

PPRSF 2010 ABSTRACTS

6A1 *Let sleeping dogs lie*

Paige Groninger

No abstract available at press time.

6A2 *Growing tulips*

Taylor McQueen

No abstract available at press time.

6A3 *Organic vs. conventional produce: Which is safer?*

Isabella Schneider

My science fair experiment was to test whether organic or conventional produce has more bacteria. My hypothesis was that if I grew bacteria from organic and conventional produce then there would be more bacteria on the organic produce than the conventional produce. This will show which produce is safer to eat, so people know which one you is better to buy. I found in my experiment that the conventional produce has fewer bacteria than the organic, which is what my hypothesis was. The experiment was divided into two parts. In the second part of the experiment, I washed the produce to see if it would reduce the amount of bacteria. I found that the washed produce had a lot less bacteria than the unwashed produce. This is true of most of the results except the conventional spinach, where the washed had double the bacteria of the unwashed. I found that strawberries had the least bacteria colonies and the spinach had the most. My conclusion is that organic produce has more bacteria than conventional, and it is better to wash your produce off before eating it.

6A4 *Motor oil*

Brenna Cotton

No abstract available at press time.

6A5 *Mouse maze*

Erin Sleppy

In my experiment I built a maze out of foam core put a trail of mouse food through it from start to finish the correct way, and placed my mouse in it and see if it follows the trail of food and makes a few mistakes or just explores all around. Timing it is optional. The information collected could be useful to vets, biologists, and other people who have jobs with animals to gain more knowledge about mice, their attention span and how to treat sicknesses or any other problems the mouse may have. The information could also be somewhat useful for help with other rodents. My results were trial1 she followed the trail mainly wondered a little bit and got through in 1 minute 9 seconds. In trial2, she went in stopped to clean herself then looked around some more and followed the food out the rest of the way. She took 1 minute 47 seconds to get through the second time. In the last trial, she went explored a tiny bit less then the other times, cleaned herself quickly and went out. She went through very quickly in 1 minute 7 seconds.

6A6 *Capsaicin amounts in parts of the chili*

Leo Brasuel

Many people believe that the area with the seeds is the hottest part of the chili. To test this the seeds, placenta, and apex, were tested using the following procedure. The chili pepper was dissected and mashed, about 4.0 grams of each part were placed one of the parts into a 150ml beaker with ethanol. Then transfered into a 25ml volumetric flask filling it to the mark. After completing this it was filtered into an HPLC vial and the capsaicin content was measured using an HPLC instrument by comparing the response of the samples to the response of pure capsaicin standards. The highest amount of capsaicin concentration was in the placenta (area around the seeds) to protect the seeds.

6A7 *How healthy is monument valley creek waters?*

Madison Zawacki

I wanted to do this project so I could find out if Monument Valley Creek was a safe environment for the surrounding community. I found out the water is polluted. This caused by people throwing trash into the water and just not treating the creek right.

I started by collecting water at Monument Valley Creek and did 3 tests. This included Ph strips that tested the acid level, nitrate pills which tested the nitrate level and I tested the dissolved oxygen level. From these tests I concluded that the creek is polluted.

The purpose of this project was to make sure this creek was healthy so the surrounding creek didn't have to worry about any danger. Danger could consist of illnesses and just getting you filthy. Since my dog and I got to this creek every week, I think it was important for both me and the surrounding to know the truth of what is in the water.

6A8 *Grow with the flow*

Tara Hobbs

For my project, I will be watering six of the same type of plants each with a different type of liquid. The liquids I will use are: tap water, soap water, unsweetened cherry kool-aid, lemon juice, soy milk, and 7-Up. Weekly, I will measure each plant to see how they are responding to the various liquids. To be consistent, I will water each plant with 1/4 cup of liquid each night and take measurements each Sunday. The purpose of this project is to see how different liquids impact plant growth. I have not concluded my project yet, my display board will conclude this experiment.

6A9 *Poppin' it up!*

Graham Gale

Here is what I am going to do to create my Science Fair Project: I am going to start out by setting our hand-cranked popcorn popper on the stove. I will then turn on the stove. Then I will pour in 1/3 cup of unpopped popcorn, along with 1 teaspoon of the designated oil. I will crank the popcorn popper until all of the kernels are puffy (except for those that simply cannot be popped), and then I will separate the old maids from the popped kernels. I will repeat the process 3 times to get sturdy results.

6A10 *Germ*s

Brigette Dietzman

In my hypothesis I stated the keypad would have the most germs. My hypothesis was confirmed. The keypad had a total of 497 germ colonies plus two plates of colonies too numerous to count. The door handle had a total of 216 germ colonies plus three plates of colonies too numerous to count. Now that we know this information the cafeteria staff needs to wipe or clean the keypad more often so that other people do not get sick. If I had another chance to do my science experiment I would change the time of day that I collected the samples. I would change this because maybe a different time of day would have more colonies than the times used in this experiment.

6A11 *Ice is nice*

Kayla Snyder

RESULTS

The purpose of my experiment was to find out if ice melts faster when you add an additive to it or just let the ice melt on its own. My results showed that the ice cubes melted fastest when Sea Salt was added to the ice cubes. The average of melted water was 12.67 grams or 27.54% of the original ice cubes. I also learned that some of these additives were soluble while others were insoluble and that contributed to the results too.

CONCLUSION

My hypothesis was wrong. I guessed that the sand would melt the ice cubes the fastest by coating the ice. By looking at my control (the ice melting alone) I could see that all the soluble additives (sea salt, table salt, and sugar) melted the ice cubes faster than the insoluble additives (pepper and sand). The soluble additives looked like they "ate" the ice and broke it down faster. Some of my variables were the difference in house temperature in each trial, the additive sticking to the ice while weighing the results, and the size of each ice cube itself. Next time I try this experiment, I would see why my melted water and remaining ice didn't always equal up to 46 grams that my ice cubes weighed in the beginning. Maybe it was due to evaporation or condensation.

6B1 *Touching memories*

Sylvie Hudson

The purpose of this project was to determine different ways of memorizing objects. My hypothesis is; if people touch 15 objects, then they will remember them better than just seeing the object. Gathered 30 objects and set 1/2 of them on 1 table, and the other half on another. Procedure: I asked one person to go into the room and memorize as many objects as they could without touching them within a 2 min. time limit. I did the same with all 20 people. I had them each write down what they remember on a piece of paper. In the second room, I asked one person to go into the room, and feel and pick up the different objects within a 2 min. time limit. I did this with all 20 people and had them write down what they remember. Over all, my results were what I wanted. People who touched & saw the objects did slightly better than just seeing the objects. Seeing: 221 objects remembered from everyone. Touching & seeing: 224 objects remembered total.

6B2 *Color confusions*

Sophie Foster

My project, Color Confusions, tested to see if a conflict occurred in a person's brain when they read with both sides of their brain using a color-based word test. I tested people of different ages and categories; for example, pre-schoolers, pre-teens, adults, senior citizens, people raised in foreign countries, and mentally disabled people.

I asked the subjects to read two test pages of words consisting of colors written in colored ink. On the first test, the word color is the same as the ink color used to write it (for example the word red is written in red ink). I call this the "regular test". On the second test, the word color is different than the ink color used to write it (for example the word red is written in green ink). This test is called a Stroop Test. Using my stopwatch, I recorded the time in seconds for the subjects to read all words on the regular test and then the Stroop test. I calculated the averages of each category of subjects and then compared the category averages to each other. When I looked over my results, I saw that the times recorded on the Stroop test were greater than the regular test, indicating that a conflict occurred in the brain between the word itself and the ink color.

The reason that there might have been a conflict in a person's brain is because, when reading a color, you use your right side of your brain. Whereas, perceiving color is done on the left side of your brain, therefore making it harder to comprehend something when both sides of your brain must work together. When this happens, a conflict occurs creating a delayed response.

6B3 *Boys-vs-girls*

Desiree Grimaldo

The purpose of my project is to see which gender is more superior in taste. The test subjects will have to chew a variety of gum and tell me when the flavor is gone. Half being boys and half being girls.

6B4 *Identifying sodas*

Jenna Kindt

For my science fair project I will be testing people to see if they can identify the difference between sodas if the look similar. I will use the sodas Dr. Pepper, Coca-Cola, A&W, and Pepsi all of which are the same brownish color. To do this I will use participants from Ms. Holt's discovery class. Each person I test will be asked to try a small amount of each different soda and tell me which one they thought was which without me telling me what they were. I will label the cups A-D. I think that the participants in my Science Fair project will not be able to identify the difference. In the project taste will be playing a big part. On your tongue there are many taste buds. About 9,000 of them cover your tongue then another 1,000 are in your throat, cheeks and roof of mouth. In them are taste sensors which when you touch something with your tongue they send messages to your brain about what you just tasted. Sodas are quite tasty; maybe that's why there so popular now days.

6B5 *Dandelion root and peppermint leaf vs. penicillin*

Rene Carter

In my project, I'm trying to find out whether dandelion root or peppermint leaf is as effective as killing E coli as penicillin. I was hoping either peppermint leaf or dandelion root is more effective than penicillin. That would mean we could use it as a more natural alternative to penicillin.

For my project's procedure, I to brewed dandelion root and peppermint leaf tea bags and soak disks made out of punched note cards in the tea. While the tea was brewing, I prepared three Petri dishes by smearing E coli into each one. Once the disks sat in the tea long enough, I took a few from the dandelion root tea and place them in a Petri dish, making sure to spread the disks apart. I did the same with the peppermint tea in the second Petri dish. I took the last Petri dish and filled it with a few pre-made penicillin soaked disks. Next, sealed the Petri dishes and let them sit in an incubator for 48 hours.

Once the Petri dishes sat for the appropriate time, I took them out of the incubator and compared my results. I measured any zone of inhibition around the any of the disks.

The conclusion for my experiment was that the penicillin killed all of the E coli, the peppermint leaf killed the most after penicillin, and dandelion root didn't kill any E coli.

6B6 *Mr. Mozart's science lesson*

Fuki Hankawa

No abstract available at press time.

6B7 *How old is that strawberry?!*

Cassie Nillaga

The purpose of this project is to see what type of storage container works best to keep strawberries fresh for the longest amount of time. I am using the Green bag, Ziploc sandwich bag, plastic container and a non brand sandwich bag. This project can help people who love strawberries keep them fresh. I need to place 4-6 strawberries in each type of storage and take observations until just before mold grows. So far I have noticed that the green bags have been getting mushy and smelly a lot faster then the others which has showed my hypothesis to be incorrect.

6B8 *Is it clean?*

Quinn Jennings

For my project I will test to see if restroom surfaces a cell phone or a school phone is cleaner. With the research I've done I figure that the cell phone will be the dirtiest. Now the question is why should you care? Well here is why, I will prove to the public that cell phones can be hazardous to your health and that we should pay more attention to the bacteria around us. Also, I will answer the question is it clean maybe you should think about that the next time you talk on the phone or go to the bathroom. How will I conduct my experiment you ask, I will begin by cleaning the surfaces of 2 toilets in the girls bathroom at my school using antibacterial wipes I will also clean 2 cell phones (mine and my teachers) and 2 school phones. Next I will use the surfaces for a week. The next step will be to swab the toilets and the phones and put the bacteria I collect on agar plates and seal them. After 48 hours I will look at the bacteria on the agar plates and determine which one has the most bacteria. (I have not conducted my experiment yet.) This data will be recorded in graphs and data tables. By doing this I can be sure that the next time someone talks on the phone or goes to the bathroom that they know the bacteria is getting them from both ends.

6B9 *Hide and go seek*

Janessa Ems

No abstract available at press time.

6B10 *Sound vs. scent*

John Griffin

No abstract available at press time.

6B11 *Memory*

Bailey Rojewski

The purpose of my project is to test whether or not you could change someone's memories or make them think that their memories were wrong.

6B12 *Contagious currency*

Johnny Leech

The purpose of the project was to show the public what kinds of bacteria are growing on United States currency. I got my test subjects (a.k.a. money) from a random assortment of Banks, Pharmacy's, Fast food restrants, and collections. The project started with ordering the needed supplies. Then the petri dishes were filled with agar and let to set. Then the money was swabbed with distilled and a sterile Q tip. Then the Petri dish was swabbed with the Q tip, and put in an incubator. They were later observed. The results of my project were that the older the money the less bacteria was found. Medical places and facilities have higher bacteria content than other places. Paper money had a lot more bacteria than the coinage did. Medical facilities usually had a blanket of bacteria, coins usually had colonies, and the other types of money had a digital type look to it. The ones that were digital looking looked sharp and jagged kind of like a rusty knife. The colonies were usually yellow or white, and always circular. The blankets were always white with very few if any colonies growing along with it.

6B13 *The brain's right side, left side and its volume*

Leta McWilliams

My science fair project is testing how well each side of the brain can hear. I am also testing if it makes a difference whether the side of the brain is dominant. I will be testing which side of the brain is dominant by giving the volunteers a test. The reason I'm testing this is because sometimes when people are listening to music they take out one earphone and leave the other; I wonder why myself and other people do that. Also, my experiment will benefit to the people I'm testing because one of the ways people learn well knowing which side of the brain they use most and

how they learn best.

First I will give the volunteers the test. Then I will figure out the results. After that I will give them an iPod and they can make it so it's the right volume. After they finish the test I will give them their results of the test.

My guess is that most of the people I test will have the left side of their brain be more dominant because most people are right-handed. The left side of the brain controls the right side of the body. I also think the left side will hear well because that is the side that controls sound.

As a result of all my testing, my hypothesis was wrong. The left side of the brain is the one that can't hear as well.

6B14 *If you give a girl cake, she'll ask for a science fair*

Cameron Rojewski

No abstract available at press time.

6B15 *Give me exercise!*

Dylan Stanton

No abstract available at press time.

6B16 *Oxygen in a can*

Carter Jensen

The purpose of this project is to inform the people of the planet what you should drink to give you the most energy out of Monster, Red Bull, Rockstar energy, water and orange juice. I will test which energy drink is the safest and most reliable energy drink and water and orange juice. I will find this out by testing subject A and B and using a handy tool called a pulseox. The pulseox will tell me what there heart rate and the pulse are. I will record this experiment over a 30 minute time period for both subjects and I will look at the pulseox every five minutes. This will probably end up in water being the safest drink, orange juice being the safest, and most energetic drink, and monster being the most energetic drink. I really hope that the energy drink haven't really done anything to anything they stayed relatively constant and nothing interesting or exciting really happened which I did not expect. Also the normal level was just slightly less in consistent than the one with an energy drink. I do not think that energy drinks are a unhealthy for you as advertised, I think that any drink with sugar will get you ramped up but not to a insane level.

6B17 *Mind gender gap*

Joshua Borst

No abstract available at press time.

6B18 *Liquid or solid soap*

Jorge Moreno

My expernent will show what kind of soap works better.

6B19 *Mints! Mints! Mints!*

Karen T. Magana

No abstract available at press time.

6B20 *The smoking plant, II*

Jake Luiten

Purpose: Will a plants growth be effected by two different brands of cigarettes?

Procedure:

I purchased three tropical houseplants. Each plant was placed its own terrarium with potting soil. The plants were labeled test plant 1, test plant 2, and control plant. All of the plants were placed in an east-facing window exposed to the same amount of sun light. Test plant number one will be exposed to light cigarettes, test plant number two will be exposed to regular strength cigarettes and the control plant will remain constant with no exposure to cigarette smoke. Test plant 1 will be given three light cigarettes a day for 3 weeks; which will be placed in the terrariums at 3 different times a day. Test plant 2 will be given three regular cigarettes a day for 3 weeks on the same schedule. The cigarettes will have a paper clip pushed through them so it will hang on the tin foil. Now the cigarettes will be lit and paced in the terrariums.

Each plant will be measured for height and the leaves will be counted each week. All of the plants will be watered 1 cup of tap water every Friday. Pictures will also taken every Friday, along with measurements of the plants and their leaf count.

My data is still being collected. Because my experiement is still in progress, I will be unable to state my conclusion

at this time. However, based on the results of a similar experiemnt I did in 4th grade, I will predict that both plants that were exposed to ciggarette smoke will begin to yellow, wilt and show signs of dying while the control plant will remain healthy.

6C1 *The caffeinated radish*

Emma Howard

The purpose of my project is to help gardeners and the increase the growth of different kinds of plants. This is helpful for the increased amount of growth of plants.

The purpose of the procedure is to show exactly step by step how I was able to conduct my project and come to my conclusion. This is for people that would like to plant any different kinds of plants and with coffee grounds or coffee. The procedure can be summarized in a short section. To start I gathered my materials and planted each of the four plants. At first I watered pretty often but then started watering every Sunday. Each day I kept track of what I observed in my process journal. Each Sunday as well as watering I would take pictures and measured the growth. I started on January and ended on February 10, 2010.

I had found that the plants being watered by coffee weren't doing well as to where the plants being watered by water were doing much better. I also found that the coffee grounds helped the growth of the plants.

Each week the data was that the coffee grounds with water grew about one inch. The control plant grew about one half an inch. The plants with coffee had started out growing but quickly died during the second week.

I was amazed when I noticed that the plants being watered with coffee had started out growing and then died. I had assumed that the plant with coffee grounds and water would grow the best. I thought this because of the caffeine in the coffee.

6C2 *Which paper towel cleans the best*

Alissa Morones

No abstract available at press time.

6C3 *Video games on coordination good or bad?*

Brian Torres

In order to determine if video games can improve your coordination each test subject will be tested on their coordination through a timed cup stacking activity before they will play Wii tennis for 15 minutes. Then after their session of playing video games has ended they will have a five minute break. After the break they will be asked to do the cup stacking activity again.

Then I will look at the results and determine if video games improved the subjects coordination. Then I will make that into a graph and data table to present to the judges at science fair.

6C4 *Solar energy vs. fossil fuel*

Quin Waterbury

My project is about eliminating all the talk going on about how solar energy is alot more cost effective, or how it's not. My project will show the costs of solar energy, including building/installing the system, compared to the cost of a traditional fossil fuel energy system in a house. I will put graphs showing the costs, state funds, and savings with a solar energy system. The project will mainly focus on the costs of solar energy, and less on the costs of fossil fuel.

6C5 *Let it rust, let it rust, let it rust.*

Zach Smentowski

No abstract available at press time.

6C6 *Traditional or mesh: Speed and accuracy*

Noah Smith

The purpose of my project is to help lacrosse players all over the world find the stringing method that would improve their game. What I will have my subjects do and myself do is stand 10 yards away from the goal with the lacrosse stick strung with traditional method first. Then they will shoot on the goal as hard as they can and the person with the radar gun behind the goal will record the information. Then all subjects will do the same and then they will go to mesh stringing method and do the exact same thing. Next, one subject will stand 10 yards away from the goal with traditional and goal targets will be put up. Somebody will call out random targets (e.g. top-right). Last, everybody will do the same thing with traditional and mesh stringing method. I hope that my data shows that mesh is the best stringing method. The reason I hope this is that mesh is the string method I use. I would like to see in the end that mesh is the best stringing method for speed and accuracy.

6C7 *Heat it up!*

Ryan Mike

No abstract available at press time.

6C8 *I'm going bananas*

Claudia Westby

Bananas are very perishable and start to decay rapidly if left out for any length of time. Is there any way to make them stay fresh longer at home? My project looks at adding oxygen in different levels. The oxygen levels 50% and 100% compared to normal room air oxygen level (21%) at normal room temperature and also refrigerated at room air oxygen (21%) in sealed containers compared to a control set of bananas in a normal room air and oxygen level in an open container, like you might store them at home to determine if additional oxygen will increase the length of time a banana will remain fresh. All bananas will have their oxygen levels checked with an oxygen analyzer and adjusted to their correct levels with an oxygen tank if needed. Temperatures of each set of bananas will also be checked. My hypothesis was that if I increase the oxygen percentage in the air, then the banana will ripen faster. The results of my experiment did not support my hypothesis and really surprised me! The bananas that had oxygen added to them at 50% and 100% were almost as good as the normal 21% room air bananas in a sealed container which showed almost no decay! The experiment also showed that bananas left out on the counter exposed to normal air decay quicker than when sealed and the refrigerated bananas turned brown the quickest and would not be considered pleasant!

6C9 *What is the best design for an ion engine*

Ethan Rummel

No abstract available at press time.

6C10 *Which substance will make the balloon bigger*

Ashlee Brown

No abstract available at press time.

6C11 *Burning calories*

Matthew Moody

My hypothesis that the meat would contain the most energy was wrong. The meat didn't burn the most calories, the brazil nuts did. I think that the reason the meat didn't have the most calories was because it was already cooked. The experiment recommended not using raw foods. Maybe if I used a piece of raw meat, the results would be different.

6C12 *Hydropower*

Cedric Camacho

Six months ago my family started generating electricity through wind generator and solar panels at home; I started asking myself how I could use water movement to generate electricity, and I tried to figure out how to generate electricity with a small hydropower scale unit.

