating a data retrieval system, a laser diode proved powerful enough to retrieve and project the stored images. Stored data (linear and volumetric) that was successfully retrieved was forwarded to a computer system utilizing a CCD.</p> <p>Conclusions/Discussion The incorporation of the CCD, allowed for the demonstration of a working holographic hard drive. The phenomenon of "cross talk" observed during reconstruction, is a physical limitation of holography and causes the integrity of the data to be compromised. Further development points in the direction of holographic optical elements (H.O.E), which would replace complex optics in the system. By incorporating H.O.Es, a holographic data storage unit could theoretically fit well within the confines of the personal computer.</p>	
Summary Statement The project goal was to design and construct a holographic data storage system utilizing silver-halide media and retrieve data therefrom.	
Help Received Used lab at PCC; Prof. Unterseher provided procedural consultation	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) <p align="center">Joshua R. Rechaim</p>	Project Number <p align="center">S0715</p>
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Project Title
Harnessing Electric Potential from Dripping Water

Abstract

Objectives/Goals
 To investigate the parameters that affect electrostatic generation by means of an inline water dropper.

Methods/Materials
 1 Lord Kelvin's Thunderstorm inline water dropper; 1 Hygrometer; 1 Chronometer; 1 Voltmeter; 1 Large Pipette (100 mL); 1 Copper Wire (20 cm); 1 Liter of distilled water (H₂O); 1 Liter of saltwater (approx. 0.25 molar NaCl); 1 Liter of seawater (approx. 0.50 molar NaCl)
 1.)Prepare experiment to be conducted under 0% and 100% relative humidity. 2.)Obtain an inline water dropper. 3.)Record voltage across the two collector cans with a voltmeter. 4.)Fill the reservoir with 400 milliliters of distilled water (H₂O). 5.)Allow the water to drip for 15 seconds under 0% relative humidity. 6.)Record voltage across the two collector cans and any relevant observations. 7.)Ground the device by bridging the two collector cans with a copper wire. 8.)Repeat steps 3. # 7. 10 times for the given time interval, then 10 times for 30 seconds, 10 for 45 seconds, and 10 for 60 seconds. This is the control variable for the experiment. 9.)Repeat steps 3. # 8. under 50% relative humidity and then again under 100% relative humidity. These are the experimental variables. Repeat steps 3. # 8. with 0.25 molar saltwater and 0.50 molar seawater. Once again, these are the experimental variables.

Results

The Affect of Humidity on Electrostatic Generation

Distilled Water	0%	50%	100%
Time[sec]	Voltage[V]	Voltage[V]	Voltage[V]
0	0	0	0
15	0.041	0.027	0.0245
30	0.116	0.1195	0.1565
45	0.041	0.0405	0.03
60	0.052	0.039	0.021

The Affect of Ionic Substances on Electrostatic Generation

Distilled Water	Pure H ₂ O	0.25molar NaCl	0.50molar NaCl
Time[sec]	Voltage[V]	Voltage[V]	Voltage[V]
0	0	0	0
15	0.041	0.048	0.054
30	0.116	0.1195	0.158

Summary Statement
 Investigating he parameters that affect electrostatic generation.

Help Received



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Candice L. Wilkey	Project Number S0716
Project Title The Harmful Effects of EMFs and Its Elimination	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine if Electromagnetic fields (EMFs), found inside and around the home, can be prevented by products that claim to prevent EMFs. The hypothesis EMFs, which had previously been determined to affect planaria, will be reduced to a "safe" level, by use of a product made of harmless, non-toxic, natural chemicals purported to stop EMFs.</p> <p>Methods/Materials Three products were used: Diode Transmutation Plaque, Computer Harmonizer, BioElectric Shield, and a Q Link. Each product was tested according to each product's directions, using a F. W. Bell Elf Magnetic field meter, model 4070, to measure the amount of EMFs emitted.</p> <p>Results Each product did not affect the emission of EMFs. This is believed to be because the product does not work.</p> <p>Conclusions/Discussion The products do not work. EMFs cannot be reduced to a safe level by use of a product made of harmless, non-toxic, natural chemicals purported to stop EMFs.</p>	
Summary Statement My project is on evaluating materials that claim to stop EMFs.	
Help Received Mother and teachers helped edit my work.	



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Rhett T. Williams	Project Number S0717
Project Title How Antenna Design Affects Signal Strength	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I hope to find a better antenna design. that will improve my access points range in one direction.</p> <p>Methods/Materials I will be testing five different antenna designs made out of copper and fiberglass. I will be testing them at one fixed location for both end points and at a set distance away from the access point. I will be using a control antenna as a baseline to help determine the best design. For measuring the test I will be using WildPackets Airopoek and Cisco Link status. I will hook all of the antennas up individually to the access point to see if the signal strength has changed and I will be in a fixed position away from the access point.</p> <p>Results I found on my experiment that all of my designs preformed differently than I thought they would. The design that I was favoring to do the best did perform the best. But I found some problems in the dipole design so I fixed them and now the antenna has optimum performance. It also improved since the first time I used it and now that I fixed the problems in the antenna if has a greater gain than before. Now for the other antenna designs, they were good but not as good as the dipole design. I found with the other antenna designs I developed better ways of building them now after my experiments are complete. The antenna designs I thought would do better didn#t do as good as the ones I thought that would not do as good. I found some new ways to make antennas and how to position them. I feel with a better antenna design it will further the distance you can expect to be away from the access point. With this knowledge I can think outside the box and develop antenna designs that allow you to go further that just the 150 feet these radios are capable.</p> <p>Conclusions/Discussion Now for the other antenna designs, they were good but not as good as the dipole design. I found with the other antenna designs I developed better ways of building them now after my experiments are complete. The antenna designs I thought would do better didn#t do as good as the ones I thought that would not do as good. I found some new ways to make antennas and how to position them. I feel with a better antenna design it will further the distance you can expect to be away from the access point. With this knowledge I can think outside the box and develop antenna designs that allow you to go further that just the 150 feet these radios are capable.</p>	
Summary Statement I plan on finding a better antenna design.	
Help Received Mother and Father for materials	