

**Category:** Earth Science

**Student Name:** Madeleine Andersen

**Team Members (if any):**

**Project Title:** Killer Watts: Calculating the Carbon Cost of Comfort and Convenience

**Abstract:** I am concerned with conserving electricity and protecting the environment. I decided that if people were more aware of how much extra electricity they are using they would be more conserving. I decided to calculate the carbon cost of extra electric comforts like electric blankets, plasma TV's, treadmills, etc. I used a power meter to measure the kilowatt hours (kwh) used by each appliance over a period of time. I made some assumptions about how much each appliance is used. I decided to compare the usage of the 5th grade at one school with the 5th grade at another one. I hypothesized that a 5th grade in Alpine would have a larger carbon footprint than a 5th grade in Lehi. So, I created a survey to distribute to 5th grade students in two different schools. One was Alpine Elementary and the other was Snow Springs Elementary in Lehi. I needed a sample size of about 2 classes of students from each school to make the survey accurate. I distributed the surveys and recorded the results. I added up the total kwh used by each appliance and multiplied it by the number of 5th grade households that used that appliance. I then converted the kwh data into carbon emission data using a conversion table. I compared the final results and found that the carbon footprint for these non-essential electric appliances in 5th grade households at Alpine Elementary is 85% bigger than that of Snow Springs Elementary. My hypothesis was proven correct. None

**Category:** Earth Science

**Student Name:** Madilyne Anderson

**Team Members (if any):**

**Project Title:** Water Tention

**Abstract:** My question is. What is water tention, how can I make metal float, and how can I manipulate water tention. I think adding salt, sugar, soap will make the surface tention stronger. I will be able to get more drops of the solution on the penny than just regular water. I think by changing the temprature will have no affect. So I added equal ammounds of water to equal amounts of salt, sugar and soap. And found that soap gave us the most drops and salt and sugar less drops and made the tention weaker. So on the floating nail it was not able to float with salt and sugar and when the water was heated it droped as well. It floatted better with very cold water 40 deg or lower. There for with salt and sugar created the water tention to weaken and soap it made it stronger.None

**Category:** Earth Science

**Student Name:** Samantha Archer

**Team Members (if any):**

**Project Title:** The Greenhouse Effect on Plants

**Abstract:** The purpose for my experiment was to find out for myself what would happen to a plant if it was put in the greenhouse effect. In my experiment I put 2 plants in 2 bottles. I blew up a balloon and put it over the top of one bottle. Then I measured both plants every week for one month to see which grew better. I thought the plant given the cleaner air would do better but I was wrong. I used tropical plants so the variable plant (the one with the balloon on top) grew better. In fact it grew one inch taller than the control. I realize now what I did wrong. The variable grew better because it was in the environment it needed- a tropical environment for a tropical plant. If I did this experiment again I would use plants native to Utah. Even though my experiment didn't turn out how I thought it would I learned what I did wrong and how not to do it for next time. None

**Category:** Earth Science

**Student Name:** Sophie Baird

**Team Members (if any):**

**Project Title:** Plant Fertilizers

**Abstract:** My mom and I love to garden. We spend a lot of time in the summer fertilizing our garden and flowers around the house. We go through a lot of fertilizer in a year and some are expensive and some are not so expensive. It got me wondering if the more expensive fertilizers worked better. My project focused on the early stages of growth and if a more expensive fertilizer helped plants and flowers grow faster. The question for my science project was: Do more expensive brands of fertilizer help plants grow quicker? My hypothesis was: If I test different priced fertilizers then I think that the more expensive brands will help the plants grow faster. To test my hypothesis I planted four samples of wheat grass, in one I only used water, and the other three I used different priced fertilizers. I watered and fertilized the samples for a week to see which one grew faster. I found that in the early stages of growth the fertilizers didn't really matter, in fact the water only sample sprouted and grew faster. So, I learned in the early stages of growth it doesn't matter how much the fertilizers cost or even if you use fertilizers. After seven days of growth the water-only sample was as healthy and grew faster than any of the fertilizer samples. But in later stages of growth fertilizers can help plants grow longer. None

**Category:** Earth Science

**Student Name:** Yvonne Bass

**Team Members (if any):**

**Project Title:** Articulating Particulates

**Abstract:** Do higher populated areas have more particulate pollution than rural areas? I think rural areas will have less particulate counts. I got 2 sticky slides in 4 areas, left them there for about a week. I then brought them to the microscopy lab at BYU, used the scanning electron microscope (SEM) and took 10 pictures of each slide with the SEM, I then counted the particulates. My backyard had 32.4 particulates per 500 square micrometers, Sheep Creek had 46, Provo had 25, my classroom had 78 particulates. Then I edited my project and used the spectroscope, and identified some of the particulates to see what they were made of. None

**Category:** Earth Science

**Student Name:** Maddie Bench

**Team Members (if any):**

**Project Title:** Watering Wonder

**Abstract:** To find my experiment idea for the science fair this year, I looked on the internet. My question was, can you water houseplants with recycled water? Recycled water is water you've used to wash your hands or the laundry. Technically, it's just the water we use everyday to clean things. It has soap in it. My hypothesis was that if I could use recycled water, then I would be able to reduce the amount of overall water consumption. One reason why I thought that is because, if you had to walk a mile away from your house, just to get a few buckets full of water, you would definitely be more careful with how much water you used. Everyday, at about 5:00 or 6:00 in the evening, I would water my houseplants 30 milliliters from a syringe. There were many controls that stayed the same, but there was only one variable. It was the type of water we used, tap water and recycled water. From my results, I found out that you can water houseplants with recycled water. An interesting thing that I found out from my experiment, was that the tallest plant, was watered with recycled water. Whenever I would check on my plants, I noticed that plants that were watered with recycled water, stayed healthier the longest. Therefore, based on the results from my experiment, I concluded that you can water houseplants with recycled water and that by doing that, you can save money, water and help the environment. None

**Category:** Earth Science

**Student Name:** Adam Boden

**Team Members (if any):**

**Project Title:** Global Warming

**Abstract:** My project question was if CO<sub>2</sub> really does affect the heat on earth. My hypothesis was that the CO<sub>2</sub> would not raise the temperature. I then gathered two canning jars, dry ice ( CO<sub>2</sub>) and plastic cups filled with water and thermometers to measure the temperature and a heat lamp (sun). I would then take the two bottles and would put dry ice in one of the the cups filled with water and then I would watch the temperature every five minutes for two tests and ten minutes in one test. I would record the data in a folder. My results were that the CO<sub>2</sub> in the bottle was in fact raising the temperature. None

**Category:** Earth Science

**Student Name:** Jordan Butler

**Team Members (if any):** Brian Hoschouer

**Project Title:** Best way to desalt seawater

**Abstract:** Our question was the best way to desalt seawater. The hypothesis was that evaporation and boiling would be the best, freezing would do nothing. The way that we did this was we boiled the water first cause it would be fastest, while we boiled it we set the water out to freeze and evaporate. We waited one day for the water to freeze and broke it in to three sections and melted to test. Then we tested the evaporated water after two weeks. We found that you should do the freezing repeatedly. None