It was hypothesized that if I build a small hydropower scale unit then I can show how to generate electricity through one.

The generator was made from a hollow-ended plastic box with a metal stick through the center. The box has many turns of fine copper wire wound around it, with four large magnets clamped around the metal stick. When the metal stick and magnets are spinning fast by the turbine, the LED lights up dimly.

My hypothesis was proven correct. It was possible to generate electricity with water power.

The data was measured in term of the maximum voltage showed on the voltmeter.

I started winding 200 turns of magnet wire and the measure was 0.2 volts, with 250 turns of magnet wire the voltage was 0.2 volts, with 500 turns of magnet wire the voltage was 0.5 volts, with 750 turns of magnet wire the voltage was 0.7 volts, with 1000 turns of magnet wire the voltage was 0.9 volts, with 1250 turns of magnet wire the voltage was 1.5 volts and with 1500 turns of magnet wire the voltage was 1.9 volts.

6C13 *Magnetic permeability*

Sydney Paul

Magnets are used in many different places and industries. It is important for magnets to be able to work to their best ability. Different materials can impact the performance of a magnet. In my project I tested what materials would allow a magnet to work through them, and which materials would not.

I hypothesized that if various materials, at the same thickness, are used to test for magnetic permeability, then the

least dense material would show the best results.

Permeability was determined by placing a magnet on top of various different materials, and then counting the number of paper clips that were attached to the bottom of each material after picking it up. The paper clips were then counted to determine permeability.

Results showed that my hypothesis was incorrect. The top two materials were granite and glass. Each picked up over 70 paper clips. All materials tested decreased the magnet strength, because the magnet was able to pick up all 100 paper clips with nothing covering it.

I concluded that magnets permeate different materials at different strengths. I found that the smoother the surface, the more non-permeable the material was. A practical application of my project is done in the fields of construction and metal detectors. Metal detectors create electromagnetic field that sends waves down into the ground. In construction they need to lift up heavy metal and clean up construction sites. It is important not to decrease the strength of the magnet picking up the scrap.

6C14 *The Stirling engine*

Madeline O'Brien

This project describes the fascinating Stirling Engine. The Stirling Engine is an external combustion engine; which is very different from an internal combustion engine, like a car. This type of engine is 90% efficient, and even used on satellites. This project was designed to see how differences in temperature will affect the engine output. The greater the temperature differential, the higher the affect on the engine output. An engine kit was purchased and built. I selected with my favorite 5 foods of different temperatures and conducted experiments and collected data. Examples of the favorite food I used were ice cream, which has a temperature of 32 degrees, and chicken pot pie, which has a temperature around 350 degrees. I measured the number of rotations per minute. The Ben & Jerry's Chunky Monkey had the highest number of rotations; 218 in one minute. You can make this engine run off of anything, Chunky Monkey ice cream, hot chicken pot pie, cold sea water, sun light, and even hot molten lava. And it is very efficient

6C15 *Modified nerf gun; distance and velocity*

Zachary Crossley

My hypothesis is if a greater amount of air is delivered to a Nerf foam dart to increase its distance and velocity, then minimizing the number of air obstacles such as the air suppressor and dart guide rod, it will make the foam dart travel farther and faster, because with the obstacles removed, there is more air flow to the foam dart. My conclusion of my project is that if you remove the air suppressor, air suppressor spring, and dart guiding rod you will get the maximum distance. So, my hypothesis was correct.

I started with putting the Nerf gun into a clamp at a 45 degree angle, but when I fired the gun, the dart hit the ceiling. So, I had to put the gun upside down in a 90 degree angle. My average for the first distance test on gun 1 had an average distance of 13.5984 feet. The second gun had an average distance of 16.1083 feet and an increase over gun one of 15.58 percent.

Based on the difference in distance between gun 1 and 2, it was decided that only gun 2 would be used and modified for each test. I then set up the chronograph and did the first velocity test. I got an average of 0.2366 and average feet per second of 42.3204. For the second velocity test on the first mod (removed air suppressor and air suppressor spring) I got an average of 0.2222, an average feet per second of 45.0964, and an increase over the control gun of 6.16 percent.

I then did the distance test for the first mod and got an average of 17.9281 feet and an increase over the control gun of 10.15 percent. Then I did the distance test for the second mod (put the air suppressor and air suppressor spring back and removed the dart guiding rod) and got an average of 18.1109 feet, an increase over the control gun of 11.06 percent, and an increase over mod 1 of 1.01 percent. I then did the velocity test on mod 2 and got an average of 0.2154, an average feet per second of 46.4800, an increase over the control gun of 8.95 percent, and finally got an increase over mod 1 of 2.98 percent.

I then did mod 3 (taking the air suppressor and air suppressor spring out again) and did the velocity test for mod 3 and got an average of 0.2138, an average feet per second of 46.9184, an increase over the control gun of 9.80 percent, an increase over mod 1 of 3.88 percent, and an increase over mod 2 of 0.93 percent.

For the final part of the project, I did the distance test for mod 3 and got an average of 18.2130 feet, an increase over the control gun of 11.56 percent, an increase over mod 1 of 1.56 percent, and an increase over mod 2 of 0.56 percent.

So, it is indeed better to remove the air suppressor, the air suppressor spring, and the dart guiding rod if you want to

get farther and faster results using the Nerf Nite Finder model.

6E1 **Music helps**

Angela Edmisten

No abstract available at press time.

6E2 **Brain teaser memory**

Lauren Higgins

The purpose of my project was to find out if all the things about how brainteasers improve your memory are true, and if the brainteasers we do benefit our memory. My hypothesis is if you do a brainteaser before a memory test the score (and memory) will be improved. For my testing, I took one group then had them do brainteasers and had another group not do brainteasers. After that, I gave both groups a memory test to see if the brainteaser subjects had improved memory. My testable question "Does doing a brainteaser improve your memory?" is answered yes according to my data. The brainteaser subjects ended up remembering 7% more words than the subjects without brainteasers, which is not as much improvement as I expected. My project shows that doing brainteasers before a memory test can improve your score a little.

6E3 **Lefties and righties put to the test**

Tess Abineri

The purpose of my project was to see if (in a certain skill) left-handed people or right-handed people differ in their abilities. In this case I wanted to see whether lefties or righties recognize a song fastest. The procedure was that first I sent out a letter to the Old North End asking for left-handed volunteers. I got about 18 responses. Then I individually called or emailed back the people asking to set up a time on Saturday or Sunday the 13th and 14th. I did most of the people on Saturday and some on Sunday. While doing this I got a few rightie husbands and wives and children of the lefties to participate. Then I just had to do more righties. I ended up just using rightie neighbors and friends. Now I had all my data and a few askew results. I had had a rightie person get 16 seconds and another get 11 seconds, when the rightie's average was about 6 seconds. This definitely was bad for righties, and it indeed gave them a slower average. Though it supported my hypothesis I checked on my spreadsheet whether the righties would beat the lefties if those two slow results were instead just average results, and sure enough they were still slower than the lefties. But, if I'd had a MUCH bigger sample of people to test then I'd have more confidence in my result.

6E4 **Which is really the best cleaner?**

Kesiah Mendoza

No abstract available at press time.

6E5 **Footloose**

Taylor Stanton

No abstract available at press time.

6E6 **What types of energy drinks increase physical performance?**

Emma Chekroun

No abstract available at press time.

6E7 **Music time test**

Lakota Welling

No abstract available at press time.

6E8 **Righties vs lefties**

Fiona Miller

The testable question for my science fair project is: Who can write faster, righties or lefties? The purpose of this project is to find out if righty or leftie 6th grader would make better journalist. I started this project off by collecting volunteers to be tested. Once I had my volunteers, I gave each one a piece of line paper, a pencil, and another piece of paper with the Bill of Rights on it. I would then start a timer for five minutes and have the volunteers hand their papers to me when they were finished or when the timer stopped. I will do this over again; except I'll have the volunteers copy the Gettysburg Address. For the data, I found that righties write faster than lefties. I think this because sometimes lefties are forced to write with their right hand for a while, and they haven't been writing with their preferred hand as long as most righties. My conclusion is that, in a group of 3 righties and 3 lefties, righties write faster than lefties.

6E9 *Music and the heart*

Riley de Ryk

No abstract available at press time.

6E10 *I'm drinking what?*

Lauren Zawacki

No abstract available at press time.

6E11 *Fish tank bacterial blooms*

Amber Albrecht

No abstract available at press time.

6E12 *A soapy solution*

Sean Jones

No abstract available at press time.

6E13 *What's this liquid?*

Kayla McCurry

The purpose of my science project is to see whether the participant can identify the liquid when it's not in its natural state of color. My research shows that picky eaters enjoy food or liquids a lot more when they're in the dark and can't see the food/liquid. Sight is one of the most important senses because our taste buds rely on them a lot. When our body's about to eat the food our sight sends whether or not the food/liquid looks good and that factors in whether or not you'll like the food.

First, I will pour the liquids into glasses and label them A, B, C, etc. Then, I'll dye the liquids an unusual color and ask the participants what they think it is. Next, I'll have them taste the liquid and ask, "Now what do you think the liquid is?" Finally, I'll dye each liquid a different color and ask the same two questions.

I think most people won't be able to tell what the liquid is because based on all of my research the sight is a dominant sense and people rely on it too much.

6E14 *Texting*

Bailey Smith

My purpose for my project is to see whether or not text messaging affects the English Language. Also to show people what text messaging can do to do. My procedure will most likely go like this:

- 1) First, I will get two subjects that text everyday.
- 2) Then, at separate time I will have them copy a passage that will include non-abbreviations of a statement that you would find in a text message.
- 3) Subject B will do the same thing.
- 4) The same will happen with four other subjects (or two other groups) using the same passage.
- 5) The second group will include two subjects that text message every so often.
- 6) The last group will include two other subjects that never really text message.
- 7) I will go over all the results, examine the copied passage I each group and decide what happened to this copy of the passage. Seeing whether or not it is text messaging affects the English Language.
- 8) I will display all my information/data on my display board

I have not done my experiment yet. So I do not have the data and the conclusion.

6E15 *Goalies for lacrosse and music*

Caleb Espinoza

I wanted to do this because I thought I could incorporate lacrosse in the science fair and I could do something I love for my project. I also play goalie in lacrosse and I've noticed that when I am getting ready for a game I usually listen to my i-pod and it gets me really fired up for the game, so that's why I wanted to do this project to really see if music makes you a better player when you are playing an actual game. So I thought this was going to be the best project for me to do and complete fast and simply and it will also be a good project to. It will also be good because the people that I am using for this project are people that I play lacrosse with and they already know how to play goal and shoot so that the project will be a pretty fast one and it will also be done well.

1. Get Lacrosse net/backstop/fence.
2. Gather everyone that is helping me with the project.
3. Make sure we have all of the equipment.

4. Put on the goalie equipment.
5. Put the shooter in the correct place to shoot.
6. Listen to music.(whoever is in the goal stoping the shots)
7. Start experient.

6E16 *How storage affects produce*

August Cawiezell

No abstract available at press time.

6E17 *Decisions, decisions*

Marissa Cimino

No abstract available at press time.

6E18 *Developing an awareness of pet stewardship*

Aleesa Muir

Abstract is pending results. An abstract will be available by the PPRSF.

6E19 *Music volumes*

Logan Beauseau

No abstract available at press time.

6E20 *Does listening to music help you study, which kind?*

Abigail Conway

The purpose of my project is to find out if listening to music helps you study, and if it does what kind of music. I made study guides for 6 tests, and then I gave out consent forms to 7 people, knowing that about 4 people will not be able to make it. I then tell the participants when the first test will be, and the time of the second test, etc. I will let the participants study and give them the test. After all the tests have been given, I compared my data and found out that on average, it is better to listen to music while studying then to not listen to music.

7A1 *The soil effect*

Shelby Faulkner

No abstract available at press time.

7A2 *Bacterial resistance*

Jenna Hartley

No abstract available at press time.

7A3 *Penicillin vs. bacteria*

Hayley Powers

In my project I had to get Petri dishes that had penicillin in it. Next I had to put the micrococcus luteus in the Petri dish. What I am doing is trying to see is if the penicillin is affecting the bacteria. I will know if it is because there will be a white/clear ring around the penicillin drops. If the bacteria's were not affected then the bacteria will be right on the edge of the penicillin drops. I think that the micrococcus luteus and the bacillus subtilus will be affected by the penicillin. I will have to put the penicillin and the bacteria in a Petri dish and cover it. Next I will have to swab it. After I swab it I will need to leave it closed over night to see what the result is. This process will need to go on for at least 2 days before I can come to a conclusion. After I am done with the project I need to soak the bacteria and penicillin in 10% bleach for 24 hours. After the bacteria and penicillin has soaked for 24 hours I will dispose of it in a red bio hazard bag. My project requires me to use goggles, so that I do not hurt or get anything in my eyes, lad coat, so that I do not harm myself by spilling chemicals on my clothes, and gloves, so that I do not spill any material on my hands that could seriously injure myself.

7A4 *Dirty fish*

Malina Frank

No abstract available at press time.

7A5 *H2O Quality*

Collin Landwehr

I have always wondered what was in my water at home, and in my bottled water. In my project I found out. My project is testing my tap water in my house, and about four other brands of bottled water. I am using testing strips that can test for chlorine, copper, nitrate, nitrite, alkalinity, pH, hardness, and iron. I tested each of the different waters and recorded my results. My hypothesis was that if you test both bottled water, and tap water, then the bottled water will be cleaner than the tap water. The experimental results did not support my hypothesis. The results were the same for Nitrates, Nitrites, Alkalinity, Hardness, Iron, Copper, and Chlorine with all of the waters. With pH Fiji water and tap water tested at the EPA standard with 8 ppm. While Dasani, Aqifina, and Smart water tested below the EPA standard at 5 ppm. With chlorine all of the waters tested below the EPA standard at 0 ppm, when they were supposed to be greater than 4 ppm. All of the waters had their strengths and weaknesses, so you can't conclude that one of them was necessarily better than the other one. None of these differences is big enough to make a big difference in the way they taste, but it shows that none of them are exactly the same.

7A6 *What you can do to protect your mouth*

Patrick Jones

No abstract available at press time.

7A7 *It's a piece of cake!*

Anna Grace Sullivan

The purpose of this project was to determine if high altitude cake baking directions made a difference in the overall appearance and taste of cake. I hypothesized that if two vanilla cakes were baked, one following high altitude baking directions and the other following normal cake baking directions, then the cake baked following high altitude directions would have a better outcome.

This experiment involved mixing a variety of ingredients in order to get the right kind of cake (high altitude and regular.) Each cake was baked for 36 minutes at a 350 degree temperature. The high altitude cake was placed on the right, and the regular cake was placed on the left. When the cakes were fully cooked, they were cooled, then turned over onto a flat surface. The next day, the cakes were brought to an area for taste testing and sampled for 50 human subjects. Each human subject rated the cake sample on four aspects of taste, texture, moisture, and appearance.

The data collected did not conclusively support the original hypothesis. On average, there was no significant difference between the two cakes in all four measured aspects.

These findings led me to believe that there is no significant difference between cakes baked following high altitude directions and cakes baked following regular baking directions.

7A8 *For the sake of the lake*

Deborah King

The purpose of this project was to see if daphnia could adapt to warmer temperatures compared to the control. I hypothesized that the daphnia's heart rate would increase with the temperature.

The experiment involved heating the water temperature with an aquarium heater. I increased the water temperature a little every day. I would measure the daphnia's heart rate with a microscope every twenty four hours. The daphnia's heart rate was measured in beats per minutes. A total of four trials were performed.

The data collected partially supported the original hypothesis. The hypothesis was supported since the control generally had a lower heart rate, though the test subjects survived longer than the control.

These findings led me to conclude that daphnia have the potential to survive in warmer water for a temporary period of time.

7A9 *Ewww! What's on my shoe?*

Chelsea Smith

The purpose of this project was to discover if bacteria are more predominant on the laces, inside toe, or outside tongue of a worn tennis shoe. I hypothesized that if testing the laces, inside toe, and outside tongue of a worn tennis shoe for bacteria, then the bacteria will be more predominant on the shoelaces.

This experiment involved collecting bacteria from the tennis shoes and letting it grow in the Petri dishes for 2 days in the incubator at 35 degrees Celsius. I counted the number of colonies after a 2 day period to determine if the laces, inside toe, or outside tongue of the shoe contained the most bacteria. The final step was to transfer the bacteria to a Blood Agar Petri dish and a Salt Agar Petri dish and letting it grow for 1 day in the incubator at 35 degrees Celsius to determine the identity of the bacteria.

The data collected did not support the original hypothesis. The data shows that from the 3 pairs of worn tennis

shoes, the laces had on average 19.2 bacteria colonies. The tongues from the same shoes had on average 64.8 colonies, and the inside toe area had on average 237.7 colonies.

These findings lead me to conclude that the laces, outside tongue, and inside toe area of a worn tennis shoe all had bacteria, but the inside toe area had the most.

7A10 *Are dogs mouths really cleaner than humans*

Mack Turner

No abstract available at press time.

7A11 *Monumental mold*

Marcus Witzel

No abstract available at press time.

7A12 *Clean me for reuse!!!*

Ashley Knapp

The purpose of my project is to see if it is safe to reuse a plastic water bottle over a period of time and which cleaning product is the best cleaning agent for reuse. I had two people drink six plastic bottles of water (Aquafina and Dasani brands) each day for three days without cleaning. I took all the bottles to the lab on the fourth day. I put on the lab gear and swabbed and plated them to see if bacteria grew after drinking. Then I soaked the bottles with bleach, antibacterial dish soap and hydrogen peroxide. I then swabbed and plated them to see if the cleaning agents reduced bacteria. I returned to the lab the following day to count the bacteria in the Petri dishes and recorded my data. I took a couple of dishes and gram stained them for extra data. I returned to the lab the next day to count bacteria to see if any more grew and viewed the gram stains under a microscope. Before cleaning the bottles the Aquafina brand had more bacteria growth than the Dasani brand overall. After cleaning the antibacterial dish soap bottles had the most bacteria. The bleach bottles had the least overall but peroxide was very close. Bleach and Hydrogen Peroxide are both good cleaning products for reuse of plastic water bottles.

7A13 *What are you really drinking?*

Catherine Miller

I am trying to find out what is the most sanitary bottle after reusing it over time. I was curious because I always reuse my bottles or let them sit for a day and start using them again, and I was wondering what I was really drinking. The bottles I am using are: Arrowhead, Aquafina, Wal-Mart Brand, and Nestlé. I used these bottles because Arrowhead is a bigger brand, Aquafina is at our school and it is really good water, Nestle because it is a cheap brand that a lot of people buy, and Sam's because it is a store brand at Wal-Mart brand. The propose is to show people what they are really drinking and how much bacteria grows in the water bottles. Some water bottles have more bacteria than others so I wanted to see which one was the best and had the least bacteria colonies. Also, it is to see if when you spend less on water if it is really a deal. My procedure is basically to drink out of all of the bottles and leave a control then swab each one into an agar dish. After I do that I will put it in an incubator and wait for bacteria to grow to find my results.

7A14 *Good news: Chlorine destroys germs; Bad news: Is it healthy to drink?*

Kyung Song

Purpose

Does adding chlorine to water affect the germination of soybeans? Since chlorine is used to put in the water to make it safe for drinking and swimming, I will test it on the growth of soybeans. If chlorine affects the germination of soybeans does it affect the human body?

Procedures

- 1.) Gather all the materials.
- 2.) Label each planter and each water containers the following: Control, 0.625 ml, 1.25 ml, 2.5 ml, 5.0 ml, and 10.0 ml.
- 3.) Pour 60 ml of chemical free playground sand to each planter.
- 4.) Plant three soybean seeds in each planter.
- 5.) Attach the light above the planters, and leave it on all day and night. (144 hrs)
- 6.) Measure 10.0 ml of chlorine and pour it into 10.0 ml water container and mix it with the three liters of purified water. Do the following with: 5.0 ml, 2.5 ml, 1.25 ml, 0.625 ml with their amounts of chlorine.
- 7.) Water each planter 10 ml of water from each of its water containers everyday until control's 90% germinates.

8.) Graph the data.

Data

The 1.25 ml and 10.0 ml amount of chlorine affect the germination of the soybeans the most. Seven beans germinated from nine.

The Control Group and 0.625 ml amounts of chlorine affected germination of soybeans the least. Nine beans germinated from nine.

Conclusion

The higher amounts of chlorine affected the germination of soybeans the most and the lower amounts of chlorine affected the germination of soybeans the least

7A15 *Primer designer*

Kevin Poole

The purpose of this experiment was to show how matches and mismatches of DNA primers affect their attachment to DNA being duplicated during PCR.

To conduct this experiment, I created a model of a DNA strand using magnets. Then I created thirty-two DNA primer models using all the different possibilities of patterns of matches and mismatches. The strength of the bond of the magnets of each primer of the DNA strand was tested using pennies for weight.

