Category: Physical Science - Chemistry

Student Name: Maycee Adams
Team Members (if any):

Project Title: Does Acid Rain Affect Statues and Monuments?

Abstract: Question: Does Acid Rain Affect Statues and Monuments? Hypothesis: Acid rain damages statues and monuments. Purpose: To find out the effects of acids on chalk, a calcium carbonate compound found in many statues and monuments. Procedure: I put a piece of chalk in 4 test tubes. I carved each piece of chalk, like statues. I recorded results each day for one week. Tube A is chalk and water. Tube B is chalk and bubbled water with a straw. Tube C is chalk and vinegar. Tube D is chalk only. Results: Tube A - the water caused cracking and chipping away of the chalk. Tube B - the bubbled water caused cracking in the designs. Tube C - vinegar shaved and chipped away the chalk and caused a lot of damage. Tube D - chalk was not damaged. Discovery: I found out that acid rain really does damage statues and monuments. Acids, similar to acid rain damage chalk, a calcium carbonate compound found in many statues and monuments. Vinegar did the most damage and is the most like acid rain. Water and chalk did damage, chipping and cracking because water has a little acid in it. Bubbled water cracked the chalk because the carbon dioxide in my breath mixed with water made carbonic acid. Nothing happened to just chalk. Acid rain is caused by pollution, burning coal and oil, and exhaust from cars. It destroys buildings, monuments, statues, animals, forests and lakes. It hurts humans too. We can help stop acid rain.

Category: Physical Science - Chemistry

Student Name: Madison Banks
Team Members (if any):

Project Title: Liquids & Metals

Abstract: My science project is all about metals and how they react to different liquids. My hypothesis is that hydrochloric acid will make the metals I chose react more than the other liquids. My hypothesis was correct. I used seven different types of metals that were all from My dads sheet metal fabrication shop. the metals that I used are stainless steel, aluminum, copper, brass, hot rolled steel, cold rolled steel and, galvanized steel. I tested the reactions of each metal in orange juice, bleach, Diet Coke and hydrochloric acid. the results varied for each metal. Some of the metals rusted, Some corroded, and Some did not change at all. I judged My metal tests by visual appearance. I tested My hypothesis three times to support My conclusion.

Category: Physical Science - Chemistry

Student Name: Fatima Bate
Team Members (if any):

Project Title: Fire Away

Abstract: The question I have is What will put out fire most efficiently?" I wondered this because if there was a fire in my house I would want to know what would work best to extinguish it. Also my father is a fire fighter and I wanted to learn about his job. I set 4 fires using equal amounts of wood I set them all on fire and to extinguish the fire I used water baking soda a blanket and foam. I recorded how long each one lasted and the one that took the least amount of time was the best the one taking the most amount of time was the least efficient. I believed the blanket would work best because from my research I learned Fire must have oxygen to burn. However the blanket was not correct. The foam worked the best. The blanket took the most amount of time to put the fire out.

Category: Physical Science - Chemistry

Student Name: Samantha Benjamin
Team Members (if any):

Project Title: How does heat effect the creation of CO@ when mixing sodium bicarbonate and H2O?

Abstract: Hypothesis: When H2O temperature increases, the rate at which sodium bicarbonate and H2O create CO2 will be faster in hot water. Question(s) My background research has shown that the H2O molecules are is more active in warmer temperatures than at colder temperatures does this mean that the rate of change will be faster at higher temperatures? Based on the differing changes of the reaction when the temperature of the H2O is changed can the rate of CO2 creation be predicted? Method of testing: First I got four 50 ML beakers. I places 25 ML of H2O (water) in the beakers. The H2O temperature, as the variable was measured and 958 mg of sodium bicarbonate was added to the H20 (The sodium bicarbonate was in the form of generic antacid). From the time the two were mixed the time was measured until the bubbles reached the 50 ML mark on the beaker. Results: The time for the CO2 bubbles to reach the 50 ML mark was substantially less (3 seconds) when the water was warm (68 Celsius) in comparison to when the water was cold (.5 Celsius) which took more than 25 seconds.

Category: Physical Science - Chemistry

Student Name: Miriam Briggs
Team Members (if any): Rebecca Bronson

Project Title: Evaporation Strikes Again

Abstract: Our question was: If we mix different substances together with fridge water, which one will evaporate the fastest? Our hypothesis: We think that the tap, refrigerated & bottled water will evaporate the fastest. We measured 1 1/2 teaspoons of each substance into plastic cups & mixed in 3/4 cups of water. We marked each cup along with the date. The Conclusion: The conclusion was that the food coloring mixed with water and the bottled water evaporated the fastest. The slowest was the oil mixed with water. We discovered in our research that the stronger the bond between the water molecules and the substances we added, the slower it evaporated. Our project was really fun and interesting to learn about.