**Category:** Earth Science

**Student Name:** Jessica Buxton

**Team Members (if any):** Kenzie Ford

**Project Title:** Need a Muddy Buddy? Use Burlap

**Abstract:** Our project is about erosion. We tested how thick mud needs to be for burlap to prevent erosion. We thought burlap would work better with thicker mud (more dirt). We tested 15 ratios of water and dirt to see how much dirt there has to be for burlap to work well. Our controls were the total weight of mud and the time we let the mud sit on the burlap. Our variable was the amount of dirt and water we used to make the total 400g of mud. We made frames out of cedar wood and burlap. We sifted and weighed native soil and water for each ratio. After soaking the frames in water for 30 minutes, we placed them on top of our collection containers. We stirred the mud in canning jars using a plastic chop stick and poured a different one in every 30 seconds. We let each one sit for 5 minutes. We weighed the container with mud. After cleaning the containers, we weighed them and subtracted to find out how much mud went through the burlap. We did the whole experiment 3 times. We found that if it was 75.00% (300g dirt, 100g water) or more dirt, the burlap completely stopped the mud. If it was less than 12.50% dirt, it let almost all of it through. Our plotted data was almost linear. Our hypothesis was right. Burlap is good erosion control and works better the thicker the mud is. None

**Category:** Earth Science

**Student Name:** Logan Clayson

**Team Members (if any):**

**Project Title:** Water, Water Everywhere, But Not a Drop to Drink

**Abstract:** Will adding a reflector to the solar-powered desalination device increase the output of fresh water? I feel that adding the reflector to the device will double the output of fresh water. The results were interesting. I had 5 different items in the hypothesis and only one proved true. My journal states all of this data in full detail. None

**Category:** Earth Science

**Student Name:** Bryson Colemere

**Team Members (if any):**

**Project Title:** Plant Pigmentation

**Abstract:** Question: Why are plants different shades of green? Hypothesis: Based upon my research and experiments, I expect to find that various plants reflect different shades of the color green because they have different types and levels of pigments to help them absorb different wavelengths of light. Methods/Experiment: Paper chromatography. Step 1-Grind up roughly equal samples of three different colored plant leaves (spinach, iceberg lettuce and cabbage) and distribute them into three glass jars. There should be at least three labeled glass jars for each type of plant (i.e. Iceberg 1 Iceberg 2 and Iceberg 3"). Step 2-Add enough acetone (nail-polish remover) to suspend the ground-up leaves. Step 3- Let the acetone/leaf mixture sit for 24 hours. Step 4- Take a paper strip use the ruler to draw a horizontal straight line 2 cm above the bottom (this is the origin). Step 5- Label what the sample paper strip will contain (in pencil). Step 6-Fill the jar to a depth of 1 cm with the acetone. Step 7-Take one of the capillary tubes (or pipette or eyedropper) and fill with one of the samples. Step 8-Spot the sample in the middle of the origin. Step 9-Place the strip of paper into the solvent chamber. Place a pencil across the top of the glass and tape the chromatography paper to it if the paper is not firm enough to stand on its own. Step 10-Take out the paper strip when the solvent has almost reached the top. Step 11-Mark how far the solvent soaked up the strip/plate with a pencil. Step 12-Trace around the newly-moved spots so that if they

fade you can still use them to collect data. Step 13-Calculate the Rf value for each spot. Step 14-Repeat this experiment for each of the three samples. The paper chromatography showed various levels of migration of the different pigments within the three plants. Using the Rf equation of the distance from the origin line to the sample spot divided by the distance from the origin line to the solvent front I was able to calculate the retention factor of the samples. An analysis of the recorded data showed that the spinach leaves contained a higher level of the green pigment (chlorophyll a) and a lower level of the yellow pigment (chlorophyll b). The cabbage leaves on the other hand contained more yellow pigment and less green pigment. The iceberg lettuce was found to be in the middle of the other two samples with more green pigment than the cabbage but less green pigment than the spinach and more yellow pigment than the spinach but less yellow pigment than the cabbage. Conclusion: Based on my research and experiments I have concluded that the difference in the green shades of plants is due to the varying amounts of chlorophyll a and chlorophyll b in those plants. Different plants have different levels of chlorophyll a and chlorophyll b. Chlorophyll a and chlorophyll b absorb and reflect different wavelengths of light to aid in photosynthesis. The different wavelengths of light that are reflected give plants their green color which we see as visible light. The more chlorophyll a plants have the greener they appear. The more chlorophyll b plants have the more yellow they appear. None

**Category:** Earth Science

**Student Name:** Kiefer Cox

**Team Members (if any):**

**Project Title:** What's In Your Water?

**Abstract:** Question: From what natural water source do we find the Most pollutants? Hypothesis: Natural still water contains more pollutants than natural flowing water. Method: Obtain water pollution testing kits. Go to designated water sources to obtain water samples. Measure all samples out to the same amount. Test each sample for the same types and amounts of pollution. Chart results. Record results. Determine which water source is the most polluted. Graph results. Finish all paperwork. Display and present results. Results: The river water contained the highest pollutants overall. Because it is a natural flowing water source my hypothesis was wrong. None

**Category:** Earth Science

**Student Name:** Brandon Cui

**Team Members (if any):**

**Project Title:** Oil Spill Clean Up

**Abstract:** My projects question is will the polypropylene pads clean up the oil and if the detergent will have a negative affect upon the absorption rate of the polypropylene pads. This is due to the long chain links of the polypropylene pads and the chemical structure is similar to the oils chemical structure. My hypothesis is that the polypropylene pads will absorb the oil, the detergent will have a negative affect upon the absorption rate on the polypropylene pads, and my third hypothesis is that the Tide detergent will have the largest affect, then the Joy, and finally the Ajax detergent. I did this project by adding 500mL of water and 100mL of oil to a container of 1L. Following this step I used a blender and stirred it for 30 sec. After this I added the polypropylene pads pre-weighed, numbered, and cut into 16x18cm into the mixture. I let the pads set in the mixture for 5 minutes then drip for 5min in a container. Repeating this step but after stirring the mixture adding 5, 10, or 20mL of detergent to the mixture then stirred for 30 sec. I conducted my research by using the search engine Google, Wikipedia, and Yahoo.None

**Category:** Earth Science

**Student Name:** Hunter Dunkley

**Team Members (if any):**

**Project Title:** Is Hobble Creek cleaner upstream or downstream from Springville

**Abstract:** I wondered if the water is cleaner upstream or downstream from Springville. I thought it would be cleaner upstream. I went up the canyon and did kick samples and counted the bugs that I found and then went past Springville and did the same sampling. I found fewer bugs downstream and concluded after research that the water is cleaner upstream. None

**Category:** Earth Science

**Student Name:** Sarah Farnsworth

**Team Members (if any):**

**Project Title:** Radical Radishes

**Abstract:** My question was, "What type of lighting is best for plants?" This project was meaningful because our family grows a garden each summer. I wanted to know the best area to start vegetable plants indoors that would eventually be transplanted outside. My hypothesis was that if I grow the same radish seeds in four different areas (direct sunlight indirect sunlight total darkness and fluorescent lamplight) the plants in the direct sunlight area would be the healthiest. I ran this experiment two times. In each experiment I let the seeds grow for 20 days keeping them moist. After 20 days I evaluated the health of the radish plants. I evaluated each plant's color sturdiness and root quality giving separate scores for each plant in each category. I averaged the scores for each experiment and then averaged the scores from both experiments into a final total. None

**Category:** Earth Science

**Student Name:** Michelle Finch

**Team Members (if any):** Samuel Finch

**Project Title:** Air That 'Soots' Utah Valley Temperature inversion

**Abstract:** Air That 'Soots' Utah Valley: A Working Model of a Temperature Inversion This study investigates if it is possible to create a working model of a temperature inversion for the purpose of demonstrating an inversion's effect on pollution. 6 trials were conducted under six conditions. Each trial was an attempt at improving the Temperature Inversion model. The results reveal that it is possible to create a working model of a temperature inversion that shows a temperature inversion keeps pollution in the valley. The investigators hypothesized that it is possible to make a working model of a temperature inversion was correct. By placing a heat source at the top of a box and a cold source at the bottom of a box a temperature inversion is created within the box. When smoke is placed in the box the heat at the top forces the smoke to the bottom. None