The experiment results were measured by counting the number of pennies it took to separate the primer from the DNA strand. Then I calculated the ratio of pennies per match.

The results of the experiment showed that primers with two or more adjacent matches were stronger than primers with spaces between the matches.

The results indicate that my hypothesis should be rejected. The factor was the number of adjacent matches, not the number matches and mismatches.

7A16 *The effects of different materials on bean plants*

Samantha Evenson

The purpose of this project was to observe the effect of different materials on bean plants (water, soil, and water soluble plant food). The reason I chose this project because I have a garden and wanted to learn what material I should start my seeds off in. I tested 3 plants for each material and took the average height of each group of plants each week over a ten-week period and recorded any changes that took place like the mold. My hypothesis was that the seeds growing in plant food soaked cotton balls would do the best because the plant food has vitamins that the water and topsoil do not have. I learned that the bean seeds growing in the water soaked cotton balls grow the best over the 10-week period, which proved my hypothesis wrong. I also learned not to start my plants off in plant food soaked cotton balls because in the 7th week the cotton balls that had the plant food became moldy and the plants began to wither and die. I think that this information will help gardeners, nursery workers, and me.

7A17 *The ants are dying 2 by 2... (why?)*

Justin Young

The purpose of this investigation was to test if certain minerals decreased the lifespan of ants. I hypothesized that most if not all of the minerals would decrease the lifespan of the ants.

The experiment involved creating 6 ant farms with 40 red harvester ants in each of them. One ant farm was the control, and the other five contained 180 grams each of the minerals Carnotite, Cinnabar, Orpiment, Sulfur, and Fluorite. Once the ant farms were set up, I had to count all of the live ants every day and record that information in my journal. Then I had another person verify my count. I did this for 30 days. Every 3 days I gave the ants 1 cu. cm of food and 2 mL of water for the duration of the 30 days. After 30 days, I found the average lifespan percentage decrease of each ant farm I made.

The data collected did support my original hypothesis. The range of all of the trials was greater than the control, which indicates a larger death count. All of the trials had more dead ants than the control after 30 days.

These findings lead me to believe that all of the minerals can affect the lifespan of ants. Generally, the mineral trials decreased the lifespan of the ants greater and faster than the control.

7A18 *How does your garden grow*

Sydney Fowler

The purpose of this investigation was to explore how the growth of plants of the same species differed when placed under different color lights. I hypothesized, if the light's wavelength was decreased, then the ivy houseplants' growth would increase.

The experiment involved placing nine plants under three lights of differing colors: red, blue and full spectrum (an ordinary bulb found in any household lamp). I placed three plants into each of the three cardboard boxes with one of the designated lights aimed into each box. I measured and watered the plants every third day for a period of forty-two days.

The data collected did not support the original hypothesis. Out of the three lights the plants under the full spectrum light grew the most at an average growth of 5.12cm where the plants under the red light grew 4.42cm and the plants under the blue light grew 3.17cm.

These findings lead me to believe that plants grown under a full spectrum light grow the best, and plants under a longer wavelength of light grow better than plants grown under a shorter wavelength of light.

7A19 *South African raptors: A flight from human development?*

Dominic Carrese

No abstract available at press time.

7A20 *Death in a bottle???*

Riley Mast

The purpose of this investigation is to test whether restaurant ketchup bottles contain harmful bacteria. This investigation is important because millions of people dine out at restaurants each day. If people realize that these bottles contain bacteria, they can make smarter, healthier choices when dining out. I hypothesized that if ketchup bottles are tested for bacteria, then all of the samples will contain bacteria, but not harmful bacteria.

The experiment involved creating agar based petri dishes used to collect samples. I then went to five different restaurants and collected three samples from each restaurant. I then grew the bacteria in an incubator for three days. The samples were then observed and rated on a chart from 1 to 10 on bacteria growth. The bacteria was then tested, by applying hydrogen peroxide to see if it bubbled, to conclude if the bacteria was harmful.

The data collected did not support the original hypothesis. The results showed that the silver cup contained the most bacteria, plastic contained a significant amount, and glass contained small amounts. Some petri dishes did contain some harmful bacteria.

These findings led me to believe that all ketchup bottles contain some bacteria. Additional testing could be done with other restaurants and different ketchup dispensers.

7B1 *Planaria grow speeds: Regeneration of planaria exposed to serial dilutions...*

Sydney Matteson

No abstract available at press time.

7B2 *Does milk effect a singer's voice*

William Brown

No abstract available at press time.

7B3 *Sketching emotions*

Bobby Schenk

No abstract available at press time.

7B4 *Couch potato rats*

Molly Merkert

PURPOSE:

The purpose of my project is to answer the following two questions: First, can turning on a television set with its pictures and sounds change how quickly rats can run through the maze? Second, can turning on a television set with its pictures and sounds change how quickly the rats can run through the maze if you turn it on before they run?

PROCEDURE:

Train rats to run maze. Then turn on a television set with its pictures and sounds. Have rats run maze again and record time. Analyze data.

TIME !: First, the rats will be taught to memorize the maze and run through it as quickly as possible. These times

will be recorded as the base times.

TIME 2: I will then apply the Independent Variable (IV) of having the rats in front of a television set with its pictures and sounds while I run the rats through the maze and record their time.

TIME 3: Finally, I will apply the Independent Variable (IV) of having the rats in front of a television set before I run the rats back through the maze. I will then immediately run the rats through the maze without the IV and record their time.

IV: Television, pictures and sound.

MDV: Time it takes to run the maze in three settings: at the end of training (without IV), during rat run with IV, and during rat run with IV only before a rat run.

7B5 *Onion tears!*

Zoe Jennings

My project tests the many wives tales made for how to prevent onion tears. This project will benefit the community greatly. Cutting an onion can be a serious health hazard, because it may leave the people with sensitive eyes in great pain and when you can barely see and you have a knife in hand bad things can happen. My experiment offers a solution to onion tears, a health hazard and they are just plain uncomfortable. For starters tested the remedies to see which ones did and didn't prevent the tears you get when cutting an onion. I did my project like this, first tested the tooth pick, incense, peeling the onion under water, vegetable oil and the outside ventilation. After this I timed the ones that did not prevent tears with a timer. Next I looked at all the data and come to a conclusion that going outside to cut an onion is most effective at removing onion tears in fact you don't even cry! In the end I helped the online people asking for a solution, the produce man at whole foods who believes that an onion is an great thing and needs to be shared with the world to promote health and maybe I gave him the evidence he needs to give confidence to people to go ahead and cut that onion with this remedy you'll will be fine, and most of all I helped my poor aunt in the quest of no onion tears!

7B6 *Run to the music*

Justin Skalberg

No abstract available at press time.

7B7 *Brain, action, and memory*

Rennosuke Hankawa

The project studies after what kind of situation our brains works the best, especially with memory. This is supposed to help figure out if reading before taking a quiz is the best, or if running or jogging is the best, or if something else is better. The project starts with the subjects of the project reading a book. Then, they read a story that I wrote, and answer questions concerning it. Then, they read different stories and answer questions for using the computer, staring at the wall, and running. The number of questions they get correct from the total of four will tell me after which one of these actions and conditions do the brain memorizes the best. The answer that I got was that, surprisingly, the "Staring at the Wall" test was first, and then it was "Running", "Using the Computer", and then, finally, "Reading". The average percentage for correct answers in the "Staring at the Wall" test was about 89.06%. Then, the "Running" test had 87.5%, "Using the Computer" had 79.69%, and the lowest, "Reading", had 54.69% correct. So using a computer and reading is not as good as staring at a wall or running before trying to memorize.

7B8 *The effect of drink color on taste perception*

Kailey Urbaniak

No abstract available at press time.

7B9 *Perfect ten flyaway*

Abby Landwehr

Last summer while I was training my flyaway my coach would always say candle, show your angle. so I got the idea to do my Science Fair project on what the actual angle was to do a flyaway with the correct height so my coach would stop nagging me. I chose the five best people on my team to preform a flyaway while a gymnast's dad who is a professional photographer took pictures of the flyaway so that it looked like it was in slow motion. I would then buy transparent protractors to glue onto my backboard. I would find the average angle and that would be the ideal angle of a "perfect flyaway".

7B10 *Hand hygiene*

Lorien MacEnulty

No abstract available at press time.

7B11 *Flower vs. gun: what will you remember?*

Emma Reece

My Testable Question is: How does a potentially harmful still image affect memory as opposed to non-harmful images? My Hypothesis is: If children are shown potentially harmful still images, then they will remember those better and longer than harmless images. To do this, I created a power point containing 20 images which are: flower, smiley face, gun, cello, knife, seal, snake, shark, cat, books, chalk outline, stuffed bear, Snoopy, tank, twister, lightning, animated bomb, dog, iPod, and sword. I will show this power point to all my test subjects. They will have 5 seconds to view each image, and then they will have one minute to repeat as many as they can remember. The first thing I did was I did research on memory and specifically if others have done research on this subject. Then I came up with a consent form for parents and students. Once I got the permission slips back, I started testing. I compared the results of what they remembered right after seeing the pictures to one week later when I again asked them which images they could remember. The conclusion of my Science Fair project is that memory was affected when kids see potentially harmful images and harmless images. More than twice as many test subjects remembered more potentially harmful images in the initial testing. Roughly 90 percent of my test subjects remembered more of the potentially harmful still images longer than the harmless images. My Hypothesis was supported.

7B12 *Don't wake me up!: The effect of sleep on performance*

Dominic Walker

This project's purpose is to test how different sleep times affect performance. In order to complete this, I will follow a very simple set of procedures. I will let them have a healthy sleep night. That is 10 to 12 hours for me, and 8 to 9 hours for the adult subject. When they wake up, I will allow the subject to do 3 different tests. First of all there is a typing test. I will give them a paragraph and the subject will need to type it. I will record the number of errors plus the amount of times that they hit the backspace button. Second of all, I will give the subject a video game test. It will be played as Dance Dance revolution. I will record the score that they got in my process journal. Third, I will have them do an athletic test. They will run on a track for 4 laps, which is approximately 1 mile, and I will record the time that they got. Then, I will repeat this test, although the subject will get a sleep deprived night. For me that is only 7 to 8 hours of sleep. For the adult subject it is 6 to 7 hours. I do not have very much data yet since I have not finished my project, so any data and conclusion is inapplicable.

7B13 *Color my memory*

Noelle Strait

The purpose of this project was to determine whether bright colors would increase short term memory. I hypothesized that bright colors would increase short term memory.

The experiment involved giving each subject a writing utensil, the number sheet and the survey. The subjects would view the numbers for 20 seconds and then wait 30 seconds after viewing the numbers until they began writing down which numbers they could remember.

The data collected did not support the original hypothesis. I hypothesized that the test group (colored numbers) would do better overall than the controls group (black and white numbers) in accurately recalling the most numbers from the number sheets. When comparing the average scores of all the control and test subjects, I found that the test group's average score was: 41.3 points out of 150 points possible. The control group's average score was: 48.0 points.

These findings lead me to conclude that the colors not only do not increase memory of the numbers but may actually be a distraction, reducing the subject's ability to remember the numbers shown.

7B14 *What stains my teeth?*

Katelynd Trinidad

The purpose of this project was to determine what soft drinks out of coffee, tea, carbonated cola, and grape juice, stain teeth most. I hypothesized that darker colored drinks with high quantities of caffeine (coffee and carbonated cola) would stain the teeth most.

The experiment involved soaking 1 sterilized tooth in 60 milliliters (4 tablespoons) of each drink used. The teeth soaked for 45 minutes each day for 15 days. Once done soaking, the teeth were transferred to a dry cup until the next session of testing. This test had 3 trials in total.

The data collected did support the original hypothesis. During the experiment, darker colored drinks higher amounts

of caffeine stained the teeth more severely. Therefore, carbonated cola and coffee both stained the teeth much more compared to lighter colored drinks such as tea. However, carbonated cola, by far, stained the teeth most over a 15 day period, turning them completely brown.

These findings lead me to conclude that the darker the fluid is and the higher the level of caffeine content, the darker the stains will be on the teeth.

7B15 *The best thing since fresh fruit*

Megan Percy

The purpose of this investigation is to determine if dehydrated fruits have the same nutritional content as fresh fruits. I hypothesized that if fruit is dehydrated, then the glucose will increase, the calories will decrease, and the vitamin C will decrease.

This experiment involved numerous complicated steps. First we had to dehydrate the fruit. Then we had to prepare the fresh fruit. After that we needed to perform the calorimetry test. The fruit didn't ignite; therefore the results were not accurate so we could not use them. The glucose test was easier because all we had to do was stick the test strip into the fruit puree that we had created after the calorimetry test. Finally we did the vitamin C test and it took 3 hours. We needed to make the vitamin C indicator solution, and then precariously drop the same amount of puree into it each time until it turned clear.

The data collected partially supported the original hypothesis. On average the fresh fruit needed 4.1 drops of puree to change the vitamin C indicator to clear; the dehydrated fruit on average needed 3.9 drops to change the vitamin C indicator to clear, which means there is more vitamin C in dehydrated fruit. On average the fresh fruit contained 212.8 milligrams of glucose per deciliter fruit puree; the dehydrated fruit on average had 257.5 milligrams of glucose per deciliter fruit puree.

These findings lead me to believe that dehydrated fruit has a different nutritional content than fresh fruit. More testing is necessary to confirm results.

7B16 *Can you taste the difference?*

Jossilyn Painter

My project's purpose is to see if the difference in sweeteners can change the quality of the product. It is also to see if people can taste the difference between sweeteners. I think that about a majority of the participants will be able to taste the difference between the two sweeteners.

My procedure is first I will have my participants blindly taste a bottle of Coca-Cola. Then they will taste the other bottle. After that, they will answer a few questions and this will take up to eight minutes and at least three minutes.

7B17 *Can you remember?*

Kaitlyn Cameron

The purpose of this investigation was to examine the accuracy of short-term memory, and to see how easily human subjects could be persuaded to think they saw something that was not there. The hypothesis was that attempts at persuading a test group, using a questionnaire containing misleading questions, would cause those subjects to answer incorrectly more often than a control group who was not asked misleading questions.

The experiment involved creating a poster displaying different shapes, colors, and words, which the subjects viewed. Two minutes after studying the display the subjects were handed one of two questionnaires depending on which group (control or test) they were in. After collecting numerous completed questionnaires, each response was scored based upon this scale: 0 = correct answer or not persuaded response; 1 = incorrect answer or persuaded response. Altogether, seventy-eight subjects participated.

The data supported the original hypothesis. There was a clear difference in the results for the persuasive/test group and the non-persuasive/control group. Although most of the control group demonstrated accurate short-term memory by answering the factual questions correctly, most of the test group answered the three persuasive questions (#3, #4, #6) incorrectly. On question #3, 100% of the persuasive/test group was persuaded. On question #4, 82.1% was also persuaded, as well as 71.8% on question #6.

Overall, this experiment shows that many people around junior high age will assume something to be true and can be easily persuaded to remember something that did not exist.

7B18 *What did you say?*

Polina Mareyassich

In my science fair project I will be testing if a cell phone conversation affects reaction time. The purpose of my project is to prove that using a Bluetooth will be more effective in increasing your reaction instead of talking hands-on. My procedure is as follows:

- 1) Come up with a list of 100 questions (50 for each trial)
 - 2) Gather 5 volunteer subjects to take part in the project.
 - 3) Take the first volunteer to a room with no distractions.
 - 4) Take a ruler and place it 12 cm above the subject's hand that is ready to catch it.
 - 5) Drop the ruler.
 - 6) Record where the subject's hand caught the ruler (top of subjects' thumb).
 - 7) Repeat steps 7- 8 ten times (10 trials in all with each subject) with all 5 subjects (50 trials all together).
 - 8) Make sure all data is recorded.
 - 9) Hand the Subject a cell phone.
 - 10) Take a ruler and place it 12 cm above the subject's hand that is ready to catch it.
 - 11) Call the person that will be distracting the subject on the phone (the distracter).
 - 12) Wait for the subject and the distracter to start talking
 - 13) Drop the ruler.
 - 14) Record where the subject's hand caught the ruler (top of subjects' thumb).
 - 15) Repeat steps 9-14 ten (10 trials in all with each subject) with all 5 subjects (50 trials all together).
 - 16) Hand the subject a Bluetooth device. And repeat steps 10-14.
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7B19 *Do you remember? The effect of blueberries on memory*

Kyra Lukens

My project was testing the effects of blueberries on memory to see if blueberries could be given before a giant test or not. My hypothesis was that the blueberries would affect the memory of my subjects by making them remember more words. For my project I chose 6 people, three girls and three boys each being the ages between 12 and 13, to eat ¼ cup of blueberries. When I gave the test I said a list of 10 3 syllable words and then gave my subject 5 seconds to remember the words and then I said go and gave my test subject 20 seconds to repeat as many words as they remembered back to me. The same thing happened for the test with blueberries except for that before the test I gave them ¼ cup of blueberries to eat as slowly or as quickly as he/she would like. For this test I also made sure that my subject did not eat, chew, or drink anything, except water if wanted, before the test so that I would receive accurate results.

7B20 *Burn baby burn*

Matthew Welter

The purpose of the project was to discover if drinking an antacid with a certain beverage decreased the time it took for the antacid to work. The procedure was to grind an antacid tablet into about 120 milliliters of milk, soda, and orange juice and measure how long it took to dissolve and neutralize the solution. Milk did do very well to increase the time it took to neutralize but it turns out that drinking one of these beverages does not enhance the speed the antacid dissolves and neutralizes. Although, this is only true with Tums tablets because antacids work differently based on what they consist of. Drinking milk with an antacid that lasted much longer in the stomach might have a positive effect.

7B21 *Immune system: Warriors of the body*

Luke Wilmeth

Purpose

Is to determine what factors affect the immune system the most. I will determine the effect of diet a (vegetables, fruits, sugars, caffeine, fast food) and lifestyle (sleep and exercise) according to the answers given by my test subjects to determine the affect the immune system the most.

Hypothesis

My hypothesis is that those who eat fresher, dark-colored fruits, and vegetables, and less simple sugars will have a stronger immune system.

Procedure

1. I have researched the way in which our immune system works. I have researched government recommendations for healthy lifestyle and dietary habits, as well as studies which have been performed on things which affect the immune system. This helped me to form the questions on my survey.

2. I created a cover letter explaining my project, and emailed it out with my survey form to test subjects.
 3. I created an Excel spreadsheet for all of the data that I collected. I assigned each of the test subjects a number, and entered the data into the spreadsheet.
 4. I will then group the data by the number of days of illness experienced by the test
 5. My data is recorded in a word document file which only my mom and I will be able to access.
 6. I will then make my conclusions as to whether any single factors played a role in the overall health of these test subjects. In order to protect the privacy of the test subjects, no personal info will appear on the health survey.
- Data: Still receiving my data.
Conclusion: To be determined.
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7C1 *Camera exposure*

Christine Pracht

For my science fair project, I decided to test the effect of exposure on picture quality. The purpose for this experiment was to discover which exposure creates the best focus throughout a landscape picture. My first objective was to find a landscape with a visible foreground, middle ground, and background. I found and took pictures of a few different landscapes that met my requirements in Garden of the Gods. My father and I would set up the camera on a tripod and adjust the tripod legs to the needed length for the landscape we were taking a picture of. I took two picture with every two apertures until I reached the highest I could using this pattern at each landscape. The results were opposite of what I thought. The higher the aperture was, the more in focus a close foreground was. If the aperture was lower, the nearby foreground was blurry. This conclusion will help me in future photos and hopefully help new photographers of today and tomorrow.

7C2 *Which color light on a foggy night?*

Cassidy Stegner

The purpose of my project is to determine if a certain color of light (wavelengths), makes visibility clearer in the fog. I believe that this is important because it could prevent car wrecks and can help people be safer.

I will test for my project by using the following procedure:

1. Buy color cellophane wrap and rent or borrow a light meter.
 2. Get a jar and remove the label.
 3. Cut different colors of cellophane wrap and fold them into squares.
 4. Fill the jar with water.
 5. Add two teaspoons of milk to the water.
 6. Stir milk and water to form a cloudy liquid.
 7. Put the light meter behind the jar and the flashlight in front of the jar.
 8. Shine the flashlight through the cloudy liquid into the light meter. The light meter will measure the intensity of the light shining through the clouds formed in the liquid.
 9. Put different colors of cellophane wrap film over the flashlight to make different colors of light.
 10. Record the brightness or strength of the different colors of light shining through the liquid.
 11. Repeat 1-10 and do the same for all the colors.
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7C3 *Strings make sound*

Bowen Hardcastle

Project info on [backborad](#)

7C4 *Biomechanics of pitching*

Joseph Simon

No abstract available at press time.