Category: Physical Science - Chemistry

Student Name: Rebecca Bronson
Team Members (if any): Miriam Briggs

Project Title: Evaporation Strikes Again

Abstract: We were interested in evaporation and wanted to know if we mixed different substances into water how this would affect evaporation. From our reseach, we learned that water can form a bond with different substances, and this bond can slow down evaporation. Also, for evaporation to occur, the water molecules have to move quickly and escape from the body of water. If a substance were sitting on top of the water, it would make it difficult for the water molecules to escape and turn into vapor or gas. Therefore, we hypothesized that oil, salt, sugar and other substances would slow down evaporation if they were mixed into water. We believed that tap, refrigerated and bottled water would evaporate faster because nothing would slow down the evaporation process. We tested our hypothesis by mixing different substances into 3/4 c. refrigerated water. Then, every three days, we marked on each cup how much the water level had decreased. Our results showed that oil did slow down evaporation the most because it sat on top of the water molecules. The water mixed with substances like salt, sugar, and cocoa also evaporated less quickly than the bottled and refrigerated water. Surprisingly, the tap water did not evaporate as quickly as we had hypothesized. We think this may be because it isn't filtered and minerals may have bonded with the water, causing it to evaporate less quickly than we had predicted. We learned that evaporation occurs constantly on the earth and provides us with things like salt.

Category: Physical Science - Chemistry

Student Name: Benjamin Cardon
Team Members (if any):

Project Title: The Effect of Different Kinds of Light on Paper

Abstract: Introduction: My mother is librarian. She wanted to know what kind of light she could use in a display case that would be safer than other kinds of light on paper and inks. Research Question: What kind of light will do the least damage to books and papers in a library display case? Research: I did some research to discover how light and heat accelerate acidification in paper. I also discovered the Kelvin number and the number of lumens produced by different kinds of light bulbs. Hypothesis: LED light will cause the least damage. Halogen will cause the most damage. Equipment and Procedure: I purchased four different light bulbs; a 60 watt halogen, a 60 watt incandescent, a 3.5 watt LED and a 1.5 watt florescent. I chose these because they produced similar number of lumens of light. I wired four light sockets and placed them and the light bulbs into four cardboard boxes, with one side open. Then I put a sample of newsprint and construction paper in each box. I also put a sample of each kind of paper in a fifth box without a light bulb. I turned on the lights and let them shine for a month. I measured and recorded the temperature in each box. Then I removed the paper and compared the amount of damage to each piece. Conclusion: As I had predicted, the halogen light did the most damage and the LED light did the least.

Category: Physical Science - Chemistry

Student Name: Hannah Chapman
Team Members (if any):

Project Title: Food Preservation Methods

Abstract: My question asked which substances (lemon juice, vinegar, salt, sugar) preserves an apple better? I thought that the lemon juice and vinegar would work the best because when I read about fruit preservation acids were supposed to work fairly well. I tested four substances on apples to see which one prevented browning. I found that lemon juice did the best, then salt, then sugar, and then vinegar (which browned faster than all of the apples).

Category: Physical Science - Chemistry

Student Name: Alex Childs
Team Members (if any):

Project Title: Don't Sweat It! Can Body pH Change the Effectiveness of Antiperspirant?

Abstract: Antiperspirant is dissolved by your sweat and then goes into your pores and plugs them up to stop sweating. Body pH can vary from person to person and is different in the morning than at night. My question was, will body PH change the effectivness of antiperspirant (will antiperspirant dissove faster in an acidic liquid or and alkaline liquid). My hypothesis was that the more acidic liquids would dissolve the antiperspirant faster than the alkaline liquids. To find out, I cut antiperspirant into cubes that were fifteen grams. I then soaked them in eight liquids with different pH levels to see which liquid would dissolve the antiperspirant most. These liquids were lime juice, tea, soy milk, milk, water, eggs, tuna, and ammonia. I then waited 24 hours. After 24 hours, I weighed the antiperspirant in each liquid again, and they were actually all 16 or 17 grams after the starting 15 grams. My conclusion was that body pH doesn't have an effect how well antiperspirant works.

Category: Physical Science - Chemistry

Student Name: Nicholas Cooper
Team Members (if any):

Project Title: Collecting Gas From Water

Abstract: Problem: What happens when an electric current passes through water? Hypothesis: I think the atoms in the water molecules will break apart because they will be attracted to the electric charges. I think the hydrogen will come faster than the oxygen because there are two hydrogen atoms and one oxygen atom in a water molecule. Methods: I will pour water into a bowl and add salt to conduct electricity. I made a platform with pencils to put over the bowl to hook up the battery to the water. I started the electricity flow. Soon I saw bubbles forming around the pencils. There was also residue at the bottom of the bowl. I found out that it was sodium hydrate from the sodium part of the salt that I added. Salt is sodium chloride, and the chloride was attracted to a pencil instead of one of the gases. That means that my hypothesis was neither proved or disproved because of the salt. If I did this project again, I would use something else instead of salt to conduct electricity.