**Category:** Earth Science

**Student Name:** Samuel Finch

**Team Members (if any):** Michelle Finch

**Project Title:** Air That 'Soots' Utah Valley: A Working Model of a Temperature Inversion

**Abstract:** Air That 'Soots' Utah Valley: A Working Model of a Temperature Inversion This study investigates if it is possible to create a working model of a temperature inversion for the purpose of demonstrating an inversion's effect on pollution. 6 trials were conducted under six conditions. Each trial was an attempt at improving the Temperature Inversion model. The results reveal that it is possible to create a working model of a temperature inversion that shows a temperature inversion keeps pollution in the valley. The investigators hypothesized that it is possible to make a working model of a temperature inversion was correct. By placing a heat source at the top of a box and a cold source at the bottom of a box a temperature inversion is created within the box. When smoke is placed in the box the heat at the top forces the smoke to the bottom. None

**Category:** Earth Science

**Student Name:** Kenzie Ford

**Team Members (if any):** Jessica Buxton

**Project Title:** Need a muddy buddy? Use Burlap

**Abstract:** Our project is about erosion. We tested how thick mud needs to be for burlap to prevent erosion. We thought burlap would work better with thicker mud (more dirt). We tested 15 ratios of water and dirt to see how much dirt there has to be for burlap to work well. Our controls were the total weight of mud and the time we let the mud sit on the burlap. Our variable was the amount of dirt and water we used to make the total 400g of mud. We made frames out of cedar wood and burlap. We sifted and weighed native soil and water for each ratio. After soaking the frames in water for 30 minutes, we placed them on top of our collection containers. We stirred the mud in canning jars using a plastic chop stick and poured a different one in every 30 seconds. We let each one sit for 5 minutes. We weighed the container with mud. After cleaning the containers, we weighed them and subtracted to find out how much mud went through the burlap. We did the whole experiment 3 times. We found that if it was 75.00% (300g dirt, 100g water) or more dirt, the burlap completely stopped the mud. If it was less than 12.50% dirt, it let almost all of it through. Our plotted data was almost linear. Our hypothesis was right. Burlap is good erosion control and works better the thicker the mud is. None

**Category:** Earth Science

**Student Name:** Wayson Foy

**Team Members (if any):**

**Project Title:** Banana's and the ripening process

**Abstract:** Question: How does heat and light effect the ripening of bananas. Hypothesis: The bananas will age faster exposed to heat and light. The opposite will happen when the bananas are exposed to darkness and are chilled. Methods: I purchased 11 slightly green bananas. I labeled them 1-11, then placed them throughout the house and took pictures of each banana in its new environment. Results: I gathered the bananas and took pictures of the ending results. I learned that bananas age very quickly if they are set in direct heat and light. Banana #2 placed in front of the heater, and banana #10 cooked in the microwave are black and very moldy and mushy. Banana #4 placed on the kitchen table and banana #5 set on the kitchen counter were also black and mushy. Bananas #6,#7,#9, were all placed in bags. They were all set side by side on the kitchen floor, so they had the same heat source. Banana #6 was in a brown bag with apples, and banana #7 was alone in a brown bag. Both were very brown, with a little yellow remaining. Both were very soft to the touch. Bananas #1,#8,#11, were all placed in cold temps. Banana #1 placed in the fridge is greenish brown, but firm to the touch and edible. Banana #8 that was in the freezer is dark yellow and frozen. After it thawed, it turned black and became mushy. Banana #11 that hung from the roof froze and thawed many times throughout the experiment. Therefore it turned black and was very mushy with liquid seeping out of the peel. None

**Category:** Earth Science

**Student Name:** Mikaylee Gray

**Team Members (if any):**

**Project Title:** Green Clean

**Abstract:** Question: Will a natural stain remover remove a stain as effectively as a chemical? Hypotheses: Yes, I think that the natural lemon juice and salt will work best. Method: First, I applied a small grape juice stain to each of the white, cotton handkerchiefs. Next I flushed all 3 handkerchiefs in cold water. Then I applied Spray N' Wash to the first handkerchief. Then I applied lemon juice and salt to the second handkerchief. Next I placed the white vinegar on the final handkerchief stain. Then I hand washed them with mild, environmentally friendly detergent. I allowed them to air dry. Then I checked the results. Results: It turned out that the lemon juice and salt left a slight yellow residue, but the white vinegar took out the stain as effectively as the chemical remover did. My hypothesis was half correct. A natural stain remover did take out the stain, but it was not lemon juice and salt. None

**Category:** Earth Science

**Student Name:** Katelynn Hales

**Team Members (if any):**

**Project Title:** The Sky is Falling

**Abstract:** I am doing a science project on micrometeorites. I wanted to know if I could collect them and if they fall to the earth every day. I started out by taking a plastic table cloth and laying it out on the lawn of my backyard, getting a bowl of freshly fallen snow and letting it melt and evaporate, and also getting magnetic particles from off the roof. After all this I collected particles off the table cloth and putting them on a slide to examine under a microscope. I also put the snow and roof specimens on separate slides too. I looked at them and took pictures but the best of our findings were from the test sight. My grandpa has a meteorite so we took shavings of it and looked at it under the microscope. We compared to our samples. We can't be sure but we think that we have collected at least two micrometeorites in what we've found. It has been very fun collecting all of these things, using a microscope for the first time, and putting together my board. None

**Category:** Earth Science

**Student Name:** Jake Hanson

**Team Members (if any):**

**Project Title:** Oily Feather

**Abstract:** Background: What type of detergent will remove oil from a bird's feather the best? There are many oil spills all over the world. The harmful oil can affect all the wild life in the ocean and on shore. I chose this project because of my love for penguins. Method: I interviewed the penguin keeper from Utah's Hogle Zoo. She helped clean birds at a major oil spill. She gave me a lot of helpful advise. Three different types of detergants were used. Each feather was soaked in motor oil, and then washed by hand. Results: Three people estimated how much oil was removed from each feather. Dawn Dish soap removed the most oil from a bird feather. None

**Category:** Earth Science

**Student Name:** Whitney Headlee

**Team Members (if any):**

**Project Title:** Worms at Work

**Abstract:** My project was intended to explore if earthworms help plants to grow. My hypothesis is that worms do help plants grow faster and healthier. I purchased two identical plants of three different species and placed earthworms in the soil of one of each of the species. I made an initial measurement of the of height and width of each plant. I gave each plant an identical amount of water an sunlight each day and measured each plant's growth every 5 days and then again on day 50. My experiment proved my hypothesis to be correct as the plants with earthworms grew higher, wider and were more healthy.None

**Category:** Earth Science

**Student Name:** Fischer Heimbürger

**Team Members (if any):**

**Project Title:** Saving Frosty: Protecting Snow From Melting During Climate Change

**Abstract:** My science fair project is on protecting snow from melting during climate change. After learning about snow blankets being used in Switzerland to save its glaciers, I wondered if there might be a more natural and less expensive way to do it here in the mountains of Utah. My approach was to add measured layers of natural materials to fresh snow and observe melt rates to see if they could be slowed down. The natural materials I used were pine needles, soil, tree bark, hay, and atomized sprayed water. I did three separate experiments with differing variables. In the first, I put the natural materials on top of snow placed inside clear plastic containers. In the second, I put the snow in dark black pots and buried them in standing snow. In the third, I set my materials directly on top of snow that had recently fallen. From these experiments I learned that on sunny winter days natural materials can actually speed up the process of melting rather than slow it down. To best preserve snow we should let Mother Nature do her thing which consists of melting the top layer of snow into a protective barrier that shields the snow beneath. However, I also learned that under certain circumstances a layer of natural material can act to boost overall snow levels, such as when it is buried between repeated layers of snowfall. This knowledge could help in water conservation, ski industry preservation, and flood/erosion management. None