7C5 *Laser intensity*

Trent Warren

The purpose of this experiment was to find out if the color of a laser affects its strength and usefulness. I hypothesized that if various lasers are tested in order to determine their intensity at different ranges, then the red laser will be the color that has the strongest beam.

The experiment involved testing three different color laser pointers (red, green and blue) all with an output of approximately 5 milliwatts and powered with two AAA batteries from the same packaging. The testing was conducted outside at night and each laser was tested at distances of 10m, 25m, and 40m for a total of seven trials.

The data collected supported the original hypothesis. The red laser's area had the least diffusion at all three distances

tested, but the blue and green lasers varied. The data showed that at 10m the green laser diffused the most, but at 25m and 40m, the blue laser had the greatest diffusion. The pattern showed that at closer distances (10m) the blue and green lasers are similar in their diffusion (5425 microns and 5691 microns). As the distances increased, the blue laser's diffusion increased at a rate greater than the green laser.

These findings led me to conclude that when comparing the three laser colors (red, green, and blue); the red laser kept its intensity and diffused the least, making it the laser with the strongest beam.

7C6 *Divide and descend*

Rebecca King

The purpose of this investigation was to determine if several smaller waterfalls create more power than one big waterfall. I hypothesized that if the water fall with one drop is compared to a waterfall with several steps, then the waterfall with the one drop will create more power.

This experiment involved several steps. The first major step was to construct the waterfalls. The next step was to measure and cut the wood and pipes. Next, the pipes were screwed in place. The next major step was to run 3.1 liters through the falls. Finally, the quantitative and qualitative observations were recorded.

The data collected did support the original hypothesis. On the average basis, the water of the 1 step waterfall was more significant by 0.03 watts, an 11% increase. After all five trials, the 1 step waterfall was able to produce the most watts.

These findings lead me to believe that a 1 step waterfall can create more watts than a waterfall with 5 steps.

7C7 *Oxidation o nail*

Nik Mace

The purpose of this investigation was to test if various salts affect the formation of rust on iron nails. I hypothesized that sea salt will increases the rust formation process quickest.

This experiment involved weighing salt and putting it in the baby food jars. I had to do this 95 times. After that I of poured warm distilled water over the salt and stirred it until the salt dissolved. The types of salts were kosher, canning, Epsom, iodized, sea, ice-cream. The control had no salt in the water. The amount of rust per nail was judged by my rust scale 1- yellowish red color of rust 2- reddish orange color of rust 3-yellowish red orange color 4- mostly covered in rust. I had 9 trials of each salt.

The data collected did not conclusively support my hypothesis. On the first in a couple of hours the control had some rust on the nail.

7C8 *Magnetic cars*

Charles Baker

I hypothesized that if the design for a magnet powered car is varied, than a prototype can be built within 80 to 90% of the design criteria.

The experiment involved building a magnetic car using several simple steps. Obtain the materials needed for the experiment: popsicle sticks, magnets etc. Glue and cut the materials following the detailed procedures. If the procedures are followed correctly, then the magnetic car will be successful.

The data collected did support the original hypothesis. The magnetic car accomplished 93% of the design criteria. The hypothesis was that a prototype can be built within 80 to 90% of the design criteria

These findings led me to believe that a magnetic car can be built to hover and propel itself. A Magnetic car can be used in the real world.

7C9 *Solar panel not included*

Maxx Helfer

The Problem I'm trying to solve is always running out of battery power on a remote control car and always having to recharge it. This problem and wanting to be more environmentally sound motivated my greatly throughout this project. I worked towards my problem by using a solar panel to power my car. This sadly did not solve my problem because for some reason my solar panel wouldn't power my car. All it would do is turn the wheels, which doesn't help me. The conclusion that I draw from this is that using a solar panel is not the best way to power a remote control car.

7C10 *Ooooh, you just got burned*

Caitlin Berns

The purpose of this investigation was to discover if the density of wood effects how fast the wood ignites. I hypothesized that if the density of the wood increases that time the necessary to ignite the wood will also increase.

The experiment involved drawing a target on every piece of wood about 1 cm from the top edge and towards the center of the block. I then turned on the torch, lit the gas coming out of the nozzle immediately, and adjusted the flame so that the little blue flame within the bigger orange one was 2 cm tall. I put the tip of the blue flame against the target. Therefore, the nozzle of the torch was approximately 2 cm away from the wood. I held it there for fifteen seconds, after fifteen seconds had passed; I took the torch off of the wood in random intervals to check the wood flame. Three trials were performed of each type of wood.

The data collected did not validly support the original hypothesis. On average, the ignition times had no noticeable order or pattern. For example, the densest wood tested (Hard/Sugar Maple) had the 3rd highest ignition time.

These findings lead me to believe that the density of wood does not effect the time that wood takes to ignite. More testing would be needed to confirm the results.

7C11 *Got purple?*

Audrey Walter

The purpose of this investigation was to determine if the quantity of ozone in an indoor room will change after a plant is placed in the room. I hypothesized that if the plant number in a room is increased, then the ozone level in the same room will decrease.

This experiment involved making schoenbein paper out of filter paper covered in a mixture of distilled water, corn starch, and potassium iodide. I also had to find three rooms, one with no natural light and no one went in, one with natural light that people went in, and one with no natural light that people did go in. The ozone levels in each room were tested with and with out a plant in them for days at a time. Ozone levels were measured on a scale of 0 ' 10, 0-3 being little or no color change, 4 ' 6 being lavender hue, and 7 ' 10 being purple or blue. Each room was tested 5 times with a plant and 4 times with out a plant.

The data collected did conclusively support the hypothesis. The average ozone levels were 0.6, (room 1) 0.4, (room 2) and 0.7 (room 3) after 5 trials in each room. These averages were compared to an over all average ozone level of 1.5 in the control.

These findings led me to conclude that plants do lower ozone levels in indoor rooms.

7C12 *Ready! Aim! Lubricate?*

Nicholas Krause

The purpose of this investigation is to determine if lubricating the barrel of an electric air soft rifle increases the rifle's accuracy. Currently, the most highly reviewed lubricant for air soft rifles is silicon. Second to silicon is the common household lubricant WD-40. If it is proven that lubricants can improve the accuracy of air soft rifles, air soft war participants could use lubricants to improve the accuracy of their air soft rifles.

The experiment involved building a stationary for the gun and building a target and then lining up the target's bull's-eye to the point of impact of the rifle BB. When the gun was lined up with the bulls-eye I fired ten trials of five shots with a dry barrel and no lubricants, while under adult supervision. Then we inserted the lubricant and tested with them the same way.

The data collected did not support the original hypothesis. In fact, the accuracy of the rifle dramatically decreased when lubricants were added. The average point per shot for the dry barrel was 8.3, however when the silicon and the WD-40 were added to the barrel, the average point per shot decreased dramatically to 2.1 and 3.3 respectively.

These findings lead me to believe that lubricating an air soft gun barrel has no potential to increase the accuracy of an air soft rifle. Testing from different distances is necessary to confirm results.

7C13 *Fiery fresh fabrics*

Devon Klingman

No abstract available at press time.

7C14 *The effects of magnetic levitation on friction force*

Emma Frantz

No abstract available at press time.

7C15 *Vitamin capsules!*

Hugo Lara

No abstract available at press time.

7C16 *The hotter the better*

Andrew Jacobsen

The purpose of this project was to find which disposable cups (paper, plastic, Styrofoam) hold heat the longest and are the best choice for hot beverages. I hypothesized that temperature loss in Styrofoam, made out of a thicker material, would be less than in plastic or paper.

I brewed hot coffee and placed in three types of cups (paper, plastic, Styrofoam) with lids on the counter. I placed 400ml of coffee in the cups at a standard temperature. The mean temperature (dependent variable) decreased for all cups but at varying rates. Plastic and paper cups had significantly cooler temperatures closer together than Styrofoam.

The data collected did support my original hypothesis. The Styrofoam cup held heat the longest. Coffee cooled the fastest in plastic then paper, and lastly Styrofoam.

It was concluded that Styrofoam was also the safest disposable cup for hot beverages; since its surface is cooler to the touch it would not cause a distraction to motorist on a busy interstate.

7C17 *Go milk!*

Daniel Jacobsen

The purpose of this project was to find out which types of milk (whole, 2%, 1%, evaporated or powder) spoiled the fastest when kept at room temperature for a number of days. I hypothesized that milk with the highest fat content would be the first to spoil.

Five different kinds of milk samples were placed in equal size containers from the refrigerator. The samples were set on the counter to observe how quickly they spoiled. The spoiling (5-1) ranged from fresh to very sour. I checked the samples about every 6 hours.

The pattern of data showed the types of milk (independent variable) did affect the spoilage rates over time from (1 - 10) days (dependent variable).

The data did in part support the original hypothesis. The mode was somewhat fresh for 1%, somewhat spoiled for 2% and whole was spoiled. This supports my hypothesis which said that milk with higher fat content spoils fastest.

Evaporated milk, however, took 10 days to spoil with its higher fat content and did not support my hypothesis.

These findings lead me to believe that with the exception of evaporated, milk with higher fat content spoils the fastest.

7C18 *In the fog*

Nathan Burgo

No abstract available at press time.

7C19 *Does it matter? Measure the spatter*

Cameron Agostino

My purpose for this project was to determine if the height of a falling object affects the spatter distance of a liquid.

My hypothesis was that the water balloons closer to the ground would spatter farther.

I started this experiment by setting up the ladder and filling up the water balloons. Then I tested each height three times to find the average. After each time I recorded the data. For each height I had to move up more steps on the ladder to change the height.

I had to use water balloons because party balloons are too big.

My mom helped me by timing how long it took the balloons to hit the ground as well as handing me the balloons so I would not forget the step of the ladder I was on.

The key results led me to conclude that the height of 2.23 meters was higher because the average spatter width was 2.9 meters. The 1.34 meters had an average 1.82 meters. The height of 2.05 meters had an average of 1.54 meters.

Conclusion: The data makes sense because the higher the drop the farther the spatter. My hypothesis was completely opposite of my results. From a height of 1.34 meters the average was 1.82 meters. From the height of 2.05 meters the average was 1.54 meters. Then from a height of 2.23 meters the average spatter width was 2.9 meters.

7C20 *Recycling radiation by retrofitting*

Ronny Stearns

The purpose of this project was to determine if re-venting the household dryer heat into the lower level family room will affect the temperature and humidity levels of the house. I hypothesized that if a clothes dryer vent is redirected into a room and the dryer running time is increased, then the temperature and humidity levels will increase compared to if the dryer heat were vented outside.

The experiment involved putting six wet bath towels into the clothes dryer and running the dryer for one hour while measuring the temperature and humidity of the room every ten minutes. Half of the trials were run with the clothes dryer vent blowing outside through the laundry room duct, and the other trials were run with the clothes dryer vent blowing into the room with a hosiery sock on the end of the vent to catch the lint.

The data collected did conclusively support the hypothesis. For all of the trials with the dryer heat vented inside there was an increase in both the room temperature and humidity level. On average, the room temperature increased by 1.34 degrees Celsius (°C), and the humidity level increased by 33.3%.

These findings lead me to believe that redirecting the heat from the dryer vent to inside the room will increase the temperature and humidity level in the room more than traditional venting directed outside. All of the trials showed similar results to confirm these effects.

7C21 *Choose the finer things*

Ryan Van Wagenen

The purpose of this experiment was to manipulate the materials used in sandbags in order to determine which material would better hold back water over a period of time. I hypothesized that if the types of material used in sandbags were manipulated, specifically fine sand, medium sand, or coarse sand, then the material with the smallest open area between each grain of sand would hold back the most amount of water.

The experiment involved placing fine sand, medium sand, and coarse sand into burlap sandbags. I also had to use a cooler large enough to hold the filled sandbags. After filling the sandbags, I placed them individually in the cooler over the spigot. A bucket was placed underneath the spigot to catch the water as it came out. After the sandbags were placed, the spigot was opened, and I poured 6.5L of water into the cooler. Immediately, a stopwatch was started and set for 2 minutes. At 2 minutes the spigot was closed and then measured the water in the bucket using smaller, more accurate measuring cups and recorded the data.

The data collected did, in fact, support the original hypothesis. My experiment showed that the materials that had smaller sand granules, that were easily packed together, held back more water than the materials with bigger granules and bigger openings between each granule.

These findings lead me to believe that the finer the sand, the more water it will hold back.

7C22 *The trickle down effect*

Sara Kurko

This project tested percolation through a constant soil type for three different water sources ' lake water, rain and snow ' to determine if the source of water affects percolation and therefore filling of an underground spring. I hypothesized that rain would percolate more than the other sources of water, because soil would be more porous and less compressed than under a constant, heavy source of water. I created three identical set-ups to represent land with an underground spring. I used equal amounts of water with each set-up: the lake had water standing on the soil; the water was sprinkled on the soil over 2 days for rain; and frozen water shaved then packed onto the soil for snow. I observed the amount of percolation into the three springs daily for five days. After five days, 1 cup of water had percolated through the snow set-up, ½ cup through the lake and 1/8 cup with rain. My hypothesis was proven incorrect: snow had the greatest percolation compared to lake and rain. I concluded that although soil porosity affects amount of percolation, evaporation also plays a role in the process.

7C23 *Making a bio-degradable bullet-proof vest*

Bobby Wilson

This project in itself determined the viability of a bio-degradable bullet-proof vest. My initial idea was to determine the bullet-resistance of multiple liquids and compare them to each other. Then, I got the idea of reinventing the bullet-proof vest. Though, it would have to be different than the modern one (more bio-degradable, cheaper, and lighter). This was the standards in which I wanted to base my vest off of, while still maintaining bullet-resistance.

To reinvent the bullet-proof vest, I heated up Arabic gum with water, then mixed this with granulated dirt. This made a wet, mud-like clay. When dry, it became a solid, hard plate that could replace the sappy-plates in bullet-proof vests. To test the bullet-resistance of this plate, I shot it with a .17 HMR (rifle) from seven yards away. To discover the penetration of the bullet after it went through the plate, I put a phonebook behind the plate when I shot.

The results I came up with after this experiment were astonishing. I made three different thicknesses of plates. The small plate had little effect on the bullet. The medium-size plate actually did slow down the bullet enough that it only made large dimples on the cover of the phonebook. The large plate basically stopped the bullet, leaving very small indentations.

What I learned from these results is that a bio-friendly, bullet-proof vest is a viable idea for the future. If a company were to do more tests and research, the vest could possibly be trusted on soldiers in combat. Another possible idea is if a soldier ran out of sappy plates in the field, he or she could possibly make their own with a small amount of Arabic gum, water from their canteen, dirt, and a small propane stove.

7C24 *Blaze vs. baking soda*

Lauren Wilson

The purpose of this investigation is to discover if adding varying concentrations of NaHCO_3 to paint increases the paint's ability to withstand fire. I hypothesized that if the concentration of NaHCO_3 in the paint is increased, then the ability to withstand fire will increase.

The experiment involved three major steps. First, I made my paint samples and let them dry. Next, I burned the samples over the flame. Finally, I recorded my observations and data in a table.

The data collected did support the original hypothesis. The paint with no NaHCO_3 added to it ignited in an average of 1.7 seconds, whereas the paint with 1 gram of NaHCO_3 in it ignited in an average of 4.2 seconds. This was 2.5 times longer to ignite than the control sample.

These findings lead me to conclude that NaHCO_3 does influence the flame resistance of paint.

7C25 *Paintball madness*

Ian Craig

The purpose of this investigation was to determine if ambient temperature affected the accuracy of a paintball gun. I hypothesized that as ambient temperature decreased the accuracy of the paintball gun would diminish.

This experiment involved placing a paintball gun in a fixed stand aimed at a fixed target. The range did not change, while the positioning of the gun and target remained fixed. I marked the concrete under the stand and target with tape and markers to ensure they did not move during the experiment process. Once the experiment started the gun was never moved, nor were any settings changed on the gun. I tried to shoot on days where the wind was consistently low and therefore had minimal impact on paintball accuracy. The only independent variable was the ambient temperature. Ten shots were fired at five different temperatures; 10°C , 4°C , -1°C , -7°C , and -17°C . After each shot the placement of the shot was recorded, then the target and gun were checked to ensure they had not moved. This involved looking at the marks on the ground and checking the level of the gun to ensure the same aim point.

The data collected supported my original hypothesis. For the most part, as ambient temperature got colder the accuracy of the paintball decreased in a near linear manner. The only exception was in Trial 3 at the -1°C temperature, where the accuracy dropped off greater than the colder, -7°C and -17°C temperatures.

These findings lead me to believe that ambient temperature does affect the accuracy of a paintball gun. More testing is necessary to verify these results at higher ambient temperatures.

7C26 *Frozen in time*

Hannah Fleming

The purpose of this experiment was to determine how different shapes of ice, all having equal volumes, affected the rate the ice cubes melted. I hypothesized that if the surface area of a cube of ice decreased, then the rate the ice melted would decrease.

This experiment involved several steps, starting with labeling each container that would be holding the water as A, B, C, D and E. Secondly, I placed 750 mL of water in each container. The containers were placed in the freezer for 12 hours. The containers were then taken out of the freezer and placed in a room with a temperature of 21°C . Finally, I began timing the melting period. After each container of ice completely melted I recorded the total melting time. This experiment was repeated two more times for all containers.

The data collected did support the original hypothesis. Container C had a surface area of 545.5 cm^2 and had an average melting time of 775 minutes. Container E had a surface area of 934 cm^2 and had an average melting time of 615 minutes.

These findings lead me to believe that the shape of an ice cube with a lower surface area will melt slower than a shape that has a higher surface area. The greater the surface area the more ice will be exposed to the warmer atmosphere; therefore able to melt at a faster rate.

7C27 *Do you hear what I hear*

Tara Martin

The purpose of this project was to test if the temperature of air that sound is traveling in affects the frequency. I hypothesized that if the temperature of air that sound is traveling in increases, then the frequency will increase.

The experiment involved preparing the test room, setting up equipment, and measuring the temperature. After the F note was played, the frequency was recorded on Ishmael software. The F note frequency was recorded at 5o, 10o, 15o, 22.38o, and 25o Celsius and six trials were performed at each temperature.

The data collected did not support the original hypothesis. Every trial at every temperature recorded the same frequency. The lowest frequency range was 328-371 Hz, the middle frequency range was 682-716 Hz, and the highest frequency range was 1028-1058 Hz.

These findings lead me to believe that the temperature of air at 5o, 10o, 15o, 22.38o, and 25oC in which the sound of the F note is traveling in does not affect the frequency.

7C28 *Sound effects*

Brent Frieden

The purpose of this project was to determine whether a change in tone broadcasted from a speaker will require differing voltages if the volume coming from the speaker stayed the same. I hypothesized that if the tone is changed while keeping the volume the same, then the strength of the voltage and current driving the speaker will change also. The experiment involved measuring the voltage and current of the speaker at different frequencies of 440, 660, 880, 1760, 3520, 7040, and 10,000 Hertz (Hz) with the same volume of 70 decibels (dB). The impedance and power were then calculated. The speaker was mounted to a board and the sound meter was attached to a tripod, level with the speaker. Five trials were performed for each frequency.

The data collected did support the original hypothesis. On very high tones (10,000 Hz) and low tones (440 Hz), a higher voltage and power were needed in order to reach a 70 dB sound level. For example, in the anechoic chamber, at 10,000 Hz, the highest tested frequency, it took 697.3 millivolts (mV) to achieve 70 dB, while, at 1760 Hz, a midrange frequency, it took 102.3 mV, and at 440 Hz, the lowest tested frequency, it took 356.7 mV. The power required at these same three frequencies was 31.7 milliwatts (mW), 1.3 mW, and 10.8 mW, clearly higher at high and low frequencies. This basic pattern was the same on all trials, both at home and in the anechoic chamber, although the home data had some strange effects at around 660 Hz, likely due to reflections.

These findings lead me to conclude that certain frequencies use a smaller amount of power and can be used to save power, and that in general, speakers have a range of frequencies in which sound is easily produced.

7C29 *Is the mass or area of toilet paper more important to your bottom line?*

Courtney Sommer

The purpose of this investigation was to find out if the mass of toilet paper better determines its value than area as it is sold by units of area. I hypothesized that if the manufacturers change, then the amount of absorption is more determined by mass than area.

The experiment involved building a dipping tool that would dip the toilet paper samples for the same amount time. I measured and cut the toilet paper samples into consistent areas of 322.8 cm². The samples were then weighed on an analytical balance to determine their mass. Using the dipping tool, the toilet papers were immersed simultaneously for 5 seconds in 100 milliliters of water and then removed simultaneously to control watershed. The remaining water was measured in a 100 milliliter graduated cylinder and subtracted from the starting amount to determine the amount absorbed by each sample. Both mass and absorption data were recorded. I performed ten trials for each of the 14 makes of toilet paper tested.

The data collected did support the original hypothesis. An average mass increase of 8.5 percent from one make of toilet paper to the next generally resulted in an average 9.1 percent increase in the volume of water absorbed while keeping area constant.