Category: Physical Science - Chemistry

Student Name: Elissa Coral
Team Members (if any):

Project Title: Corrosion

Abstract: My project is on Corrosion, Corrosion is the act of being worn down, or rusted by a liquid. I chose this topic because I wanted people to have to stop, and think about it, and really want to learn more about it. My question is what metal will Corrode in what liquid? To find out what the answer was I took four different metals and placed them in four different liquids. After I did this I left the bowls in a room where they would not be disturbed and I could observe the bowls. I observed the bowls about every two days. After a week I took the metals out of the liquids and did my final observation for my experiment recording the results. The results were that all of the outcomes of each of the metals were all different. Each of the liquids had a different effect on each of the metals. The rust from the metals mixed into the liquids and changed the color of them.

Category: Physical Science - Chemistry

Student Name: Ashlie Cordero
Team Members (if any):

Project Title: The Effects of Temperature on Liquid Conductors

Abstract: For my experiment, I asked the question: In liquids that conduct electricity, how does the temperature of the liquid affect its ability to be a conductor? After researching conductors, the properties of liquids and electricity, I formed the hypothesis that liquids will conduct electricity more efficiently at a higher temperature. For my experiment I chose 5 different liquids: pickle juice, orange juice, cola, pureed salsa and antacid. I placed ¼ cup of each into plastic cups, 3 of each sample. One sample of each liquid was heated to 125°F, one sample of each liquid was cooled to 42°F and the other samples were left at room temperature which was 73°F. The room temperature samples were used as my control to establish a standard for conductivity. Each sample was then tested twice using an ammeter to measure the amount of current flowing through my circuit. I found that the liquid samples that were heated conducted electricity better than both the room temperature and the cooled samples. My hypothesis was correct. However, I was surprised that even at a higher temperature these liquids did not conduct enough electricity to light the small light bulb in my circuit. In our world we currently mine metals for use as conductors. I think that we should look at using liquid conductors that we can produce in order to help protect our environment.

Category: Physical Science - Chemistry

Student Name: Joaquin Coronel
Team Members (if any): Morgan Martin,Joaquin Coronel

Project Title: LEMON AND POTATO BATTERY

Abstract: My project is a LEMON AND POTATO BATTERY it works by metal and citric acid.First we tried to figure out how it would work,so we connected the wires into the nails and pennies,but it would not work.That was because we did not have enough power,and that was because we only had one lemon,so we added another one which made two but we still did not have enough power,then we added two more which made four,and it finally worked.Our hypothesis was would we make electricity with lemons and potatoes".Our goal was to create electricity without wasting energy.Actually you do not need to waste any more money on batteries because you have them at home.All you need is pennies nails alligator wires and lemons and potatoes.

Category: Physical Science - Chemistry

Student Name: Cameron Cox
Team Members (if any): Tessa Hatchett / Cameron Cox

Project Title: Are Permanent Markers Permanent?

Abstract: The purpose of our experiment was to observe what types of solvents could remove a dot of permanent marker on different materials. We thought that solvents containing alcohol would be the most effective in removing permanent marker from materials because alcohol is found in many cleaning products. We dipped five materials: paper, card stock, felt, cotton fabric & aluminum foil in to five different solvents: water, bleach, vinegar, rubbing alcohol, and nail polish remover for 10 seconds and then let them dry. The ink spots lifted" the most off of the materials where solvents containing some type of alcohol were used. We concluded that permanent markers aren't really permanent as they can be somewhat removed using alcohol-based solvents. Our hypothesis is correct

Category: Physical Science - Chemistry

Student Name: Luke Davis
Team Members (if any): Dillon Platt

Project Title: How Much Oxygen is in Air?

Abstract: Our purpose is to determine how much oxygen is in air by burning the oxygen out of a glass tube sealed at the bottom by water. Our references tell us that air is about 21% oxygen. We believe that the volume of gas inside a tube will be reduced by almost 21% when we use a candle to burn the oxygen out of the air in the tube. If we put the bottom of the tube in water, the water should come up into the tube to make up for the volume of the oxygen that gets burned out of the air. We put the candle on the candle stand and used a match to light the candle and placed the tube over the candle. We marked the water level on the tube after the candle went out. We repeated this experiment twice filling the tube with play-doh 3 inches deep and with play-doh 6 inches deep. We ended by calculating the fraction of the volume of gas removed by the candle burned during each test After the flame has been burning for a few seconds and it starts to go out, the water rise is noticeable. After the flame goes out the water level doesn't change. The bigger the volume of gas to start out, the higher the water level rises in the tube. The three tests gave almost exactly the same results and were a little less than the 21% number 19.5-19.6%.