**Category:** Earth Science

**Student Name:** Kaden Hunter

**Team Members (if any):**

**Project Title:** Water and Electricity

**Abstract:** Water and Electricity This was a fun and exciting science project for me this year. I learned sometimes the experiment is not going to turn out like I planned. My question was: Which of these will create more electricity: water, soda pop, orange juice, ketchup, or corn syrup when you pour them over the top of a water-wheel? With having a question in mind I began my research through the use of the internet and books. I learned how to make a simple generator and how it helped me gather the data for my experiment. My hypothesis is: I think water will make more electricity than soda pop, orange juice, ketchup, or corn syrup when I pour these items over the top of a water-wheel. In doing this experiment I found out my hypothesis was wrong. Ketchup turned the wheel the best because it was heavier. It only turned because of its weight and not because of force. I learned that force or pressure was an important part of creating electricity. I went back to my wheel and used water pressure (using a garden hose and nozzle) to generate enough power to light a small bulb. This told me that electricity is created by pressure and not because of a specific liquid. Today they use dams full of water to generate electricity, like the pressurized water that turned the wheel and lit the bulb. Water is cost efficient because it is readily available and is a clean source of power. None

**Category:** Earth Science

**Student Name:** Jessica Jensen

**Team Members (if any):**

**Project Title:** Spills That Kill

**Abstract:** QUESTION: What material (fleece, felt, cotton fabric, or cotton balls) will absorb the most oil floating on water? HYPOTHESIS: That the cotton fabric will absorb the most oil because it is loosely woven and light. PROCEDURE: I gathered fabrics, cut them into 1/4 wide strips and weighed them into 5gm portions. Then in a graduated measuring bowl I put 2C(440 ml) water and 1C (220 ml)oil. I placed 5gm of one fabric into a strainer and put it into the oil and water for 30 seconds Then I lifted it out and let it drain for 30 seconds. We then recorded in ml how much oil and water was left. Then I repeated this three times with each fabric to get an average. RESULTS: fleece absorbed the most oil then feltNone

**Category:** Earth Science

**Student Name:** Ethan Kiernan

**Team Members (if any):**

**Project Title:** The Corrosive Nature of Metal

**Abstract:** What liquids will corrode foil faster? I think Coke will corrode tin foil faster than Sprite, Water, and Salt Water. I lined up 12 plastic cups on a table. Then I dumped a cup measurement of coke into 3 cups. I did the same for Sprite, Water, and Salt Water. I put all the cups into a cupboard and left them alone for 1 week. When the week was up I took them out of the cupboard and observed what happened to the foil. I wrote it down, typed it up, and then I was done. When my experiment was over I learned that salt water caused the most corrosion because salt can eat metal. Salt Water was highest in corrosion, Water in 2nd, Sprite in 3rd, and Coke came in last. None

**Category:** Earth Science

**Student Name:** Damon Kyle

**Team Members (if any):**

**Project Title:** Does plastic pollution in the ocean affect sea birds living on remote islands in the Pacific?

**Abstract:** I did my project on plastic pollution in the ocean and the affect it has on sea birds living on remote islands in the Pacific. My hypothesis is that the birds might be affected in some ways, but I didn't think they would be affected too much because they live so far from populated areas. I found online a Marine Ecologist named Carol Keiper who was able to send me two albatross boluses, which are masses of undigestible materials that a baby albatross regurgitates. They came from Kure Atoll, which is one of the islands of Hawaii that is uninhabited. My method was to dissected both of the boluses to see how much plastic I found compared to organic materials. The results were that there was about 50% plastic and 50% organic materials in the two boluses combined. When the birds eat the plastic their bellies get full, but they starve to death. I expected to find some plastic, but I was surprised at how much I actually found. None

**Category:** Earth Science

**Student Name:** Andrew Lawson

**Team Members (if any):**

**Project Title:** Compost

**Abstract:** The purpose of my experiment was to find out which type of compost helps plants grow best. I used three alternatives to test my hypothesis: tree trimmings, produce scraps, and plain dirt. I hypothesized that produce scraps would be the best compost and would help the seeds grow the best. I used 3 small planting pots for each experiment. For each experiment, I used the exact same amount of dirt, water, seeds, sunlight, and time. The only variable was adding either produce scraps or tree trimmings to the dirt. I repeated my experiment three times using the same approach. In each experiment, the first seeds to sprout were planted in the produce scraps. The next seeds to sprout were in the plain dirt. The containers with the tree trimmings barely grew at all and the soil started to grow mold. The compost with the produce scraps grew the biggest by the end of the two weeks. The seeds in the compost with the produce scraps sprouted two days earlier than the seeds in the plain dirt. I also learned that if you add too many tree trimmings to the compost, then you can ruin the compost. My hypothesis was supported because I stated that the seeds in the produce scraps compost would grow bigger than the seeds in the tree trimmings compost and the seeds in the plain dirt. I learned that making compost is man's way of imitating nature's process, although in an accelerated form. None

**Category:** Earth Science

**Student Name:** Caleb Lee

**Team Members (if any):**

**Project Title:** Thirsty Sprouts

**Abstract:** Question: What liquid is the best for seeds to grow in? Hypothesis: I think that the seeds will grow the best in plain water. Process: Soak the bean seeds overnight. Label zip lock bags with names of fluids. Put folded paper towel into bag. Pour different liquids into each bag. Place three bean seeds in each bag. Tape bags to poster. Hang poster in sunny place. Watch seeds each day to see if they grow roots or sprout. Make sure paper towels stay moist. Check results after two weeks. Results: The bean seeds sprouted in 8 out of 12 liquids. They grew at different rates. The roots grew different lengths. I found that salty liquids and oils are not good for sprouting or growing seeds. I found that Vitamin Water was the best for sprouting seeds. Water is best for growing plants, and extra vitamins help. None

**Category:** Earth Science

**Student Name:** Ethan Lefavor

**Team Members (if any):**

**Project Title:** Solar Power

**Abstract:** I became interested in my experiment when I learned about Solar Power. I decided to research how Solar Power is used. I found out that solar power is used to heat homes, cook, purify water, and run green houses in cold climates. Some countries are running time trials on solar powered cars. If we stored solar power for one year, it would be twice the energy as all the earth's consumable resources combined. I wanted to know when the sun's power is the strongest. I thought it would be strongest at 1pm. I decided to run a solar car at each hour of the day and see which hour the car traveled fastest. I built a solar car from a kit. I measured a track on the street of 20ft. At each hour from 11am to 5pm I ran the car six times and recorded its speed. I then found the average of each hour in seconds. I recorded the results on a graph and found the car ran the fastest at 2pm. The time was later than I thought it would be. I found that the sun's power is strongest when it shines directly on the solar panel than it is when it shines at an angle. I learned that the sun has great energy to be used. I think scientists should keep working on using solar energy to save our planet. None

**Category:** Earth Science

**Student Name:** Ashley McConnell

**Team Members (if any):**

**Project Title:** Is Heat Always Associated With Light?

**Abstract:** Is Heat Always Associated With Light? My hypothesis was YES because when I was near a lightbulb it felt hot. In my experiment I tested lots of different light sources with a thermometer. Then I recorded the tempature of that light source. I also took the room tempature. In my data I found out that jellyfish and fireflies have a chemical reaction happening inside them. That is called bioluminescent. There light does not give off heat. So my hypothesis was wrong. I also tried to do my garage light, but it was cold in the garage. I found out that you have to be in a controlled area. None