These findings lead me to conclude that mass is a better determinate of absorption than area. Mass is a better indicator of value to the consumer than the units of area that are required by the U.S. Department of Weights and Measures. Other factors that affect absorption, such as the density and structure of the paper fibers, could also be tested.

7E1 *Wind turbines*

Brandon Stone

No abstract available at press time.

7E2 *Digitally capturing the scene of the crime*

Karin Smith

The purpose of this investigation was to decide if digital technology could be an inexpensive and accurate way to acquire fingerprints. I hypothesized that if the fingerprint surfaces, glass, metal, wood, and plastic, then the fingerprint will show up the clearest on glass.

The experiment involved putting zinc sulfide and strontium aluminate on the surfaces to make the fingerprint glow. Then, an ultraviolet was used to make the chemicals glow. I put the surfaces under a black, velvet cloth. I took the pictures, uploaded the pictures on the computer, and examined each picture to determine the approximate percentage of clarity of each fingerprint. The fingerprint clarity was determined by a clarity scale: 0- difficult or impossible to observe patterns, 1- some noticeable patterns, 2- more obvious patterns, 3- most or all of patterns effortless to observe. Four trials were performed for each surface.

The data collected did not support the original hypothesis. Glass and wood had the highest average clarity. Clarity of all trials resulted in the highest pattern development as a 1. Glass and wood had pattern development of three 0s and one 1 each.

These findings lead me to conclude that if different chemicals were used, then the fingerprint would have a higher pattern development and would have the potential to increase.

7E3 *It's a drag*

Aaron Overton

The purpose of this investigation was to find out which shape is more aerodynamic I hypothesized that if the shape of the vehicle is changed to a sharper form, then the amount of drag on the vehicle will decrease.

The experiment involved building a wind tunnel and three different shapes. I set up the wind tunnel. I then inserted each different shape for two times, once for the low blower speed and once for the high blower speed. I then recorded the amount of drag after 30 seconds in my journal.

The data collected did support the original hypothesis. When the blower setting was on one the Slope had an average of 46.6 grams of drag compared to the Wedge and Block with averages of 51.6 grams and 88.6 grams of drag. When the blower setting was on two the Slope had an average of 69 grams of drag compared to the Wedge and Block with averages of 71 grams of drag and 139.3 grams of drag.

These findings lead me to believe that if a Slope like object is used, the drag is less.

7E4 *Water or glass: That is the question*

Kristian Carroll

The purpose of this project was to create a lens that has water inside it and produces a more clear and detailed picture. I hypothesized that when water is put inside a lens it would create a more clear and detailed picture.

The experiment involved first making the lenses out of rubber couplings and glass. Second we had to take the pictures with all the different lenses. Third we had to determine the scale on which we measured the clarity. Last when we got the pictures back we had to determine their clarity and detail.

The data collected did not support the original hypothesis. Most of the data collected was in between 0 and 2 which means most of the pictures had very little clarity. There were very few pictures that had a higher clarity than a 2 so good results were not noted.

These findings lead me to believe that a lens with water inside that would improve the clarity and detail if made by a professional. The independent variable (type of lens) did affect the dependent variable (clarity). As the independent variable changed the dependent variable decreased.

7E5 *Noise will be noise*

Libby Churchman

The purpose of this project was to determine which sound barrier design reduces noise the most. I hypothesized that if a box is lined with folded fleece, then it will provide the best sound barrier design.

This experiment involved building three congruent, 5-faced, wooden boxes (25cm by 25cm) that would each have fleece inside arranged differently. In the first box, there were two layers of fleece lining the insides. In the second box, the same amount of fleece was used, but it was folded like an accordion. The third box featured one layer of fleece topped with a layer of fleece strips. Then, a speaker plugged into an Mp3 player was placed under the first box, and a decibel meter was placed directly outside the box. A consistent car sound was played on the Mp3. The sound audible to the decibel meter was recorded. Five trials were performed on each box.

The data did not support the hypothesis. The recorded volumes for the second box were the highest out of all the collected data for each box.

These findings lead me to believe that the sound barrier design in the third box is the most effective because of the

dents in the fleece that capture the sound.

7E6 *Do people actually learn from science fair?*

Brooke Rojewski

The project I am doing will decipher between what is necessary and what is not--the key question--Do people actually learn from Science Fair? Basically, I will be testing people of all ages who have done science fair to see if they have learned from that, then recording the data. I am eager to find my results, to be proven wrong or right...I don't really know. Obviously nothing is on solid ground at the moment, wavering between truth and lies. I believe my hypothesis will become true, although anything can happen.

7E7 *Whatever floats your boat*

Tanner Barrett

The purpose of this investigation is to determine what boat design is most resistant to overturn when hit by a wave. I hypothesized that if flat bottom, vee bottom, round bottom, and multi-hull bottom boats are tested in simulated storm waves, then the multi-hull boat will be the boat least prone to capsize when compared to the other boats. In developing my hypothesis, I determined that the stability of boats are determined by whether their center of gravity is balanced by the hull's center of buoyancy. Based on my research, multi-hull boats are very stable because of their wide stance.

Before testing my hypothesis, I made 4 different boat hulls from fiberglass and glued 8 pennies on the inside of the boat and put a fiberglass cabin on top. I then made a tally sheet and recorded the amount of overturns per minute. The data collected did support my hypothesis. Of all the boat designs, the multi-hulled boat proved to be the most stable, showing an average rate of 1.2 overturns per minute. This design performed 65% better than the round bottom, 78% better than the flat bottom, and 85% better than the vee bottom, which all had rates of 3.4, 5.4, and 8.0 overturns per minute, respectively.

These findings led me to believe that a wider boat is more stable than a narrow boat. The data collected did support this proposed relationship, such that the stability of the boat was demonstrated to be directly proportional to the boat's width.

7E8 *Does size matter – Effects of building size for the wind removal of...*

Ryan Parrish

In Colorado Springs, temperature inversions trap smog below the Troposphere. During these inversions, low velocity air currents are the only way to remove the smog. In a city, the height and size of skyscrapers might block the wind. Over the last ten years the height of the average skyscraper has increased 31 meters. How the building size will affect the wind's ability to remove smog is being tested.

Two different low velocity winds and two different heights of skyscrapers were tested in a wind tunnel with smog introduced at ground level. Three solar cells attached to multi meters, located at three different heights and across from lights, measured the effect of the smog in volts over time. The difference in the volts showed how the size of the building and wind velocity changed the smog level at each of the locations.

The taller skyscrapers affected the wind's ability to remove smog the most and the higher the wind velocity the greater the affect. The smaller skyscrapers did not affect the wind's ability to clear out the smog.

7E9 *Does he need glasses or a smartball*

Taylor Carroll

No abstract available at press time.

7E10 *Wind turbine blade pitch efficiency*

Charlie Malone

The purpose of this investigation was to test which pitch angle works the best for wind turbines and create the most electrical power with the same windspeed constant. I hypothesized that a 20° pitch angle would create the most electrical power.

The experiment involved building a wind turbine and connecting the wind turbine to a lot of wires which connected to two DMM's and one DC-load motor. Then I set the pitch angle of the wind turbine and turned a fan on pointing to the wind turbine and recorded the highest reading in the next 30 seconds. After that I would repeat the procedure but change the pitch angle, the pitch angles were 10°, 20°, 30°, 40°, 50°, 60°, 70°, and 80°.

The data collected did support the original hypothesis. The original hypothesis stated that a 20° should produce the greatest generated power in watts. My data clearly shows that the greatest is generated at the lower pitch angles (20° and 30°) and there is a steep drop in the power beginning at 30° continuing down to 80°. A 20° pitch angle produced

28.44 mW of power (on a fixed electrical load) and a 10° pitch angle produced 26.57 mW, but a 30° pitch only produced 18.45 mW down to a low of 3.58 mW produced at 80° pitch.

These findings lead me to believe that lower pitch angles produce much more pitch angles than higher pitch angles.

7E11 *Can you make water out of thin air?*

Michael Bukowski

The problem that I plan to address with my project is the lack of sources of fresh water around the world. I plan to build a machine that will turn atmospheric air into water. Initially the machine will be built to run on electricity, but can be easily retrofitted to run on a solar wind turbine.

The way I plan to build this machine is to hook up a fan that will draw in air. That fan will direct air into a compressor which will condense and dehumidify it. The byproduct of this process will be condensation which will be collected in a reservoir under the compressor. The water collected in this reservoir will then be pumped into a filter and then dispensed for drinking. I am still in the process of building and refining this machine therefore I have no data at this time.

In conclusion I hope that this machine will be able to be used in areas such as Haiti where fresh water has been hard to find and sustain.

8A1 *Attack of the pH: who fares better Bacillus subtilis or E. coli*

Margaret Theobald

I wanted to know if pH affected bacteria and if so what kind of bacteria did it affect the most. I hypothesized that the bacillus subtilis would be affected most by the acid because my research showed that bacillus subtilis was easier to kill. I treated paper disks with the acid of lime juice and the base of dish soap, placed them on neutral agar plates and the bacteria. Between the E. coli and bacillus subtilis bacteria, E. coli was most affected by the acid and bacillus subtilis was affected by the base. I conclude that my hypothesis was partially correct by the fact that E. coli and not bacillus subtilis was more affected by the acid.

8A2 *Cleaning green*

Josh Layton

This experiment was done to test the effect of green cleaning agents on E. Coli bacteria. My hypothesis was if I apply green cleaning agents to E. coli then it will not kill as much bacteria as bleach. I started by applying the bacteria to the agar plates and treating them with my solutions. Then I sealed the plates and waited 48 hours and measured the width of the bacterial growth. My hypothesis was wrong, all of the solutions worked better than bleach. Bleach killed all the bacteria where it directly hit the plate, but the other solutions killed more because the solutions spread out among the plate. This can be used not only to protect the environment but to protect us from the dangers of bleach as well.

8A3 *Plants and food*

Kristin Starr

The reason for this project was to see if I you should go to the store and buy plant food or make some homemade plant food. This would be useful for farmers to make their crops grow faster and for people with home gardens. For this project it was hypothesized that one or both of the plants with homemade plant food would grow healthier, bigger, and faster than the plant with store bought plant food. First for this project you would gather the items you needed for this project and make the plant food you would let the plants sit in a bag for the first night to hurry up the plant growing out of the seed. Then you would plant the plants, water them, and feed them the plant food. Every three days you water them and every week you would feed them. During this project the plants were about the same but towards the end the plants with homemade plant food were growing so much better than the other plants. They all came out of the seed at the all time, but the plant with store bought plant food did not grow that much while the plant with homemade plant food grew about twice as fast and bigger. In conclusion the plant with homemade plant food grew much faster than the plant with the store bought plant food. My hypothesis was right. You just needed to get the same amount of sunlight and water.

8A4 *Do natural remedies work for stream pollution?*

Dante Carter

The purpose of this experiment is to determine which type of natural remedies, orange peels or algae will help clean up stream water with pollutants like Escherichia Coli, nitrates and phosphates. My hypothesis was that the orange peels added into the stream and sewage water would reduce the Escherichia Coli in the water.

My procedure was to build a “stream” out of plastic buckets, and have a pump making the “stream” flow. I added

sewage amounts and stream amounts of phosphates, nitrates and E coli to the water. I added algae, and took samples of the water after 0, 5, 10 and 15 minutes of the algae being in the water. Then I used test strips to analyze the nitrates in the water, a Hatch Colorimeter to analyze phosphates, and Quanti- Trays using Coli-ert, to measure the E coli present in the water. Then I will do the same thing except using orange peel instead of algae.

My conclusion is that orange peels and algae are not effective at cleaning stream pollution in a fifteen minute time period. I hypothesized that the orange peels would reduce some of the E coli in the stream, but the orange peels didn't help the E coli at all. The orange peels and algae did not help the nitrates, and the phosphates sometimes varied in results, but in the end the remedies did not help the phosphates either.

8A5 *Salty algae*

Nick Gentz

The purpose of my experiment was to see the effect of road salt on algae. If I add road salt to the algae water then it will cause the Dissolved Oxygen levels to go up the more salt I add. I grew some algae in a bucket, after about 2 weeks I measured out water and put it with some of the algae water and put clear lids on them. Then I labeled 3 containers "0", "500", "1000", and "1500". I let them sit for 14 days with constant sun light (some natural some from a sun lamp). Each day I measured the dissolved oxygen levels in the water. I noticed that the algae in all the containers didn't really grow except the one that I didn't add any salt to. So to answer my testable question, road salt has a bad effect on algae water. It lowers the DO level in the water which can suffocate fish and other organisms in the water. I think it kills the algae so it doesn't produce as much oxygen, and if it kills the algae what else dose it kill in the water?

8A6 *Planaria regeneration and electromagnetism*

Alina Lugo

Pulsing electromagnetic fields are being used in therapy with applications including improving mental and physical performance. The purpose of this project was to test the effects of a 6 volt electromagnetic field on the regeneration of planaria. The hypothesis was that if a group was cut before being electromagnetized for 3 days, then those planaria would regenerate slowly.

Twenty were cut before the electromagnetism and twenty were cut afterwards. Ten were put into two control groups (50 planaria altogether). Eight groups were set to be electromagnetized for a certain amount of days: 2, 3, 4 or 5. Each day had three 15 minute periods of electromagnetism. After 20 days, the data showed an average of 6.33 planaria in each petri dish and an average of 4.33 regenerations in each group. Some of the electromagnetized planaria regenerated abnormally. One abnormality that was present in some of the heads was a bump above the tip of the tail it regenerated. Some didn't regenerate to their full length, although most likely they would have grown to their original size with time and food. The control group differed from the others as it showed quicker regeneration (I cut the 2nd control group after all the others) and normal regeneration.

In conclusion, after collecting the observations and data, electromagnetism does not show to have a good effect on planaria regeneration. The hypothesis was proven to be partially wrong, because the group mentioned was perhaps a little slower than average in having their planaria regenerate.

8A7 *Sick plants, well plants – Using plants as biological indicators of...*

Haley Matteson

No abstract available at press time.

8A8 *Cleanest cleaner*

Madison Bautista

The purpose of this project is to test different cleaners. The will be tested by using common household cleaners to clean door knobs around Rampart High School. The doorknobs will be swabbed before the cleaner is applied. After swabbing the doorknob, the doorknob will be cleaned and swabbed again. The dishes with the bacteria form the doorknob will be kept in an incubator and pictures will be taken each day to chart data. The data and conclusion are not available as of now but will be on by March 13th at Science Fair.

8B1 *Canine caterwauling*

Jordan Bushnell

The purpose of my project is to determine whether an ambulance siren is more likely to make canines howl than a fire or police siren. To find out, I will play digital recordings of siren sounds at a uniform volume to see if my dogs react to the sounds. I will observe the dogs' reactions, assign points to each distinguishable reaction (ears pricked up, head tilts, tail wag, standing up, bark, howl) for each dog.

Six trials will be done. At the end of the trials, the points for each sound type will be tallied and a conclusion reached.

8B2 *The diabetic detective*

Sam Pierce

The purpose of my science fair project is to figure out the different effects on Diabetes after certain activities and in different temperatures. If people do activities with more exercise and sit in hotter temperatures, then the blood glucose will drop lower. This was tested on weekends. The same type and amount of food was eaten on testing days. Insulin shots were taken as needed. Blood glucose levels were measured before and after 20 minutes of sitting, bicycling, and sitting in 40 degree and 103 degree hot tub. The difference in blood glucose levels after sitting was 67, after biking was 30, after sitting in 40 degree hot tub: 44, and after sitting in 103 degree hot tub: 46. In every activity, except for sitting in hot temperature, blood sugar dropped. The biggest drop was in the sitting experiment.

8B3 *Is your friend lying?*

Caroline Kinne

The purpose of my Science Fair experiment is to see how often middle school students lie and if they tend to lie more in a group. Hypothesis: If middle school students lie to themselves, then they will lie even more in a group. I think this because middle school age kids are often embarrassed with themselves. Students were given a survey to rank answers from 1-5 individually. They retook the quiz in a group setting, discussing each question. Students were told the survey was to “examine the values of American students”. The results show that students did change their answers when as a group member vs. as an individual. However, no one’s average changes were above one on a scale of one through five. On average, the most inconsistent answer on the question “Have you ever farted and blamed someone?” Despite the fact that questions 23-44 were repeated from 1-22, the responses were different. They changed based on how personally the question was asked.

8B4 *Paranoid*

Madison Dewey

The purpose of my project was to test natural powders - that are supposed to protect against unwanted germs and bacteria and boost your immune system - to see which powder is most effective. For the second part of my project, the intention was to formulate the powders into a hand sanitizer by adding lotion to them.

Basic steps for creating and testing the experiment start by preparing the materials, the fume hood, the adult supervisor, the protective intricacies, and the monitored flame. A significant part in the experiment is swiping the bacteria onto the petri dishes in a criss-cross motion and adding the sensitivity discs (with the powders) onto the labeled petri dishes, without getting anything mixed up. Then seal the petri dishes and place them upside down in the incubator for 42 hours and record the data regularly.

The results led me to conclude that none of the powders had an inhibition zone in which the bacteria were killed. In fact, all of the powders except Reishi, had contaminants that, when put in the new setting ‘ petri dishes ‘ grew their own bacteria on top of the original bacteria. The Reishi instead stained the bacteria surrounding the sensitivity discs. As for the second part of my project, (trying to test if I can make the powders into a hand sanitizer) none of the “hand sanitizers” were effective and the closest thing to a hand sanitizer was the control lotion for Staphylococcus because it had a real inhibition zone.

8B5 *Mouse maze*

Courtney White

The point of this project was to be able to figure out what food the mice will prefer, so as to come up with a snack they will enjoy as a pet and finding the most effective food to be able to catch mice. If mice are given the opportunity to try different foods, then mice will prefer cheese over peanut butter and mixed seeds. To test this experiment, mice will be placed one at a time in the maze with a food source at the end of the maze. The average time it takes each mouse to reach its food source will be calculated to determine which food source is preferred by mice. Peanut butter appeared to be the preferred food source due to the fact that the mice reached that food source quicker than cheese or the natural food.

8B6 *Vibrating mice*

Jack Hamilton

No abstract available at press time.

8B7 *Musical memory*

Taylor Moon

No abstract available at press time.

8B8 *What makes 'em grow?*

Sydney Vrecenar

No abstract available at press time.

8B9 *Natural vs. antibiotics: Which is more effective on the killing of e...*

Hannah McIntyre

The purpose of this project is to educate people about the effects of natural remedies versus the effects of man-made medicines. It was expected that if the natural home remedies were tested against standard antibiotics against the eliminating of E. coli bacteria, then the standard antibiotics would do a better job than the natural remedies because antibiotics were made with one purpose in mind - to kill or inhibit the growth of bacteria. The procedure entailed gathering all the materials, and then culturing 7 nutrient-agar plates with Escherichia coli (strain K12); 3 with the standard antibiotics (amoxicillin, penicillin, tetracycline), 3 with the natural remedies (garlic, apple cider vinegar, red wine), and one control. After the experiment, the dishes were sterilized with a 10% bleach solution and disposed of. The results of this experiment resembled the predictions that were made before the experiment began. The antibiotics did eliminate the bacteria better than the natural remedies, with amoxicillin and tetracycline being the top two killers.

8B10 *Pain killers and planaria – How do they effect the healing process?*

Abigail Negley

My experiment was to find out how three over the counter pain killers, Tylenol, Advil, and Aleve, would affect the healing and regeneration process of Planaria. My hypothesis that the control group would regenerate faster was proven wrong. For the experiment, I performed three serial dilutions, 1: 10,000, 1:100,000, and 1:1,000,000. I then cut my Planaria in half and put three specimens in each jar. I found that Tylenol healed the Planaria the fastest, and made them stronger, the Advil allowed the Planaria to fully regenerate, however they lost function of their mucus membranes and darkened in pigment, the Aleve group died completely, and my Control group regenerated completely. My conclusion was that, I found that my testable question of, what are the effects of over the counter painkillers such as Ibuprofen, Tylenol, and Aleve on the healing process of Planarian, had a different answer for every type of analgesic. My hypothesis that If I put Ibuprofen, Tylenol, and Aleve in different baby food jars in different strengths of ten, then the planarian without an analgesic will heal the fastest was proven wrong. Tylenol made the Planaria regenerate faster, and made them stronger; the control group came right behind.

8B11 *Say cheese!*

Mia Davis

No abstract available at press time.

8B12 *Dirty hands*

Emma Spencer

This experiment was finding out whether hand sanitizer or soap killed more bacteria. It was predicted that hand sanitizer would kill more. Serratia was put into six agar plates. In two of the agar plates four hole punches of paper soaked in soap were placed into each of the two plates. In two more agar plates the same was done but instead of soap the hole punches of paper were soaked into hand sanitizer. In the last two one was left with no paper as the control and the other was also a control but one piece of paper dipped in nothing was placed into it to make sure results were accurate and that there was no bacteria on hole punch or paper that was being used. It ended up there was no bacteria that had an effect on the serratia on the piece of paper that was not soaked in anything. The results ended up being soap had an average zone of inhibition of 2.25 millimeters while hand sanitizer had an average of 2.75 millimeters. The prediction was true and hand sanitizer killed more bacteria then soap.

8B13 *Rainbow recovery*

Cassandra Roten

This project was very difficult to analyze because there was many thins to keep track of. The purpose of this experiment was to find out if colors effect human emotions.This experiment was very important to our society because it involves human emotions and what our world is covered in, colors. Colors are used in our most important things in our world such as construction signs and buildings. For example, in construction sites you often see colors such as orange, yellow, and red. Most people would not ever think of this as an effect in emotion. However, according to my experiment if you were to see the colors red, orange, or yellow you would be more alert or aware of your surroundings. The results of my project showed that colors have a very big impact on our lives and emotion. After the experiment had been finished and I had collected the data, it showed that different colors effect people in different ways. For example, red and black seemed to make the person more uncomfortable and agitated. However, blue and purple made more of a positive affect on the test volunteer such as making them calm and tired. In the end, colors make a big impact on our society as we know it.

8B14 *Health supplements: Truth or spoof*

Ashley Soulvie

My reason for choosing this project is because I wanted to know what different health supplements did to bacteria and if humans could help prevent from getting sick as often. I thought Echinacea would the best because it helps the immune system, then followed by Zinc which would help create more health body tissues then Vitamin A which helps with normal growth, and is important to the skin and eyes. I swabbed the E Coli into the Petri dish, and then put the treated inoculating disks into the bacteria then taped it shut and let it bake for two days. The Echinacea started to grow bacteria of its own, while the Zinc had minimal zone of inhabitation, Vitamin A was the strange one, and the bacteria was spotty.

8B15 *Tylenol rapid release gel cap race*

Ashley Storti

My project's purpose was to see what liquid; water, ginger ale or lemon juice would dissolve a Tylenol Rapid Release gel cap the fastest. My procedure was very basic; gather all of my materials, measure out liquid amounts, drop gel cap into liquid, and time and record data. Repeat the steps a total of three times for each of the three liquids. After looking at my data, I found that the ginger ale had the fastest dissolving time, followed by water, and finally lemon juice being the slowest. In fact, the ginger ale possibly gave me these results because of the carbonation in the drink which caused the pill to move around with the bubbles. Seeing the results from the testing, it proved that my hypothesis was in fact incorrect. I thought that the lemon juice would have the fastest dissolving time due to the acid in the juice. The results could possibly lead me to believe that taking this pill with a carbonated beverage would start the dissolving process faster than taking it with a glass of water or orange juice.

8B16 *It's cold!*

Laura Morrison Pibel

No abstract available at press time.

8B17 *Active sensory deprivation: Learning tool or psuedoscience*

Steven Ortega

My project was the effect of active sensory deprivation on pattern recognition, from which I was attempting to learn if it was indeed correct that sensory deprivation improves brain function. I conducted my tests by giving 20 people informed consent agreements, those who agreed were divided into 2 groups (groups A and B), and having group A take a pattern recognition test (15 questions which they had 5 minutes to complete, and there was no chance to study beforehand), whilst group B listening to white noise out of stereo headphones, with ping-pong ball halves over the eyes, in a comfortable chair for 10 minutes, and then took the test. I found that group B scored 2.7 points higher than group A on average, and group B also had a much more tightly knit group of answers than group A. I then came to the conclusion that while the 2.7 increase, and the smaller pool of answers may be indicative of a slight increase in mental abilities, it was far more likely that the 10 minute active sensory deprivation period made participants far more relaxed, decreasing their animosity towards spontaneous test taking, and that the therapeutic value far out ways the mental one.

8B18 *Running on empty*

Maggie Montoya

The purpose of my project was to find out the effects of exercise on Carbon Dioxide output. I pretty much wanted to ask for participants to rest, run, do jumping jacks, push-ups, and sit-ups for five minutes each then I wanted to test their carbon dioxide output with the CO₂ gas sensor and the LabQuest. I had them each breathe into a gallon sized bag until I got the data I needed which was one breath from 0-4 seconds. I tested 5 boys and 5 girls I didn't see much of a difference between the data I got from the two different genders. It seemed like every person I tested pretty much had the same kind of results, the cardio exercises had a lot more carbon dioxide output than the strengthening exercises. A lot of the data was really high because I didn't set the CO₂ gas sensor to high before I started testing people. My teacher says that messed up the data because I couldn't get the full amount since it wasn't set to high. I think my hypothesis was correct and that gender didn't affect the data very much, if at all. My data was correct and my project went well overall I think.

8B19 *What is the effect of body mass on carbon dioxide output*

Alissa Fisher

The purpose of this project was to establish the effect of body mass on Carbon Dioxide output. The hypothesis was that body mass would have a deciding factor on the amount of Carbon Dioxide molecules that would be exerted. The experiment, at hand, consisted of two main steps. For the first step, a participant would get weighed and measured to then come up with an overall body mass index. While the participant was being weighed and measured the information would be put into a body mass calculator to then tell what that person's body mass index was. After that step two was as followed; the participant would take a deep breath in and breathe out into a plastic bag, which had the CO₂ tester in it, to then tell what that participant's part per million average was. Subsequent to doing the first participant the same action was followed through for twenty- four more participants. Following the end of the experiment the hypothesis was proven incorrect using the data that was collected. It was originally predicted that a person with more body mass would exert more carbon dioxide molecules, but in all sincerity it turned out that only some of the "bigger" people had an effect. Another thing that was found interesting was that the more athletic the person was the more Carbon Dioxide molecules that were exerted. The results from this experiment could be used to open the minds of obese children.

8B20 *Peppermint memory?*

Oscar Billis

No abstract available at press time.

8B21 *Prize or praise*

Alessandra Wallisch

The purpose of this experiment was to find out which form of positive reinforcement, praise or prize, works best in influencing children to complete a task. My hypothesis was that the giving the children a prize as a positive reinforcement would work best on influencing the children to complete a task. The experiment did not have require many steps to complete it. The first step was to divide the children into two groups, and give both groups a test. The next step in completing the experiment was timing each person on how long it took them to complete the test. When all the results were recorded, averaging all the results, was the next step. When all the results were averaged for both groups, praise and prize, the experiment was over. An observation that was found while doing the experiment was that the children reacted better when told that were going to be given a prize. The conclusion was if some children are given prizes, and some children are given praise, than the children given prizes will complete the task faster. As you can see my hypothesis supported my conclusion.

8B22 *Your doorknob has what on it?*

Jennifer Mobley

I found the process of this project fascinating. The experiment was tiresome, and my outcome was disappointing. I was hoping there would be more data, because the project would have been more enjoyable. I believed Hotel A would have had the most bacteria content because of the lack of cleanliness. I also had a problem with the area of the doorknobs I swabbed.

The spot I swabbed would not have been a place a user would have touched. For example, instead of swabbing the handle, I swabbed above the handle. At some hotels, they had different types of doorknobs. In Hotel B, it was a push/pull door, and in Hotel C, it was a handle.

My previous plan for this year's project was to go into the hotel room itself. There I was going to swab the entrance and exit doorknobs of the hotel room and the bathroom doorknobs.

Hotel F was the hardest to obtain samples from. I did not get the samples from the hotel, but a small exterior building owned by the hotel. At Hotel B, the door was propped open resulting in no need to touch the doorknob. My favorite part of this experiment was speaking with the manager at Hotel C. I went to his hotel and he told me I could do my experiment at his hotel. I accepted his offer after an hour of consideration. I really appreciated the generosity of the manager at Hotel C. The experiment was time consuming but enjoyable.

8B23 *Mom I'm sick!*

Taylor Yates

I did my project on the average rate that medications dissolve in gastric acid (or hydrochloric acid) and disperse into your blood stream. I did this project because I wanted to know if taking medicine actually starts working within the time the bottle suggests or if it's all in your head that the medicine is working. My results came out that typically you are believing that the medicine is working so your brain tells your body to feel better because it is all in your head, "I took medicine I should feel better soon" when in reality the medication does not start to work for around another 15 to 20 minutes. This can prove that we do not always have to take medications unless absolutely necessary. The medication if we take too much can actually create a hole in your stomach lining. The only medication that actually was dissolved and distributed into your blood stream was 500 milligrams of Tylenol. Some of the rapid melt in your mouth medications actually did not completely dissolve in your mouth. Some of the 24 hour allergy medications tend to last longer in your system to get the full relief that some may need, but they started working almost an hour to two hours after the recommend time to start working. This goes to show that you cannot always trust what bottles and boxes say.

8B24 *The alligator and the brain*

Matt Southcott

The purpose of my project was to see if people automatically assume that the "larger" number is more. I thought it would be interesting to test this because I knew it was true for me, especially when I was younger, I would always assume that twelve was more than two, even if it was 12 inches and 2 feet. I wanted to see if it was only me or if a lot of people thought this way too.

So for my project I made a questionnaire. The questionnaire consisted of 15 "Which is more?" questions. (4,280 feet or 1 mile) I gave out the questionnaires in 7 classes. 163 people took the questionnaires. 91 of them were male and 72 were female. It wasn't as even as I wanted it. 13 of the males who took the questionnaire didn't finish it. And 18 of the females didn't finish. So I used 78 males and 54 female questionnaires.

After I got all of the questionnaires taken I split them into male and female piles. Then, I marked down how many males and females missed question 1 through question 15. After that, I calculated the percentages of how many males and females missed questions 1 through 15.

I found that my experiment was a failure. After I charted all of my data I saw that the most missed questions were ones where the larger number was actually more. The data showed that they majority of people thought that all of the questions were tricks and only chose the smaller numbers. If my hypothesis was correct, the questions that were missed the least should've been the ones who were missed the most.

8B25 *Our subconscious and its effect*

Marika Schubert

My purpose was to see how much little things could influence our daily life. My hypothesis was that in having a group of people think about something, the thing they thought of would influence their reaction I tried to design an experiment that could test the affect of small things on our subconscious. I decided to create an experiment where I would expose a person to something that invoked something specific. I had one group of people simply look at the Rorschach test I had for them. I had two other groups think about the thing that I was about to show them for thirty seconds. For example, with the inkblot of angels and demons, I had them think of angels or demons. The results from group to group were difficult to gain any meaning from. Because the lack of a pattern directly links to my hypothesis, I had a null hypothesis.

8C1 *The solar aureole & water vapor*

Cleo Reinking

No abstract available at press time.

8C2 *Reducing global warming? The effect of microorganisms on geologic...*

Sophia Schneider

As global climate change becomes more and more of an issue, methods of cutting our carbon dioxide emissions are sought after. One possible solution is a procedure called geologic sequestration. This is a process in which carbon dioxide (CO₂) is injected into underground reservoirs, where it then reacts with the surrounding rock to create a safe, stable mineral.

The purpose of this study was to determine whether microorganisms naturally found in streamwater have an effect on geologic sequestration. It was predicted that the microorganisms would increase the reaction between basalt and CO₂. This would be determined through changes in mass (measured to the ten-thousandth of a gram), pH value, and elemental content (analyzed with an Inductively Coupled Plasma Mass Spectrometer), in addition to observations under a stereoscope.

Eight containers were filled with basalt and carbonated water. Then, streamwater was mixed into four samples; and nutrient broth was added to two of these. These were then placed in an oven at 90°C for either two, four, or six weeks.

(I am still awaiting data from Inductively Coupled Plasma Mass Spectrometer)

8C3 *Drained juice*

Samantha Anderson

The purpose of my project was to find which type of battery had the best overall battery usage. I tested Energizer and Duracell NiMH and alkaline batteries. I hypothesized that the Energizer NiMH batteries would have the best overall battery usage because they were rechargeable and this brand had been around the longest. In order to carry out my project I tested the different kinds of batteries in four flashlights. These are some of the steps I took to conduct my experiment. First, I put the designated batteries into the flashlights. Then, I turned the flashlights on. I frequently checked on the flashlights and when I saw them start to dim, I would watch to see when they turned off completely. After that, I would record the data. Once the flashlights containing the alkaline batteries shut off, they were finished and could not be reused. When all the flashlights turned off, I would place the NiMH batteries into a charger. After the batteries were fully charged I would place them back into the flashlights, and repeat everything again for a total of twenty trials. It turned out that my hypothesis was correct. The Energizer NiMH batteries had the best overall battery usage and lasted 120.5 to 123.65 hours. The Duracell batteries lasted 103.37 to 109.33 hours total during the 20 trials. Out of the alkaline batteries, the Energizers lasted the longest with a time of 5.77 to 6.25 hours. Lastly, the Duracell alkaline batteries lasted 4.95 to 5.77 hours.

8C4 *What's the point?*

Aidan Mike

The purpose of this project was to determine how different angled arrowheads effected velocity, penetration of a target, and movement of a target (force).

Three different angled arrowheads (40, 60, 80) were shot five times each through a chronograph into a target set up to swing upon impact. After the five tests averages were calculated to make sure that everything was constant and to determine the mean. When struck by an arrow the target swung and a little plastic strip secured to the bottom of it moved through a tray of salt, creating a line, measuring target movement. All arrows were shot through a chronograph and their velocity was recorded. This ensured that the arrows maintained somewhat constant velocity, and allowed me to see if there was any difference in velocity between angles of the arrowheads.

My data proved that the 40 degree angle arrowhead had the fastest velocity (average 176.52 FPS), second most target penetration (average 184.2 mm), and the least amount of target movement (average 88 mm). The 60 degree angle arrowhead had the second highest velocity (average 174.7 FPS), the least amount of penetration (average 176.6 mm), and the most amount of target movement (average 97 mm). The 80 degree angle arrowhead had the slowest velocity (average 173.38 FPS), most penetration (average 186.4 mm), and the second most target movement (average 96 mm).

Although there was some questionable data due to testing methods, my tests conclude that generally a more aerodynamic arrowhead will move faster, have greater penetration, and move that target the least. The opposite was true for the less aerodynamic arrowheads.

8C5 *What our oceans are doing when we're not looking*

Manya Jacobson

My project is whether different amounts of iron in a tub of saltwater and phytoplankton affects the amount of carbon dioxide in the air. If I put different amounts of iron in each tub, then the tub with the highest amount of iron will have the least amount of CO₂. For my project I made four different plastic tubs that have the same amounts of water, sea salt, phytoplankton and different amounts of iron. Tub one had no iron, tub two had .5 grams, tub three had 1

gram and tub four I had 2 grams. I test my tubs by using a LabQuest and a CO2 sensor. I put the CO2 sensor in the tub and test the initial reading. The hardest part of my project is making the tubs, because I had to find a way to keep them airtight but also with a hole in them for the sensor. I used sealing tape, and pipe insulation to make it airtight. Then I had to measure my different iron amounts by using a small scale.

8C6 *Oil spoil*

Allison Rose

The purpose of this project was to test which solvent would help the bioremediation of oil on a marine oil spill. If Dawn Dish Soap is used to clean up animals caught in an oil spill, then it will work better than CitraSolve. First, the water, oil, and solvent was measured out, and then combined into the six glass jars. Two jars had Dawn Dish Soap and two jars had CitraSolve, the other two were the control group, without any solvent added. Transparent graph paper was used to measure the approximate volume of the oil. This was used to record the percentage the oil had changed. Within a matter of minutes pouring the three ounces of CitraSolve, there was a reaction in the oil. Some of the oil had started to turn white. The next day, the oil with the CitraSolve had expanded and turned color. The Dawn Dish Soap, however, had barely started its work. CitraSolve proved to be more effective, and the 3ounces of Dawn Dish Soap less effective. These results were very surprising.

8C7 *Tastes so good . . . but is it that bad for us?*

Aubrey Stegner

No abstract available at press time.

8C8 *An ocean of acid: Breaking the chain?*

Kiley Schlortt

The purpose of my experiment was to discover the effect of ocean acidification on the mass of shells. I predicted that if more acidification was added, then the mass of the shells would decrease. To complete this project, I first added 2.7g of shells to each of my 15 beakers. Next, I added differing amounts of carbonated water and salt water in 15mL intervals to have a total of 100mL of liquids in each container. The carbonated water amounts started at 0mL and ended at 60mL. Then, I let the beakers sit for ten days. What I found was that there was little to no change in the mass of the shells. Any change could be attributed to salt clinging to the shells, bringing the mass up, or shell dust lost when being transferred from the beakers to the triple beam balance. This project could be continued by adding more carbon dioxide each day. The carbon dioxide in water is quickly released, however, in the ocean, it is constantly added to the water. The carbon dioxide may have had an immediate result on the shells, but it was not in the water long enough to have an effect large enough to be noticed.

8C9 *Jump*

Isaac Morse

No abstract available at press time.

8C10 *Mudslide*

Mattie Rufenacht

The purpose of my science fair project is to see which kind of plant holds soil together the best. If I get these three types of ground cover, prairie, grass, and wildflower and test erosion on them, then the least amount of dirt will come out of the wildflower pan. I think this because they cover more ground per plant and have lots of roots. This project is important because if you live in an area with lots of weather you should know which plants will hold up best and keep your soil in. Three types of ground cover samples the same size were placed in identical tin pans. The pans were tipped to 22 degrees and 270mL of water was poured at the same rate at the top of the pan. The dirt and water that ran out the holes at the other end of the pan were collected. The water was evaporated in an oven and the remaining dirt was massed. The average amounts of soil eroded are sod: 1.3g, prairie grass: 6.7g, wildflowers: 41g, and bare soil: 271g. The sod held the soil together the best followed by the prairie grass, then the wild flowers, however any of these plants are better than the soil alone.

8C11 *The golf ball test*

Brandon Driscoll

The purpose of this project was to figure out what golf ball is better for my swing. The brand I thought was going to be the best was Titleist. I tested this variable by going to a virtual driving range at Dick's Sporting Goods. I swung at each ball 3 times using a seven iron. Approximately 10 different brands were tested. I found out that a golf ball that is the cheapest is the best for my swing.

8C12 *Underground water flow*

Caitlin Heier

Purpose/Problem

The purpose of my experiment was to calculate the water flow of materials by measuring its out flow of water in one minute.

Procedure/Materials

For my experiment I filled four 2liter bottles with each material (sand, soil, gravel, and clay), then I consistently ran water through the material. Once the out flow of water seemed consistent I began measuring the outflow. After one minute of collecting the outflow of water I measured it to find the flow rate. I repeated the experiment five times to get an average flow rate for each material.

Results

From the information I gathered from my experiment, I was able to identify gravel as the material with the fastest flow rate (most outflow of water in one minute). Then it was followed by sand, soil, and then clay, with clay having the slowest flow rate.

Conclusion

After completing my experiment, I found it to be successful. I had been able to identify gravel as the material with the fastest flow rate. This information is valuable in many applications. It would be useful in construction, for choosing silt for a specific purpose, and for finding what material would be the most appropriate for water runoff or drainage.

8C13 *Breaking bridges*

Adrian Dunavin

I did this project because I enjoy building things and if I want to be an engineer I should start learning now. The project ended up being a little harder than I thought because the towers had to be exactly 17cm. apart for it to work properly and one end held the straw tighter than the other. It was very fun so I wanted to do more and that is when I thought of using two strings to hold it up and I was and I was kind of trying to kind of get more than 100 pennies. I was very happy that my hypothesis was correct because I love to be right. Although I was kind of surprised how much stronger the double suspension bridge was. All in all I loved my project ,was happy with the results, and would for sure do it again.

8C14 *Think before you drink*

Natalie Becar

No abstract available at press time.

8C15 *Fish fry fuel*

David Everhart

This project was started with wanting to make fuel with a framer budget in mind and would not be bad on the equipment. The first idea was to make a batch that could be ran in a tractor but after doing the experiment I found that it would be better if was used in something smaller first.

First you have to heat the oil then poor it into a two liter bottle. After that you take that meth oxide and add it to the bottle which takes the settlements out of the oil and some of the soaps. The next step is to drain the oil off. Then when you have drained the oil you can wash that oil and clear it up. This step is not required but I did it and after the wash I tested it to see if it is ready for use.

The result of the test is that the diesel that was made can be used in an engine. So it was found that if you make diesel by standard procedure then it is possible to make biodiesel that is a substitute for standard diesel. It was also found that if the diesel is made in bulk that it is cheaper than standard diesel but when made in small batches that it is not as cost effective. Biodiesel can be found to be a great alternative fuel for the world.

8C16 *LED's: A bright new future!*

Chelsey Youell

No abstract available at press time.