**Category:** Earth Science

**Student Name:** Alexis Nelson

**Team Members (if any):**

**Project Title:** Shakin' Things Up

**Abstract:** My question was what Materials, when placed under a building, will help it withstand an earthquake the longest. I wanted to know if springs or bearings would hold the building up the longest. I thought that the springs would help the most on the shake table because the springs would let the building bounce. The bearings would let it roll back and forth. For my experiment, My dad and I built a shake table out of a drill, drill-bit, wood and an off-set weight. These are the instructions to build a shake table: 1.Get the materials. 2.Build one big box, and one small box. 3.Put the small box on top of the big box and hold it on with 2 metal guides. 4.The drill, and the drill-bit are secured to the big box by metal straps. 5.The drill-bit goes through the small box and has a weight at the end. This makes it off- set, and makes the table shake. After you build the shake table, it's time to build the buildings. Here's how: 1.First take 36 blocks of Timber Tumble games, and build a building on a piece of plywood. Time how long it takes for the building to fall down when the drill is on and the table shakes. 2.Next, build a building on a piece of plywood with springs under it, and time it. 3.The last time you do it, build a building on bearings, and time it.None

**Category:** Earth Science

**Student Name:** Sean Nelson

**Team Members (if any):**

**Project Title:** Does Air Have Weight?

**Abstract:** My experiment was to determine if air has weight. I did this by proving that the trapped air inside a van will move to the front of the van when the van is stopped quickly. I used a balloon to show that as the air moved to the front of the van, it increased the pressure in the front of the van and pushed the balloon towards the back of the van. It also showed that the same thing happened when the van was turned sharply to the left or to the right. When the van turned to the left the balloon moved to the left and just the opposite occurred when the van turned to the right. The experiment proved that air does have weight because the balloon moved in the opposite direction than expected. For example, when the van stopped my body tried to keep moving forward, yet the balloon went the other direction. The balloon moved because there was more pressure in one end of the van than the other. The high pressure zone was created by the all the air rushing to the front of the van leaving a lower pressure zone in the back. If air did not have weight there would have been no air movement causing the high pressure zone. It was the high pressure that moved the balloon in the other direction. The balloon, and not our bodies, was affected by this because the balloon has very little weight and a large surface area. None

**Category:** Earth Science

**Student Name:** Jordan Nestman

**Team Members (if any):** Jordan Nestman and Joshua Leigh

**Project Title:** How does Temperature effect Air Pressure

**Abstract:** We wanted to know how heat and cold effect air pressure. We felt that heat would cause air to move faster and expand. Also that cold would cause air to move slower and compress making the air pressure lower. We used an empty 2 litre bottle, balloons, boiling water, snow water, two bowls, and a watch. By putting a balloon over the lip of the 2 litre bottle, then holding the bottle in a bowl of boiling water we were able to see the balloon expand. This procedure we did 3 times using a new balloon each time. Next we did the same with thing with the bottle and balloon, this time holding it in snow water. We were able to watch the balloon be sucked into the bottle. This we repeated a total of 3 times using a new balloon each time. We found that through our research and results of our experiment that heat makes air mollecules move faster, bumping around, thus creating an increase of pressure which expanded the balloon. So, with the cold causes air mollecules to move slowly causing less bumping around thus decreasing air pressure. This was shown when the balloons were sucked into the bottles. We concluded that temperature does effect air pressure. None

**Category:** Earth Science

**Student Name:** Tyson Ngatikaura

**Team Members (if any):**

**Project Title:** Sprout Break Out

**Abstract:** My question was at what temp. do alfalfa seeds grow best in from a 40 degree fahrenheit to a 90 degree fahrenheit. My hypothesis was that the 50 degree jar would grow the best. I got made three stands for three of the high temp. jars 90,80,70 degrees and I put three different voltages of light bulbs. for the 60 degree I left it on the table and for the 50 degree I put it near the window and for the 40 degree I put the jar i a bowl of ice. Then I put a full spectrum lamp so they could all get the same amount of sun light. None

**Category:** Earth Science

**Student Name:** Shaelynn Nunley

**Team Members (if any):** Alex Schultz

**Project Title:** Heat

**Abstract:** my question is asking which cars out of regular and diesel exhaust heat is melting more ice faster. In our hypothesis we thought the diesel cars exhaust was going to melt more. My results show that the regular exhaust heat is melting more ice. Well what we did was we froze two same size ice tubes then cut the ends off and put one in a diesel gased car and one in a regular gased car and turned the car on, then we put a plastic container under the exhaust then every 5 minutes we changed the containers and checked how much was melted with a measuring cup. None

**Category:** Earth Science

**Student Name:** Matthew Ockey

**Team Members (if any):**

**Project Title:** The Effect of Fire on Soil Erosion

**Abstract:** For my experiment I wanted to find out how fire impacts the amount of soil erosion on a mountain. I located four sites on Mt. Jordan in Draper, Utah to conduct my experiment. Two of the sites were on the part of the mountain that had been burnt by the Corner Canyon Fire in August of 2008. The other two sites were on the non-burnt part of the mountain. Three containers were placed in holes at each site so that the top of the container was at the same level as the top of the soil. Slopes were measured and sites were found on the non-burnt side that were similar in slope to the burnt sites. After it rained, I gathered my containers and replaced them with new ones. The contents of each container were baked at 350° F until all the moisture evaporated. The soil was weighed and weights were recorded for each container. Then I compared the weights of the burnt and non-burnt sites. The experiment was repeated after the next rainfall. The average weight of the soil from each of the non-burnt sites was 23.75 grams and 22.5 grams. The average weight of the soil from the burnt sites was 107.75 grams and 36.33 grams. As you can see from this data, the burnt side of the mountain had more soil erosion. None

**Category:** Earth Science

**Student Name:** Mariah Papac

**Team Members (if any):**

**Project Title:** The Effect of Temperature on the Amount of Carbon Dioxide Dissolved in Seawater.

**Abstract:** Greenhouse gases cause global warming, which is the heating of the earth. One of the major greenhouse gases is carbon dioxide (CO<sub>2</sub>). The burning of any substance such as coal, gasoline, and wood creates carbon dioxide. Most of the gases that are found in the atmosphere dissolve in water at the ocean's surface including carbon dioxide. The purpose of my research project is to learn if temperature changes the amount of carbon dioxide dissolved in the seawater. I hypothesize that cold seawater will have the most dissolved carbon dioxide. To test this hypothesis, I prepared three beakers of seawater at three different temperatures (cold, warm and hot). I recorded the temperature of seawater and then measured the amount of dissolved carbon dioxide using phenolphthalein indicator and sodium hydroxide. Multiplying the number of drops of sodium hydroxide added by five gave the concentration in parts per million. I found that the cold seawater had a carbon dioxide concentration of 70-90 ppm, and both the warm and hot seawater had a concentration of 30 ppm. The experiment confirmed my hypothesis that cold seawater would have the highest concentration of dissolved carbon dioxide. It was unexpected that the warm and hot seawater would have the same amount of carbon dioxide. My results for the amount of carbon dioxide in cold seawater (70-90 ppm) was similar to that found in

the ocean (64-107ppm). The amount of CO<sub>2</sub> in the air will increase as the ocean warms. This means global warming will occur faster. None

**Category:** Earth Science

**Student Name:** Kassey Pappa

**Team Members (if any):**

**Project Title:** Cilantro

**Abstract:** I decided to do my science project on cilantro. I tried to figure out what nutrient helped the cilantro grow the best. The nutrients I used were water, miracle grow, and, baking soda. My hypothesis was that I thought that the baking soda would grow the best because in my research I found that any common baking soda would grow any organic foods. My final results were that the water did the best miracle grow did second and the baking soda didn't grow at all. This could help farmers to get their food to grow faster and get better results. None