JF1 ***Don't kiss your ...***

Lauren Dewey and Ellie Sullivan

The purpose of this project was to see if you could get sick from your pet. Many people let their dog lick their face, so we wanted to see if it was safe to let your pet do that. Also people are afraid that when your cat bites you, the bite will get infected. Finally, because people kiss people, is it really safe to do that and not get sick? To test our question we swabbed 10 human mouths, 10 dog mouths, and 10 cat mouths with sterile swabs. We took the swabs and rubbed them onto agar filled (sheep's blood) Petri dishes. In a lab the person in charge put the Petri dishes into an incubator and let the bacteria grow. Three days later we compared the different mammals' bacteria by counting all the bacteria colonies. We found out that cats have the dirtiest mouths, dogs have the second dirtiest, and humans have the cleanest mouths. We know this because on our data tables and graphs, it shows that cats have 10/10 300+ bacteria colonies. The dogs have 7/10, and the humans have 4/10 bacteria colonies that numbered 300 or above. Based on the results of our project, we would recommend you not kiss your pet, and you might want to think twice about kissing another human.

JF2 ***Track star***

Lauren Saultz and Hannah Phillips

For our project, we are going to test track spikes vs. regular running shoes. We are testing which shoes make the people run faster. We will have all ten of the people run a 200 meter dash two times, one with track spikes and one with regular shoes. We are going to time each person and make a chart of the track spikes and regular shoes. Our hypothesis is that the people with track spikes will run faster with spikes. We think that the track spikes will work best because they fit to your foot better, and don't weigh you down or have extra space. We will be testing ten different people, two times each to total twenty tests. We are testing five girls and five boys; they will all be athletic runners. They all are in seventh grade and either twelve or thirteen. We will be timing them and seeing which one works better and we will show how our hypothesis is correct or incorrect. We also do not need very many materials for this project. We will be using track spikes, two timers, ten people, a track, and running shoes. From what we have researched the average time is about thirty seconds for a 200 meter dash. We will see which shoe come out on top.

JF3 ***Groovy genius***

Jasmine Hodosi and Paloma Perea

No abstract available at press time.

JF4 ***Bad bacteria***

Jessica Wahlen and Serena Padilla

No abstract available at press time.

JF5 ***Now you see it ... now you don't: The effects of aging on your blind spots***

Kelly Heiniger and Gabby Bruno

Our science fair project was about the size of people's blind spots. After finding proof that blind spots grow larger as people age, we decided to test if they grew by the same amount. We hypothesized that the blind spot sizes would not increase by the same amount. Our subjects were sorted into five age groups: 5-14, 15-24, 25-34, 35-44, and 45-54. We measured the size of the subjects' blind spots using a simple test on a paper involving a circle and a square. The subjects were asked to cover their left eye, look at the cross, and while moving their head toward the paper, tell us when the circle disappeared and reappeared. Their eye levels at the disappearance and appearance were recorded using centimeters on a ruler. We tested their right eye three times and then averaged the three sets of numbers. The average is the size of their blind spot. We repeated the process, instead asking them to tell us when the cross disappeared and reappeared, the numbers were averaged again. We compared each age group. Our conclusion proved our hypothesis correct. As people aged, their blind spot's size varied. While the size grew, it did not increase by the same amount. The largest jump in the numbers was between the age groups 35-44 and 45-54. No age group had the same numbers. Very few people have the exact same eyesight in both eyes. Optometrists should provide for each eye individually.

JF6 ***Which blue are you***

Laney Bowden and Mariah Cooke

No abstract available at press time.

JF7 *Shaking things up*

Hunter King and Collin King

PROBLEM

The purpose of our science project is to see which structure height and side design holds up best against a simulated earthquake. We wanted to solve this problem because we thought it sounded fun and different from our previous science fair topics. This experiment can help society by determining which height and side design holds up best against an earthquake, which in turn could save peoples lives, and build better earthquake resistant buildings.

HYPOTHESIS

Our hypothesis is that the one story diagonal house will hold up the best against a simulated earthquake. Our hypothesis is based on the fact that taller buildings sway more during earthquakes and diagonal sides add more strength to the structure than horizontal and vertical sides.

MEASUREMENT

We measured this experiment by observing how much shaking occurred per building, and by timing the buildings on how long it took for them to fall off, or if they fell off.

CONCLUSION

This paper showed the reader all the information on earthquake definition, the make-up of earthquakes, earthquake general information, and how to build an earthquake shake table. Of course, there is other information on earthquakes that was not included in this paper, but the information that was, was given to help the reader get an idea what an earthquake is and to simulate one. The author of this paper hopes all the reader's questions were answered, and that the reader learned new information as well.

JF8 *DWD*

Levi Schofield and Luke Dekker

The purpose of this experiment is to determine if being distracted affects a driver's ability to drive safely. We became interested in this project when we were informed of the new law taking effect December 1, 2009. This law prohibited drivers from using their cell phone (in California) while driving. We wondered why California was doing this, or maybe why this was the only state who established this law. The project can raise the awareness of the dangers of distracted driving.

We decided to test this problem by having about fifteen people drive a car in a racing video game. the subjects would drive a vehicle around a set track using a wheel and pedals. The subject would be timed, and the number of errors made would be kept track of (Hitting a wall, etc.) We did our best to eliminate as man distractions as possible (aside from the distractions involved with the tests.) these included things like outside noise, music, and other people talking.

We used an X-box, madcatz steering wheel and pedals, a 30 cm. long chair, and the Midnight club 3 DUB edition video game, to conduct these tests. Our hypothesis was that texting would be the most distracting of simulated distractions. We based this on statistics that we found in the article written by "Insurance Information Institute."

The test results concluded that driving in a video game simulation, a person on average is 1.5 times more likely for a driver under the effects of driver distractions to be involved with or cause a vehicle related accident. But (depending on the severity of the distraction) the dangers can increase up to 2 times more dangerous than driving without the effects of driver distractions. So our hypothesis was proven correct. The tests results concluded that texting is the most dangerous, and should never be attempted while driving for these main reasons. It causes a serious threat to the other drivers on the road as well as the driver himself.

JF9 *Automated terrarium*

Micah Meleski and David Meleski

Many people own lizards, frogs, or other reptiles/amphibians. We do too. The animals that we keep are tropical, so making life possible for them usually is a hassle because they require high humidity levels, and live food.

In Colorado climate, the maintenance is very high for these tropical animals because of low humidity, and low temperature levels. We wanted to find out if we could automate the levels of humidity and temperature in a tank.

We wanted to build a low-maintenance terrarium for two tree frogs; a green tree frog and gray tree frog, and a long-tail lizard. To find if this creation was possible, we attempted to build an automated terrarium. Our design was a mostly self-sustaining environment with a microcomputer that oversaw the climate in a terrarium and alerted us if a malfunction occurred. We then began by building a general structure that would house the animals comfortably. After this we started programming the microcomputer and placing sensors in the terrarium. When this task was finished, we installed lights and several pumps. Before we placed the animals in the tank, we adjusted the sensors and microcomputer. Once this was finished, we placed the animals in their new home.

As this terrarium was completed, we learned that a self-controlling environment was possible, and that a lower maintenance standard was achieved. The general result of this project was successful. However, we were unable to create an automated feeding system because the transportation of the animals' food, crickets into the terrarium automatically would be hard to achieve in the time allotted. We did however succeed with the creation of a water system for plants and animals, as well as an excellent humidity system.

At the end of the creation process, we found that not only could this research be used to make other terrariums, but could be used to make climate-controlled indoor micro atmospheres that require little to no maintenance. The research could also be applied to people trying to simulate a certain tropical species habitat on a larger scale.

SA1 *There is always a bigger fish*

Sylvia Donahoo

No abstract available at press time.

SA2 *Got mutated bacteria?*

Justin Mayo

My project was intended to find mutated bacteria resistant to common anti-bacterial solvent in areas of common human interaction. I hypothesized that there are bacteria such as these easily accessible all around us, and that I could capture and culture some from areas like a keyboard, a door handle, or an Expo marker. I gathered the bacteria from these locations and cultured them in agar-treated petri dishes with spots of anti-bacterial solvent included inside. I included a control and two test petri dishes for each gathering spot. I then transferred the petri dishes to an incubator with hopes that traces of bacteria would culture inside the splotches of solvent. – I have chosen to redo my experimentation and will begin the process of testing shortly. The process will remain the same. I just wish to achieve valid results. I should be able to update and finish my abstract soon.-

SA3 *A study of bacteriostatic agents: Part 2*

Liam Jasperse-Sjolander

A growing problem in the medicine is antimicrobial resistance, and I feel this is due to the use of more complex artificial antimicrobial agents. To fix this problem, I feel that rather than becoming more complex, we should look to natural antibiotics, such as carnivorous plants. In this project, I will be studying how the bacteriostatic properties of the four carnivorous genera of *Darlingtonia*, *Pinguicula*, *Nepenthes*, and *Dionaea* compare to the two man-made solutions of bacteriostatic water and bacteriostatic saline.

First, a bacterial culture of species *L. Acidophilus* must be grown on 28 agar plates, labeled and divided in half with a sharpie, and allowed to grow in an incubator at 35°C. After three days, the colonies should be counted with a colony counter. To do this, each zone, or half agar plate, should be assessed by measuring the percent area in each of four approximate quadrant formed by the colony counter grid.

Next, each of the variables should be applied. Zones 1-8 will have *Pinguicula* applied, 9-16 *Dionaea*, 17-24 *Darlingtonia*, 25-32 *Nepenthes*, 33-40 Bacteriostatic Saline, 41-48 Bacteriostatic Saline, 49-56 will be saved as a control group. The odd numbered zones will be given a swabbing of the given plant juices or man-made solution, while a piece of leaf or drop of solution will be given to the odd numbered zones. Results are to be recorded regularly over a period of 4-8 days in the same matter.

An abstract complete with conclusive results will be included at the fair.

SA4 *Come fly with me: The tracking ability of homing pigeons*

Emily Elkins

For my project this year I am tracking a team of five homing pigeons and testing the question "Do homing pigeons have the instinctive ability to return home to their coop regardless of the practice they have had and, if they are trained to fly home, does this make their flight time more efficient?". I will start out by gathering five Racing Homer Pigeons that are the same age, live in the same location, eat the same food, and are handled the same. Then I will take all five pigeons 20 miles away and let them go and have someone watch the coop for the birds to return, and record how long it takes them to fly back. Before releasing the birds, I will call the person that I have asked to watch for the birds and tell them to start timing when I have released the birds. Then the next day with the same pigeons I will go 5 miles away. Then go 10 miles out the next day, 15 the next day, and then 20 miles again. I will repeat the calling and recording at each distance. This process of increasing the flight distances trains the pigeons and the first 20 mile distance gives the control time. So I will next compare the 1st 20 mile time with the 2nd 20 mile time. This will show if being trained helped the pigeons improve their time and answer my testable question. Right now I am in the process of testing and do not have final results. I will make these available at the fair. I was instructed by my

teacher, Ms. Hampson, that this was sufficient.

SA5 ***Acid Rain Repair***
Molly Turner

No abstract available at press time.

SA6 ***Popcorn mania***
Jon Comiskey

No abstract available at press time.

SA7 ***Lichen it or not?***
Jacob Foreman

No abstract available at press time.

SA8 ***Comparison of external and internal regeneration in earthworms***
Brittany Smith

In this experiment for a Comparison of External and Internal Regeneration in Earthworms, the purpose is to convey if internal re-growth occurs more quickly after severing of the segment, and if re-growth is prior to external regeneration, during or after external re-growth. During the experiment the rates of external regeneration, worms 1-70 were to be severed and recorded under note card observations. The aspects of death, re-growth, and healing were to be taken into account, as well as dates for data collection. Internal regeneration is recorded by the use of a microscope, and or the use of a non-harmful dye given to the worms used to show through the dorsal and ventral arteries, to affiliate the route of blood to organs in the body. Data in the experiment was taken as to longevity of the segments and the condition during an accounted period. Rates of growth such as posterior segments 15-20, survive on average a week compared to the average survival of anterior ends 1-5 as one to no survival. Data is still pending. For the conclusion, the project is not complete yet, and thus no conclusion is yet to be provided.

SA9 ***Is ultraviolet radiation induced zooxanthellae expulsion in coral is...***
Caleb Kruse

Currently, 27% of coral reefs worldwide have been destroyed, and 58% of the reefs that remain are at high risk. One of the major threats that the coral reefs are combating is coral bleaching. Bleaching occurs when a coral expels its symbiotic dinoflagellate zooxanthellae. This is detrimental to the coral, and often results in death because the zooxanthellae provide the coral with up to 90% of its energy. This zooxanthellae expulsion occurs for various reasons, the most common of which are increased water temperatures, and higher levels of ultraviolet radiation. Previous years research has indicated that heat induced expulsion is initiated by the hydroxyl ion, which causes an oxidation process in the coral. Ascorbic acid has been shown to act as an antioxidant in this situation, thus greatly reducing severity of bleaching.

While bleaching caused by heat has been studied, and the biological mechanics are documented, little experimentation on bleaching caused by UV radiation has been conducted. For this reason study will be conducted for three purposes: to quantify the rate of zooxanthellae expulsion in coral exposed to increased UV radiation, to discover whether oxidation is the cause of UV induced bleaching, and to observe whether in UV threatened coral ascorbic acid can reduce zooxanthellae expulsion.

In order to study UV induced bleaching, a novel method of zooxanthellae isolation will be used: Coral will be homogenized, the zooxanthellae will be isolated and counted, and zooxanthellae density will be determined. Comparing these results to the control, coral which is bleached because of increased water temperatures, and UV bleached coral which is supplemented with ascorbic acid, will allow for further knowledge regarding the biomechanics of UV induced bleaching, as well as a possible method for remediation.

SA10 ***Hydroponic growth***
Harley Glenn

The purpose of this experiment is to see how plant growth differs between soil and rockwool bases, when all other factors are equal. It was also preformed to see how well hydroponics actually is when used with simple controls in someone's home. The experiment is an easily obtainable one, that is also easy to preform. The purpose of the experiment was effortless to document and conclude from. Overall the experiment was a good choice as well as the purpose of it.

To repeat this experiment is easy with the following simple steps. First, put 1/4 cup of Rockwool into a container (preferably paper cup) then sow one of the bean pods in the middle of the cup, above this you will place another 1/4

cup of Rockwool. Repeat as many times as needed. Then, do the above step for soil with an equal amount of times repeated. Next, place all the plants in a container that allows them to be under the same conditions (such as: sunlight, temperature, ect.). Finally, monitor and record the plants' growth everyday. Also keep track of when the plants are watered and how much sunlight is given to them daily. Follow the steps carefully and remember that you control the environment.

The data I gathered was for the growth of the plants over a certain amount of time (6 weeks). I also noted the temperature, sunlight, and water given to the plants daily. On top of this I wrote down any occurrences that happened with the plants such as bends or intaglements. The data differed from the plants placement in the box I had kept them in, which was under the light. The data also differed depending on the plants "growing bases". In my first trial two soil plants didn't grow, but in my second trial all of my plants grew. The results for both trials were similar.

In conclusion I found that plants in Rockwool grow more quickly and efficiently by 1.5cm. I also observed that the plants growing in Rockwool seemed to be slightly more green and more stable. While the soil plants were often bending over while the Rockwool plants stood straight up. When the soil plants got a tinit of light brown to them the Rockwool plants stayed freshly green. Overall the Rockwool or hydroponically grown plants grew more resoucefully.

SA11 *Bacteria killing waves*

Derek Linan

No abstract available at press time.

SB1 *Inter-fear-ence: Interruption and its effect on short-term memory*

Tanner Howard

No abstract available at press time.

SB2 *Shut up and drive*

Ellie Hinkle

The purpose of my project is to discover whether talking on a cell phone actually does affect a person's reaction time. In order to test this, I will have each subject take a simple online reaction time test two times: once while he/she only focuses on the test, and once when he/she takes the test while talking on a cell phone. When talking on the cell phone, they will be talking to my father on a phone from another room, who will ask them a series of questions that will force them to think about other things besides the reaction time test. I will record their results and compare the first and second test. I have not done my testing yet, but I will have my results at the fair.

SB3 *Intelligence in our genes*

Rileigh Darby-McClure

The purpose of the experiment I am performing is to determine if human intelligence (measured by an IQ test) is related to factors including genetics and environment. Based on previous research, my hypothesis is that the majority of IQ is based on genetics. One study, described by Dr. Robert Tissot, concerned non-random mating between humans, and explained that married couples tend to have a higher IQ correlation than do siblings. If this is true, then it is possible that genetic makeup (specific to intelligence) could affect socioeconomic status, contrary to the more widely accepted theory that socioeconomic status affects IQ. The result would be an increasing value of IQ dependency on genetic makeup. The way I will perform this experiment is to find families in the Colorado Springs area that have lived here for generations; this is to keep the location constant. I will give them a questionnaire asking for information including the test subject's age, location, IQ (as measured on a PhD certified IQ test,) relation to others taking the test, and annual income. After obtaining the information, I will replace names to ensure anonymity, construct family trees, and present the data in the form of graphs to compare the various factors. A conclusion will be formed upon analysis of the data.

SB4 *The science of taste*

Joshua Dostal

The purpose of the experiment was: Does food taste better if one cannot see, and can one identify the ingredients in a dish just as well as someone who can see? I had eight people (four male, four female) eat five different Progresso brand soups with vision and then blindfolded. While eating each soup the subject would verbally fill out a survey about each soup. Each survey asked on a scale of one to ten how tasteful the soup was, if the soup was salty, sweet, sour, or bitter, and all of the identifiable ingredients in the soup. After doing the experiment I found that out of eight subjects, five soups per subject, the subjects thought the taste of a soup was better blindfolded twenty times. The subjects thought a soup was less tasteful blindfolded eight times, and the taste of the soup was the same blindfolded

twelve times. I also found that the subjects got more of the ingredients either wrong or missed a key ingredient in the soups a total of twenty five times when blindfolded, whereas they got more of the ingredients wrong or missed a key ingredient in the soups only four times when not blindfolded. The subjects got the same amount of ingredients wrong or missed a key ingredient in the soups ten times when both blindfolded and not blindfolded. From these results it is clear that sight has extremely little effect on how food tastes, and identifying ingredients in food.

SB5 *The use of starches in clotting blood*

Abbi Helfer

No abstract available at press time.

SB6 *Equine respiratory health*

Emily Ryan

The project display will show the results of this research.

SB7 *Call of the Wild*

Heather Woolley

This experiment was testing how time spent in a natural environment affect the mood and test scores of students. It was thought that If the student spends more time in a natural environment, then their mood, fatigue, anxiety, and concentration levels as well as test scores will improve because the brain responds favorably to nature in a way that stimulates the release of chemicals reaching a metabolic equilibrium. During a school day six students were taken out of their regular classes, where they were given a mood survey describing anxiety, mood, concentration and fatigue levels along with a simple addition test consisting of 100 problems. The students were firsts asked to fill out the survey and complete as many addition problems as they could in thirty seconds, once at school and three more times in a natural environment. Although there were not enough students to make a final conclusion, one could see that being in a natural environment did improve the student's mood levels and at one point improvement could be seen on the math test. Unfortunately it was a chilly Colorado day out, and by the third math test outside the progress of the students declined due to the participants being cold. All in all, this experiment showed that humans should listen to their "call of the wild" and go outdoors.

SB8 *Testing for bias in a photo lineup*

Maria Wallisch

No abstract available at press time.

SB9 *Blood glucose*

Ryan Kiehl

No abstract available at press time.

SB10 *Lung capacity*

Lisa Tuggle

No abstract available at press time.

SB11 *There is nothing to fear*

Tiana Cerciello

No abstract available at press time.

SB12 *Personality impact on memory*

John Kwon

Purpose: Do shy people, or introvert people, and out-going people, extrovert, have an effect on their recall on either digits or words?

Procedure: Create a survey that will help identify each person's personality as introvert or extrovert. Using 4 memory lists, vocab and numbers, each participant will have 1 minute to memorize as many as he/she can on each list with 30 seconds rest between each and 1 minute limit for recall and write their answers on the sheet provided. The participants will also be asked how confident they are in their answers before submission. The participants will be debriefed after fully completing the both surveys.

Data/Conclusion: In conduction.

SB13 *Proteomic method development for the analysis of tissue transglutaminase's...* Rahul Shankar

Tissue transglutaminase (tTG), the most significant and diverse member of the transglutaminase family, is an enzyme best known for its ability to covalently cross-link proteins. tTG plays an important role in the progression of many diseases, including cancer. However, the mechanism of tTG's role in cancer is unknown. This research develops the tools to investigate the cross-linking activity of tTG, and future research will study the role of tTG-mediated cross-links in the progression of diseases like cancer.