**Category:** Earth Science

**Student Name:** Nathan Peterson

**Team Members (if any):**

**Project Title:** Solar Energy at Different Altitudes

**Abstract:** My question is: At what altitude is solar energy most efficient? I hypothesized that at greater or higher altitudes a solar cell would be more efficient because there is less atmosphere to block the sun's rays. I made a solar cell using copper sheeting to create a cupric oxide vs copper battery with a sodium solution as a conductor. I then used this solar cell to collect my data. I travelled to many different locations using a GPS device to identify the altitude. I measured and recorded my results. My results showed that the 1000 feet or 304 meter altitude difference in my measurements did make a difference in OHM's produced by my solar cell. The difference was not as significant as I would have predicted. I believe that the altitude variation needed to be larger than this to show a significant difference. My data did show enough of a trend to say that my hypothesis was correct and that at higher altitudes more solar rays would make more solar energy than at lower altitudes. None

**Category:** Earth Science

**Student Name:** Brittany Reece

**Team Members (if any):**

**Project Title:** Green Energy

**Abstract:** Question: How much energy can be provided by small wind turbines with different numbers of blades (2, 3, 4). Hypothesis: I thought that 2 blades would provide more energy because the blades should be much lighter and easier to spin. Method: We spun each blade several times 4 different ways: outside wind, blowing on it with our mouths, a fan, and a blow dryer. I measured the wind energy by 20 milliamps. A milliamp is a thousandth of an amp, which is a term of measurement. Results: 4 blades got 62 at highest reading 3 blades got 66 at highest reading 2 blades got 42 at highest reading. Conclusion: My hypothesis was wrong. After some extra researching, I found out four was considered best at turning wind but my highest reading came from three blades. I looked a little closer and found out that the blades were sharper in angle on the three bladed turbines than anywhere else. None

**Category:** Earth Science

**Student Name:** Bailey Sanderson

**Team Members (if any):**

**Project Title:** Muddy Water vs. Salty Water: Which can you distill clean water from best?

**Abstract:** My Question is- Can you distill clean water from muddy or salty water? My Hypothesis is that you could only distill clean, clear, drinkable water from muddy water and not salty water. So I made two solar distillers. I had two tin pans and put two cups of water into both of them. Then I put 1/4 cup dirt with grass into one and 1/4 cup salt into the other. I put one glass into the center of each tin pan and put plastic wrap on top. I secured the plastic wrap with a rubber band around both tin pans. I put a coin in the center above the glass to weigh down the plastic wrap. I put both the solar distillers in a sunny spot outside for 7 hours. After doing my experiment 6 times, my results were that I got 1/2 a teaspoon clean, clear drinkable water the first day from both muddy and salty water, the same thing happened the second day. On the third day, I got 1 1/2 teaspoons from both muddy and salty water and the same thing happened on the fourth day. But by the fifth day, I collected 2 teaspoons from both muddy and salty water and the same thing happened the sixth day. If I were to do this project again I would have done it in a warmer month because I know I would have collected more water in less time. None

**Category:** Earth Science

**Student Name:** Alexandra Schultz

**Team Members (if any):** Shaelynn Nunley

**Project Title:** Heat

**Abstract:** Abstract will be coming by email from parent. None

**Category:** Earth Science

**Student Name:** Matthew Searcy

**Team Members (if any):**

**Project Title:** Ocean Whirlpools

**Abstract:** Abstract: Ocean whirlpools are cool to me. I wondered where they come from, how they form, and if I could replicate one. I think some of them might happen when parts of the sea floor collapse into large air caverns under the ocean. As the air moves up, water will come down through the opening and fill the space the air was in. This might happen in the form of a whirlpool. I tested my hypothesis by representing the ocean with a large cave under it. I got a large tank and fastened a 3-liter soda bottle under it through a hole in the tank. A small plug then kept water in the tank from going into the bottle until I removed it. I read that the ocean always has currents and movement in it, so when I pulled off the plug I made some ocean motion by swishing the water with my hands (representing current and tide). A whirlpool formed! I noticed that once a whirlpool formed, it wanted to keep going on its own as a whirlpool. I used several opening sizes and timed how fast the bottle got filled up when there wasn't a whirlpool versus when there was. The bottle always filled up much faster with a whirlpool than when a whirlpool wouldn't form, but it takes some movement in the water to help get it started. This is definitely possible in the ocean where the water is always in constant motion and flow. None

**Category:** Earth Science

**Student Name:** Matthew Sherwood

**Team Members (if any):**

**Project Title:** Melting Ice""

**Abstract:** The question for my science project was: Does the shape of the ice affect how fast it melts? I did some research on ice, the different states of matter, what happens when water freezes and at what temperature it freezes at. I researched how melting ice effects our environment and how it relates to our world. I found my research in books from the library and on the internet. My hypothesis was: The shape of ice with more surface space would melt faster. I thought this because the ice with more surface space would have more exposure to the air warming it. I began my project by freezing 1 cup of ice in seven different shapes. I let them sit in the freezer overnight. Then I took them out, set them each on a plate, and let them melt at room temperature. I timed how fast each shape melted. I recorded the information in my journal. Then I repeated the process with  $\frac{1}{2}$  cup of water. Next I put the information in a graph. I concluded that the shapes of ice with more surface space melted faster than those with less surface space. I was surprised that the half cup shapes did not melt in exactly half the time as the 1 cup shapes, and that they didn't melt in the same order as the one cup shapes. None

**Category:** Earth Science

**Student Name:** Makell Spencer

**Team Members (if any):**

**Project Title:** Fresh Air

**Abstract:** When I watch the weather report on the news, it displays air quality ratings green, yellow and red. What does it mean when the air quality is hazardous? Does it mean I am going to get sick? Does it mean I should stay home from school? I really did not know. My science project is going to explain the Environmental Protection Agency air quality ratings and take air samples to answer the question: How clean is the air in our community? I plan to set out air quality samples in four different locations for a five day period, one each day at each location. - My home - The School - My Grandparent's home - A downtown location I will cut out a square inch box in each card and use a clear tape to create my sample collection cards. I will use a magnifying glass to inspect and count the number of dust and dirt particles stuck to the sample area. I will record the data each day from each site. I will also collect information about the weather, like temperature, windy, stormy, etc. I am going to watch the news and check the EPA website for air quality reports for each of the five days and record the results. The results showed that downtown Payson had the worst air quality, then my Grandparents home, then school and finally my home had the cleanest air. Pollution sources (cars, businesses and weather) play a big part in air quality ratings. None

**Category:** Earth Science

**Student Name:** Keaton Stephens

**Team Members (if any):**

**Project Title:** How does seed depth affect plant growth?

**Abstract:** My question was to determine the best depth to grow sugar snap snow peas. I came up with this idea after searching the internet for science projects. I saw that Gregory Mendel discovered the laws of genetics using peas, and thought that was interesting so I wanted to do a project on peas. I planted the pea seeds at 4 different depths to see which would grow best. I put 5 seeds in each cup to make sure that I would get the same results with each cup. We checked everyday for sprouts then recorded the date that we saw each sprout. The one inch plants grew the best with 12 of 15 seeds germinating. I was surprised by how well the 3 inch plants grew with 8 of 15 growing. None