Cross-linking activity in proteins occurs at specific sites, and to analyze cross-linking, these substrate sites must be identified; a three-tiered approach was used to develop the necessary tools. First, small molecules (MEA and CADV) were utilized to identify glutamine sites targeted by transglutaminase for cross-linking. Mercaptoethylamine (MEA) resulted in tTG-modified peptides more readily identifiable by mass spectrometers. Also, over 30 unique glutamine substrate sites on fibronectin were identified in addition to the two previously reported in Transdab Wiki, the tTG cross-linking substrate database. Second, a synthetic peptide, a realistic tTG substrate, was used to cross-link proteins to identify new lysine substrate sites. Four novel lysine cross-linking sites were identified and mapped onto tTG. The third tier consisted of analytical, heuristic methods that identified cross-linked peptides analyzed by tandem mass spectrometry. The methods developed in steps one and two to identify active glutamine and lysine sites were tested using cornified envelope, a sample previously reported to contain a large amount of transglutaminase cross-links. Finally, the method will be applied to study cross-linking in cancerous tissue.

Using this three step approach, improvements were made to the data analysis methods for finding potential cross-linked peptides. The tools proposed should allow for the investigation of transglutaminase-mediated cross-linking's role in cancer progression.

SB14 *Nothing but net* Brandi Irsik

Sports are a big part of people's everyday lives. Even if you don't play, you still tend to watch sports or know somebody that does. Basketball ranks second worldwide for a commonly played and watched sport. For one to play basketball they must be able to shoot a basketball and for that you need to know what the best place to shoot from would be. On a jump shot, there are three of the more common places for one to wind up shooting from. The positions are at chest height, chin height and over the head.

I believe that the best place that somebody could shoot from would tend to be the chin height. This is because they will be able to line up the shot better and sense the proper length the basket is from where they are shooting so they will have the proper depth perception in which they will shoot.

In order to do this experiment, I obtained volunteers that have played basketball before. I had them stand at a given spot on the court and shoot a predetermined number of shots from each height. I chose the center of the free throw line.

The position which was the best was the chest height. If you are on a team or play basketball for competition, this information can be very handy for you and can help you become better at shooting and can help you learn and master the path and the arch of the ball.

SC1 *Bacteria in a sponge* Taylor Bautista

The purpose of this project is to test the amount of bacteria in a sponge depending upon how much one washes the sponge. The will be tested by using the sponges in a common household to do the dishes. The sponges will then be swabbed inside and out with a q-tip and the q-tip will be swabbed into a petri dish with nutrient agar. The dish will be kept in an incubator and pictures will be taken each day to chart data. The data and conclusion are not available as of now but will be on by March 13th at Science Fair.

SC2 *Washed out* Kaitlin Wilmeth

Purpose: The purpose of this experiment is to determine if different laundry detergents cause clothes to fade faster.

Hypothesis: My hypothesis is that the Amway SA8 will cause less fade and Surf will cause the most.

Materials:

- *A washing machine
- *2/3 a yard of fabric
- *Cheer laundry detergent
- * Tide Laundry detergent

*Surf Laundry detergent

*Amway SA8 detergent

Procedure:

1. One type of detergent will be selected and used to wash one measured piece of fabric 20 times.
2. 1/2 of the scoop included in each individual box will be dumped into washer.
3. The washer water will be set on warm/cold water, gentle/slow for spin speed, and extended spin which is the 15 minute wash time.
4. A small load of laundry will be placed in the washer along with the colored fabric.
5. After wash is complete, the fabric will be hung to dry.
6. This process will be repeated 20 times before changing to a different piece of fabric and a different detergent.

Data: Data is still being collected

Conclusion: The conclusion is still to be determined.

SC3 *Pennies: The next stimulus package?*

Jordan Townsend

No abstract available at press time.

SC4 *Nuclear fusion by inertial electrostatic confinement: Increasing efficiency...*

Ethan Hahn

The purpose of this project was to increase the efficiency of a fusor by using an ion gun to increase the plasma density. The fusor is composed of a chamber evacuated by a vacuum pump. Deuterium gas is injected into the chamber and a high negative voltage is applied to a spherical grid suspended in the chamber. This potential creates positive ions of the deuterium gas, which are then accelerated into the negatively charged grid, where they fuse. A control test was run, and this produced neutron levels of 20 microrem. A hot cathode ion gun was run in the chamber and produced 35.1 microrem, then the readings began decreasing and it was shut off. After shutoff, the readings rose to a max of 40.0 microrem. A second test with the hot cathode gun was conducted, and this produced 53.6 microrem only after the gun was shut down. These results indicate that the hot cathode ion gun raised output only after it was shut off because it produced ions, but also a large amount of heat, which increased resistance in the chamber and impeded plasma production. The heat also decreased the concentration of water in the chamber, requiring a higher deuterium pressure and this caused the increased output along with ions produced by the filament. A hot cathode ion gun run at a high temperature, then at a lower one, would produce a stable increase in efficiency because it would decrease water content, but still allow plasma to be formed.

SC5 *Sustained voltage across battery brands and materials*

Eric Olin

This experiment was conducted to assess differences in sustained voltage between batteries of different materials and different brands. Five different AA batteries composed of Lithium, Zinc, Alkaline, or Coppertop (mixed metals) were placed in identical resistive load flashlights. Over a 2hour period, a volt meter was used every 15 minutes to measure voltage. Within the first fifteen minutes of the experiment, all the batteries had a drop in voltage. In the subsequent hour, the Lithium, Alkaline Energizer, and Duracell Coppertop remained generally consistent in voltage. The Rayovacs Zinc battery demonstrated precipitous decreases in voltage, and was unable to keep the flash light "sufficiently" lit at 45 minutes into the experiment. By 90 minutes into the experiment had ceased being able to power the flash light at all. Over the course of the experiment, the Lithium battery had the least decrease in voltage. In conclusion, this experiment demonstrated that battery composition determines performance. The cheaper the battery material the more quickly voltage decreases. Alkaline batteries out performed Zinc. Lithium, the most exotic material, maintained the highest voltage for the duration of the experiment, and based on our data would outlast the batteries comprised of other materials used in this experiment. Future research on how different batteries perform in high drain devices/ high resistive load would be useful. Analysis of replacement costs could be included in another study to distinguish the most economical choice of battery. Future experimentation on the effectiveness of rechargeable batteries over time would have important implications.

SC6 *More than light*

Jasmine Stewart

No abstract available at press time.

SC7 *Improving algae biofuels: The effects of carbon dioxide and nitrogen . . .*

Sara Volz

Worldwide, algae has gained increasing attention as a viable oil source for biofuel, to meet modern energy needs while reducing fossil fuel use. Though attractive for its production potential, as it grows year-round without competing with food crops for land, algae is still not widely feasible for biodiesel yet due to the need for determining ideal conditions to optimize net oil yields. Therefore, this study evaluates the effects of nitrogen limitation in algal growth media and carbon dioxide aeration as an alternative to regular air aeration on the growth and lipid production of the green microalgae *Nannochloropsis oculata*.

It was hypothesized that nitrogen limitation would decrease growth but increase lipid production, and that carbon dioxide aeration would increase both growth and lipid production slightly. Fluorometric analysis of Nile Red stained cells in conjunction with gravimetric analysis of algal mass and hexane-solvent-extracted lipids will be employed to gauge the effects of these variables upon *N. oculata*.

Twelve samples of *N. oculata* were cultured in a homemade photo bioreactor (PBR) for two weeks under the specified growing conditions--CO₂ aeration (CD), nitrogen limitation (N), and control conditions (C). Initial results were inconclusive due to the fact that no algae grew; after further investigation, it was determined that certain growth factors, especially pH and initial seed culture dilution, were having an adverse effect on the cultures, and these aspects were amended. A week of growth into this the second attempt at algae culturing indicates the following general conclusions, though specific results of fluorometric and gravimetric analyses will be posted on the project board. CD trials have died altogether, probably due to lowered pH as a result of carbonic acid formation in the growth media. Further tests regarding and possibly rectifying this effect will be conducted. C and N trials seem on the whole fairly similar; certain N samples are greener than some C samples, and vice versa, but the net effects of nitrogen-limited media on growth are indiscernible visually.

SD1 *Optimizing low energy railgun systems*

Ravi Gaddipati

New designs and elements are introduced into a 12kJ railgun system in order to maximize efficiency. Finite element analysis is used to explore possible changes, such as magnetic field magnitude, and improve factors as described by the Biot-Savart law and railgun force equations. Possibilities explored are slotted rails, augmented rails, plasma armatures, and armature shapes; among other possibilities. Optical sensors, current transformers, B-dot probes, and piezoelectric crystals are used to gather data. Image analysis and target analysis was conducted after test shots to gather more data.

The setup was composed of a custom railgun enclosure of a novel design designed as a research platform, connected to a 400v 156,000µf capacitor bank PFN.

Computer simulations showed that slotted rails have a negative effect on the current rail geometry, and the magnetic augmentation was shown to provide a average of .3 Tesla increase of average bore magnetic field strength with 100,000 Amperes. Plasma armatures, from a theoretical standpoint, show a better chance of higher efficiency due to the quick and maintained contact, hybrid will offer the best of plasma and solid armatures. Average data showed promise of efficiency increase with a U tailed projectile. Average efficiency was recorded to be 2.2% with this projectile geometry. Post shot rail analysis revealed excessive contact bounce. High temperature Conductive Graphite projectiles were later tested, revealing very little rail erosion and enhanced projectile lubrication.

SD2 *Development and evaluation of hydrogen and oxygen rockets*

Courtney Lutton

I have not yet finished my testing, but it will be done and displayed on my board by the time i get to the science fair.

SD3 *Perpetual motion*

Ricky Cranford

Basically, what Im trying to accomplish is an engineering project in which I develop a motor that is powered my magnets and nothing else. The only main complication that I find in the project is that both of the North and South poles are of equal force, meaning they interact a with each other more than I want them to. But, just in general, I set up a test and the motor seemed to run fine by itself until the magnets touched. I think it will be completely functional when I get the entire system stable and constructed properly.

SD4 *Mathematical analysis of chemical equilibria*

David Wise

This project is designed to see if the concentration of reactants and products in a chemical equilibrium can be determined at a given time if the rate laws for the forward and reverse rate laws are known, and the initial concentrations are given. The rate law for the forward reaction shows how quickly reactants are used up, and the rate law for the reverse reaction shows how quickly they are produced. By subtracting the rate of the forward reaction from the rate of the reverse reaction, we can determine the derivative with respect to time of the reactants. Similarly, subtracting the rate of the reverse reaction from that of the forward reaction, we can determine the derivative with respect to time of any of the products. However, the derivatives with respect to time of the reactants and products are in terms of the concentrations of the reactants and products, so we have a differential equation. By making appropriate substitutions, we can write the differential equation in terms of the concentration of only one substance, either a reactant or product. Solving this differential equation will give the concentration of that substance in terms of the time. The constant can be evaluated by using the initial concentrations. Using algebra and more substitutions, the concentrations of the other reactants and products can be written in terms of the time, as desired.

SD5 *Wireless power*

Phani Gaddipati

This project aims to specify certain factors and their effects on a resonantly coupled pair of coils. Frequency, capacitance, and distance are all to be measured, in an effort to get the best possible combination of factors to produce desirable results.

The setup consists of a wood base, about 15 inches long. Two coils consisting of 10 turns are wound on a PVC 3.5" former with 175 strand litz wire. The furthest in edges of the coils are kept exactly 12 inches apart using non-ferrous clamps screwed into the wood. A timer based on the NE555 is used to keep consistent times in measuring, keeping possible overheating to a minimum. A digital function generator is connected to a power MOSFET through the 555 trigger, allowing the power MOSFET to switch the power into the transmission coil at the set frequency. The power supply is a manually rewound transformer, providing 16v AC, full wave rectified to a steady 30v DC. Both coils have terminals for swappable modifier capacitors.

The modifier capacitors are changed to change the resonant frequency in which to measure the voltage, from ground to peak on an oscilloscope. Ten nanofarad capacitors are put in series/parallel configurations to change the capacitance.

At this point of experimentation, I have found that a lower frequency yields a higher voltage. However, I must try and isolate the receiving coil to a means of power measurement, and find any possible harmonic interferences.

SD6 *Closer to where it wasn't: Estimation and tracking using adaptive filtering*

John Parish

I used a computer modeling and simulation approach to build and test two adaptive filters (a Kalman Filter and a Recursive Least-Squares Filter) as well as a non-adaptive three-dimensional g-h Filter. My computer model produced a target for the filters to track. The target had either constant acceleration or varying acceleration trajectories. My filters applied position measurements to estimate the target motion. Using the current target motion estimate, the filters created a prediction for the next target position. Then, I took a position measurement (with measurement error). The filter used only position measurements to update estimates in the target position, velocity and acceleration. The cycle repeated, using incrementally less of the measurement in each update (adaptive), leading to an accurate representation of the target path. Both of my adaptive filters improved upon my non-adaptive design by including acceleration in the target model. At a set time, I calculated an extended batch prediction of the target future position. I tuned my batch predictor by experimenting with the number of measurements I used. I completed the testing process for my Recursive Filter with different amounts of error, and different trajectories. I tested my Kalman Filter by experimenting with different process noise levels. My Kalman Filter performed best because it could keep up with acceleration changes. Simulations experimentally determined the best performing filter.

SD7 *Making waves – Constructing a basic synthesizer*

Jonathan Mobley

The driving inspiration for my science fair project was a love of electronics. One of my favorite hobbies is tinkering with electronics, so this project stood out in particular. In addition, I am especially interested in acoustics and engineering. Building an oscillator seemed like the perfect project for this year's science fair. Since this was an engineering project instead of a science fair project, I did not necessarily have any data to collect. Rather, the drafting and experimenting is the data.

As I made minor adjustments to the circuitry in order to modify the sounds, I made note of these adjustments.

Based on my background knowledge of electronics, as well as my research, I also made slight modifications that I created out of intuition. I had to make changes as I drafted my oscillator in order for it to perform optimally. At some points, the oscillator went silent, and would not perform until I had found what had caused the issue. I encountered several unusual results in my experimentation. At one point, I connected a variable resistor in the place of a standard resistor so that I might manipulate the pitch of the otherwise monotonous oscillator. As my hand approached the variable resistor, the pitch increased dramatically. I realized that the variable resistor was acting in a similar way to the antennae of a Theremin. This fascinated me to no end, and eventually became the main concept behind the controller I created. I thoroughly enjoyed my science experiment this year.

SD8 *The recording machine*

Thomas Prendergast

The purpose of my project was to find the type of wire that held a magnetic audio recording best. However, I did not find what I was looking for because my recording device did not work. I hypothesized that the steel, as opposed to the aluminum or copper, would work the best because it is a ferromagnetic material, which is a material (typically a metal) which holds a magnetic charge better than the paramagnetic or the diamagnetic materials. Also, Steel has the base material iron, which is a very magnetic material, but steel also is harder than iron, which makes it able to hold a magnetic charge better than most metals. For this project I had to build my own Telographone, or wire recorder, which was originally invented by a man named Valdamir Poulsen. For the recorder, I needed to build a read write head, which would transfer the magnetic charge to the wire, and that was hooked up to an output plug on an amplifier. Second, I needed a base for the wire guides, which were made up of two 14 inch diameter lawnmower wheels and a PVC pipe to put tension on the wire. Sadly, the project did not record on any of the three wires because of the problems stated in my analysis. I plan on redoing this project in the next year's science fair.

SD9 *Caution: Urbanization may be hot! 2*

Christopher Krause

No abstract available at press time.

SD10 *Distance a model rocket flies at different angles*

Joshua R. Leonard

The purpose of my experiment was to see at what angle a model rocket would fly the farthest and does the time of flight and distance from launch pad relate to the angle. The data I collected supported my hypothesis but was a little different than I expected. The 60 and 45 degree angles distance were very similar and all of the data was closely clustered. Thus the data supports my original hypothesis and not the null hypothesis.

SF1 *Internal combat with melanoma: Increasing immunogenicity using toll ligand...*

Tonya Pavlenko and Laura Gudvangen

No abstract available at press time.

SF2 *The separate toxicity of various engineered nanoparticles by flow cytometry*

Lorne Muir II and Nathan Weeks

We are still collecting data and will have an abstract by the regional fair

SF3 *Got germs?*

Dylan Mata-Lovato and Andres Watson

We chose this problem to solve because there has been a recent H1N1 scare. We wanted to find out which part of our high school is contaminated with the most germs: handrails, bathroom doors, water fountains, and outside doors. We thought that this would be very important since sicknesses spread rapidly throughout high schools and schools in general. Our results can caution those who want to avoid becoming sick. We will do this by first swabbing each of the areas and grow the germs that are obtained. Then we will disinfect the area and swab it the next day to see how many germs have grown over 24 hours, and then we will disinfect the area one more time and swab it the next day. Then we will let each of the samples grow for one week and then study the samples for our results and conclusion. The results and conclusion will be available the day of the science fair.

SF4 *Magnesium levels in colorado water*

Diana Curti and Katya Saenz

Procedure:

1. Drive to location one along Monument Valley Creek
 2. Record time of collection of sample and record the depth of the water.
 3. Test the temperature of the water in the creek
 4. Measure out one cup of water in a clean container. Label the container with the location.
 5. Dip the pH strip in water and record the results.
 6. Repeat once more in the same location on the opposite side of the creek.
 7. Record observations of the water and conditions of the area.
 8. Repeat for the remaining locations.
-

SF5 *Flour power*

Taylor Moran and Molly Anstett

No abstract available at press time.

SF6 *Got pop?*

Drew MacMillan, Ben Rather, and Jason Schmidt

No abstract available at press time.

SF7 *You best not be a 'P' if your in IB!*

Kate Henjum and Maren Plutt

The purpose of this experiment is to test whether or not the IB Diploma program targets and benefits certain personality types, like NTJ's using the Myers Briggs Personality Test.

First, register online for science fair, so then we can get the permission forms for surveying the IB Seniors. Then give the permission forms to Mr. Kern, and ask him to give them to each student and have them sign it if they are 18 or their parents if they are 17 or younger. Next take the surveys that were made to test the satisfaction of the IB program and give them to periods 4, 5 and 7. Tell the students to put their personality types, based on the Myers Briggs Personality type test they took a few weeks ago, at the top of the test in the space provided. NO NAMES. After they have taken the survey, collect it from them and organize it into folders based on each personality type. Make sure to make observations once the survey has been collected on the data. Lastly start organizing and making observation about all the data.

We need all the IB Seniors Myers Briggs Personality types, permission forms from the science fair website, surveys, folders, and a process journal

After analyzing our data and clearly seeing our results, we have come to the conclusion that from what we can tell from our text, the IB Diploma program does not benefit, or play to the strengths of any Myers Briggs Personality Type. The SFP's and JTN's generally had the same averages within the greatest range of .5 for any given question on the survey. There were no outliers or staggering differences in the data collected.

SF8 *Monster beating heart*

Tiffani Sandoval and Ryan McCarville

No abstract available at press time.

SF9 *Vampire leukemia*

Katie Morrison Pibel and Chrissy Gardner

For our science fair project we had the idea to try to kill off leukemia cells using garlic and onion extract. We got this idea by the theory that onion and garlic clean out the blood system and help keep the immune system healthy. We thought that if this was true then it could help get rid of the malfunctioning white blood cells. We conducted this experiment in a biology lab at UCCS. At UCCS we would treat L1210 cells (mouse leukemia cells) with the onion and garlic extract. We found that the onion did not do anything and the garlic killed almost all the cells. So we retested the garlic with the cells to find the lowest dose that we could use to kill the cells. We found that our hypothesis was incorrect because we thought the onion would have more of an effect then the garlic.

SF10 *To eat or not to eat*
Jessica Hibbert and Ashley Marten
No abstract available at press time.

SF11 *L.A.S.E.R. (Light amplification by stimulated emission of radiation)*
Geordan R. Waldman and Mark Snell
The purpose of the experiment is to try and build a high powered laser out of simple household items such as; batteries, a light source/ laser, and magnifying glasses. We did this by putting the magnifying glasses at varying distances from the laser pointer trying to get it at pinpoint. To get it to pinpoint we are hoping to use the magnifying glass to amplify the light source. By getting it as close to pinpoint as possible we are then going to try lighting a match. (A full abstract will be presented during science fair on the backboard)

SF12 *Temperature effects on chocolate dipped fruit and foods*
Allison Eling and Rose Bunting
No abstract available at press time.

SF13 *Bridge design*
Schuyler Vandersluis and Andrew Johnson
No abstract available at press time.

SF14 *The effects of nutrient deprivation on hydroponically grown plants*
Peter Racioppo, Daewong Kim, and Sarahann Castle
No abstract available at press time.

SF15 *Acne bacteria treatment*
Jason Dandino, Elise Yenne, and Ryan Sade
No abstract available at press time.

SF16 *Silver for cancerous cells*
Rene Gonzalez and JiaWei Ling
No abstract available at press time.

SF17 *Effect of certain images on the human brain*
India Walden and Hailey RoseKrans
No abstract available at press time.

SF18 *Compact fluorescent light bulbs*
Vincent Villarreal and Tessa Stanley
No abstract available at press time.

SF19 *Thermal pollution: The truth of hot water*
Haylee Ehrlich and Julia Briggs
The project display will show the results of this research.