**Category:** Earth Science

**Student Name:** Ashton Stephens

**Team Members (if any):**

**Project Title:** How does light affect plant growth?

**Abstract:** My project is on how light affects plant growth. I decided to do my project on this after researching science fair projects on the internet. This is also where I found most of my information. I learned that plants need different wavelengths of light to grow the best. Plants prefer sunlight since it provides all the different wavelengths of light. Flourescent lights provide mostly blue light, while incandescent light bulbs provide mostly red light. Plants that are kept in the dark will still grow without a light source until the stored energy in their seed is gone. I put my seeds in sunlight, fluorescent light, incandescent light and no light to see which would grow the best. I watch for any growth and then recorded how much they were growing. My conclusion was that the sunlight and fluorescent light plants grew the same length. The incandescent plants died and the plants in the dark grew long and weak. None

**Category:** Earth Science

**Student Name:** Makenna Swapp

**Team Members (if any):**

**Project Title:** What common household item will help fertilize plants?

**Abstract:** My question was: What common household item will help fertilize plants? I chose 4 plants out and watered each one of them with different substances each week. I used one for a control to water with just water. In each of the others I used sugar, Applejuice concentrate, and Ammonia with dish soap. My hypothesis was that sugar would do the best and ammonia with dish soap would kill the plant. Each week I would increase the amount of ingredients that I would give the plants. For week 1: 1TbLs of ingredients (apple juice, ammonia/dish soap, sugar) and 1cup water. For week 2: 1cup water and 2TbLs of ingredients. For week 3: 1cup water 3TbLs ingredients. I recorded the results in my journal. I tested the plants on what I thought would be the best qualities of the plants. Which are: Strength, Height, and overall health. Once I gathered all the information I found out that shockingly that ammonia and dish soap was the best to use as fertilizer. Then sugar and the worst one was Apple juice and concentrate. I had a blast doing the project and had fun doing it. None

**Category:** Earth Science

**Student Name:** Jacob Swenson

**Team Members (if any):**

**Project Title:** Can Landscape Features Be Used To Predict True Horizontal Sunset" Time?"

**Abstract:** Question: Watching the sun set on the Oquirrh Mountains I observed it takes several more minutes for the sunlight to roll off Twin Peaks to the east. I wanted to know if the sunset time published was the time the sun set on the Oquirrh Mountains, or the time the sunlight left the top of Twin Peaks or some other time  
Hypothesis: I predict that one can forecast the horizontal (published) sunset time by observing the sun setting on fixed landscape points of reference (such as Twin Peaks, Sandy, Utah) over several weeks. Method: I will go to the same location in Sandy, Utah each week and record the time the sun sets over the Oquirrh Mountains. Then I will turn around and observe at what time the sun light is no longer visible on Twin Peaks. I will compare the observed times to the published sunset times. I will attempt to forecast the time the sun will set on the Oquirrh Mountains and the time the sunlight will no longer be seen on Twin Peaks using the published sunset time charts on the last day of November. If I can predict the sunset time on the Oquirrh Mountains, and predict the time sunlight leaves Twin Peaks using the published sunset time, I can predict the published sunset time using Twin Peaks as a guide. Results: Twin Peaks can be used to predict the true horizontal sunset at this time of the year. None

**Category:** Earth Science

**Student Name:** Branden Terrell

**Team Members (if any):**

**Project Title:** Pure Water Which water is purer?

**Abstract:** My interest in this project started with a book called Young Scientist. In the book they talk about purifying water and the different methods used to do it. I then read about a certain purification plant purifying salt water. This process made me curious if salt water purifies better than muddy water. I thought for sure the salty water would purify easier than the muddy water. Salty water looks purer and more drinkable than muddy water, but too much salt in a human body can be deadly so it is important to get high salt amounts out of the water. Muddy water looks very unappetizing but may be the better chose. I wanted to see weather it is easier to remove salt verse dirt in water. After pouring salty and muddy water threw three different purification systems, I found that muddy water purifies easier and better than salty water. More salt pasted through all the purification systems than the dirt. I looked at the dirt and the salt through a microscope to find out that salt is a smaller substance than dirt therefore it is easier for it to pass through the purifier. After some research, I found that salt is very hard and expensive to remove from water. I would like to further study ways to get salt out of water because there is more salt water than fresh. I would also like to study if more bacteria live in salt water than muddy water. None

**Category:** Earth Science

**Student Name:** Savanah Tiffany

**Team Members (if any):**

**Project Title:** Trash to Cash

**Abstract:** My question was: Which organic material, horse manure, grass clippings, or table scraps, produces the most biogas? Biogas is a gas made primarily out of carbon dioxide and methane. It can be burned and used as a renewable energy source. My hypothesis was that the horse manure would produce the most biogas. For my experiment, I collected three thirty-six ounce juice bottles, thoroughly cleaned them, and drilled a hole in each lid. I then gathered three standard, Mylar balloons, filling them with water to determine their volume when full (15 liters). I then filled each individual bottle with a different organic material to the 2.5 inch line. I also added water to help it degrade faster. Then, I took three sections of tubing, inserting one end into the hole in the bottle, and the other into the Mylar balloon, sealing the connections with caulk to make them airtight. I let my experiment run for three weeks, recording my data weekly. My conclusion proved my hypothesis that the horse manure would produce the most biogas correct. The horse manure produced approximately 0.1 liters of biogas in the first week, 0.3 liters in the second week, and 0.5 liters in the final week. The grass clippings did not begin to produce biogas until the second week, when it produced 0.1 liters of biogas. In the final week, the grass clippings produced 0.3 liters of biogas. The food scraps did not produce any biogas. None

**Category:** Earth Science

**Student Name:** Stella Trincado

**Team Members (if any):**

**Project Title:** Is Snow Safe To Eat?

**Abstract:** I chose this topic because myself like other kids like to eat snow and icicles. I'm not sure whether snow is safe to eat or not so i thought it would be interesting to find out some facts about this subject. My hypothesis is, Depending on where you live snow can be toxic. Eating a very small amount can be ok. Eat at your own risk!" I went to the Wasatch County Health Department and picked up four water bacteriology vials and then collected four samples which I took to the Utah Public Health Laboratories at the University of Utah to have professionally tested. The first sample was my home well water which is my control. The lab result of that was <1 total coliforms meaning it is satisfactory to eat. Anything testing 1 and above is considered unsatisfactory. The second sample was freshly fallen snow in my backyard which tested at <1 total coliforms being satisfactory. The third sample was icicles hanging from a shingled roof which tested at 12.4 total coliforms being unsatisfactory to eat. The forth sample was manmade snow from Soldier Hollow School. It tested at total coliforms 25.6 and fecal coliforms 2.0 being very unsatisfactory to eat. My conclusion is that not all snow is safe to eat. It depends on where you pick up that handful of snow. Pollutants in the air and your local watershed are all factors in whether or not snow is safe to eat. "None

**Category:** Earth Science

**Student Name:** Taylor Tucker

**Team Members (if any):**

**Project Title:** Earth's Exhaustion

**Abstract:** Question: We wanted to see if truck/SVU would put off more pollution than a smaller car (Nissan/Sedan) and we also wanted to see if it puts out more, if that will hurt the environment more. Are Hypothesis is: We estimated that it would be Truck or SUV based off our research. We found out that the fuel goes through a burning tank before it is exhausted out of the vehicle. The stronger the odor, the more its is burning and the bigger the engine. Therefore more exhaust it put out. The Method: Before we tested the cars we had to put in a whole bunch of information about our self in to the computer. Then we have to hook up an exhaust pipe to the back of the car. So the exhaust would not build up in to the garage. Then we have to hook up an exhaust probe to the back of the car. That hooks up to the computer. Then we have to push the gas pedal for 30 sec. in the 2500 RPM range. Then we printed out the car test results. Results: We found out that the Truck or SUV was the one that put off more exhaust than the Sedan by as you can see here (pointing to the board) by one tenth of a litter. Also found out that you should get the right car for your needs and that in the summer try to ride your bike. Also that we need to try to help the environment by trying to not drive our cars as much. None

**Category:** Earth Science

**Student Name:** Kara Vail

**Team Members (if any):**

**Project Title:** The Flame Game

**Abstract:** My question is: What type of wood burns the fastest? I tested fir, oak, pine, and poplar. My hypothesis was that the wood with the least organic material {lines and moisture in the wood} would burn the fastest. I thought the poplar would burn the fastest. To decipher my question I made a shelf for the wood to sit on. My dad helped me place the wood with a metal clasp, start the fire, and help me recognize the stages that the wood went through. They were : Time at which wood ignites, breaks through and breaks. We made sure the wood was lit in the exact same place each and every time and made sure a new shelf was made for each piece of wood. We did the experiment twice. burning the fastest in both tests. The pine ended up burning the longest. I had fun doing the experiment and learning things about wood that I never knew before. None

**Category:** Earth Science

**Student Name:** Jeffrey Wang

**Team Members (if any):**

**Project Title:** Can We Use the Sun's Energy to Cleanse Dirty and Salty Water?

**Abstract:** I wanted to do my project to help people in India since do many people can't find clean water. My hypothesis is that we can use the sun's energy to cleanse dirty and salty water. I put a cup in a bowl filled with two cups of water at room temperature and put a few rocks in the cup so to keep it in place and so the water can slide in. Then I'll cover the all the bowls tightly with plastic wrap and put some rocks in the center of the plastic wrap, over the cup. so that the plastic wrap will go down. Therefore, it will make the evaporated water slide down into the cup after condensing. Since I have six bowls, three in the sun and three not in the sun, I'm going to put 118 milliliters of salt in two bowls and a 79 milliliters of dirt in two other bowls while I leave two bowls with clean water as the control. Since, after the water evaporates, the water can't escape, due the plastic wrap, it will condense and then slide down into the collecting cup. Therefore making the water clean and drinkable. My results in the collecting cup was clean drinkable water. Proving this project works. None

**Category:** Earth Science

**Student Name:** Abigail Waters

**Team Members (if any):**

**Project Title:** Mars Sweet Home

**Abstract:** The question was, Can man really live on Mars without special suits and masks?" The hypothesis was "Yes I think man can live on Mars without special suits and masks." The method used was to test the effects of carbon dioxide on plants. I bought two of the exact same plant and exposed one plant to carbon dioxide and the other I exposed to normal air. I tested the effects this had on the plants. The result was that the plant with the carbon dioxide did not do as well as the plant with the normal air."None

**Category:** Earth Science

**Student Name:** Abby Welch

**Team Members (if any):**

**Project Title:** Crystal Clear

**Abstract:** None

**Category:** Earth Science

**Student Name:** Alisa Western

**Team Members (if any):** Taylor Tucker

**Project Title:** Earth's Exhaustion

**Abstract:** Purpose: We are would like to know if a bigger vehicle like a truck or an SUV produces more carbon monoxide and carbon dioxide, than a car? Also is carbon monoxide and carbon dioxide harmful to the environment and the human health? Hypothesis: Based off our research we think that a truck or SUV which usually have large engines will give off more carbon monoxide and carbon dioxide than the small car with a smaller engine. None

**Category:** Earth Science

**Student Name:** Siani Weston

**Team Members (if any):**

**Project Title:** Which one has more effect on Avalanches the Weight of Snow, or the Angle of the Slope

**Abstract:** Avalanches are mainly caused by two factors the weight of snow and the angle of the slope. That is how I came up with my question. Which one has more effect on avalanches the weight of snow, or the angle of the slope? I thought that the weight of snow would have more effect because gravity will pull the snow down the slope. To find out if I was right I used two wooden boards to make a moveable slope and 18 bags each containing two ounces of sand. I placed a sand bag into a cloth pouch, then placed the pouch on top of a silicon pad that was clipped to the board. The silicone pad was used to stimulate sticky snow. I raised the board until the pouch fell, read the angle with a slope meter, and recorded the angle. I did this two more times. Then I added one more sand bag and repeated the procedures until all the bags were inside the pouch. I took the averages of the angle and plotted a graph. The graph showed that as the weight to increased to about 18 ounces the angle of the slope stayed the same. This means that the angle of the slope has more effect on avalanches. If the weight of snow had more effect than the angle of the slope then as the weight increased the pouch would've fell at a lower angle, so my hypothesis was wrong. None

**Category:** Earth Science

**Student Name:** Hannah White

**Team Members (if any):**

**Project Title:** Drinking the Jordan River

**Abstract:** My science fair project is called, Drinking the Jordan River. I wanted to know if in an emergency what the best method of cleaning dirty water would be to make it clean and drinkable. While researching and interviewing two knowledgeable people I found there were many methods of purifying water. Most of my resources said that combining more than one method works best. I decided the methods I would use would be filtering disinfecting by using chlorine bleach distilling filtering and distilling combined filtering and chlorinating combined distilling and chlorinating. My hypothesis was that distilling and chlorinating would make the water the cleanest. I borrowed a TDS meter to measure the ppm (parts per million) of Total Dissolved Solids in each sample. The results were: Control - 4 430 ppm Filtered - 4 250 ppm Distilled - 5 ppm Chlorinated - 4 310 ppm Filtered and Distilled - 9 ppm Filtered and Chlorinated - 4 210 ppm Distilled and Chlorinated - 19 ppm Whenever I distilled (alone and combined with other methods) it was the cleanest. These three samples were cleaner than my tap water (197 ppm; 500 ppm is highest for drinkability)! This experiment helped me understand how to prepare for an emergency when there is no clean water. None

**Category:** Earth Science

**Student Name:** Parker Willett

**Team Members (if any):**

**Project Title:** Solar Power

**Abstract:** I tried four different light sources on a small solar powered car, sun light, floodlight bulbs, incandescent light bulbs and fluorescent light bulbs. I think the sun light will create the most power. I think sun light will work best is because real cars can be run off it and it's the brightest of the lights I will be using. I am using a direct current solar power to run my solar car. Direct solar energy is produced when the sunlight strikes a solar cell by which electricity is immediately generated. For my experiment I made a hexagon light tower made out of PVC pipe and ran electrical wire to four light sockets with light bulbs. I ran my car three times around the track and timed each race with the four types of lighting. I figured out the average time it took for the car to complete the three races with the four different light sources. What makes one light source produce more energy than another? I believe it is the amount of lumens the light produces. The lumen (symbol: lm) is the SI unit of luminous flux, a measure of the perceived power of light. Lumens refer to the brightness of the source as the human eye perceives it. My hypothesis was right the sun light worked the best. The average time for each race was sun light 5.1 seconds, flood light 7.1 seconds, incandescent 14.5 seconds, and the fluorescent did not work. None

**Category:** Earth Science

**Student Name:** Jaren Wood

**Team Members (if any):**

**Project Title:** Wood Absorbency of Water

**Abstract:** The question for my science project is, what type of wood absorbs the most water. My hypothesis was that of the 7 types of wood cedar would absorb the most due to the fact that it is the lightest wood. I took 7 different types of wood which included: maple, cedar, alder, oak, cherry, hickory, walnut. Each block of wood was the exact same size. I weighed each block of wood. I then placed each block of wood in a sealed container with 2 cups of water. The container was sealed to eliminate evaporation. The blocks stayed in the water for 6 days. At the end of six days I removed the blocks and weighed each block. I then measured how much water was left in each container. The largest increase in weight was hickory. In the end maple absorbed the most water. None