Category: Physical Science - Chemistry

Student Name: Sydney Davis
Team Members (if any):

Project Title: Do Rocks Have Chemical Reactions to Household Items

Abstract: Do Rocks Have Chemical Reactions To Household Items? My purpose is which rocks out of igneous, metamorphic, and sedimentary will have a chemical reaction to household items! My hypothesis is that the sedimentary rocks will get the highest reactions to the chemicals. I think the sedimentary rocks will have the highest reactions because sedimentary rock is made with minerals from lakes, rivers and bodies of water. Most sedimentary rocks have looser minerals than igneous and metamorphic rocks! My research was done through the internet and by reading books. My test involved identifying the rocks, crushing the rocks, measuring the sample, observing the reactions the samples had with baking soda solution and with vinegar. The conclusion of the reactions confirmed that my hypothesis was correct. This investigation is important because it shows that simple household items can have a chemical reaction to something as basic as a rock!

Category: Physical Science - Chemistry

Student Name: Kawika Dipko
Team Members (if any):

Project Title: Melt Down

Abstract: Problem: Each winter in Utah we get tons of snow. During the day the snow melts but at night that water freezes. This makes it hard for travelers to drive. It was for this reason I wondered which substance melted ice the fastest. Hypothesis: I thought the ice cube with the table salt would melt fastest. Procedure: I got seven ice cubes and put them in equal sized bowls of the same material. I got a teaspoon of each substance (table salt, rock salt, sugar, baking soda, pepper, and sand) and poured it on an ice cube. I left one cube with nothing on it as my control. I recorded the appearance of each cube every two-five minutes. Results: The fastest to melt was the rock salt with an average of 37 minutes. The second to melt was the table salt with an average of 42 minutes. The longest to melt, outlasting the control, was the pepper which averaged 85 minutes to melt. Conclusion: Rock Salt melts ice quickly. I decided to look this up. I found that salt has a lower freezing temperature than water. Water freezes at 32 degrees F. Salt freezes at 20 degrees F. When salt dissolves into the ice, it lowers the freezing temperature. Pepper seems to preserve the ice and work as an insulator. Research suggests that the molecular bonding of pepper was able to absorb more heat without transferring it to the ice.

Category: Physical Science - Chemistry

Student Name: Kallai Dresen
Team Members (if any):

Project Title: Baby It's Cold Outside

Abstract: Playing outside in the snow is fun, but the excitement can be ruined by the cold. Hypothermia and Frostbite can result if a person is not insulated properly from the cold temperature. Which fabric insulates the best and keeps in the most heat? Will it still insulate the best if it becomes wet? This project investigates which of seven fabrics insulates the best and retains the most heat over a two hour period of time. To test this, equal thicknesses of the fabrics were wrapped around the sides, tops and bottoms of glass jars, which were then filled with boiling water. The water temperature was measured every thirty minutes. Fabrics were tested both wet and dry. The density of each fabric was found, and compared to the result to see if there was a correlation between density and insulation value. My hypothesis was that Polyester Polar Fleece would insulate the best when dry, and leather would insulate the best when wet. The experimental results supported my hypothesis by showing that the jar covered in Polyester Polar Fleece, when dry, retained the most heat throughout the two hours. It showed that, when wet, the leather retained the most heat. The experiment also demonstrated that most fabrics, when wet, actually cause a greater loss of heat than having no fabric on at all.

Category: Physical Science - Chemistry

Student Name: Matthew Dymock
Team Members (if any):

Project Title: High Altitude Baking

Abstract: ABSTRACT: Why do we have to follow special high altitude instructions when baking a cake or brownie mix here in Orem, UT? What will happen if we don't follow them? HYPOTHESIS: Following special high-altitude instructions printed on the cake mix or brownie box will make the baked product taller and fluffier. Following the regular instructions will make it flatter. METHOD: To answer these questions, we set out to make cake mixes and brownie mixes first by following the regular instructions and second, by following the high altitude instructions. To reduce factors that could change the outcome of the tests, we made one cake or brownie mix at a time. We stirred the brownie batter exactly 115 strokes; the cake batter exactly 2 minutes. We also baked them on the same rack in the same position all by itself in the oven. MY HYPOTHESIS WAS CORRECT! Following the high altitude instructions on a cake mix box and brownies box did bake taller products than following the regular instructions. This experience taught me that when you make baked goods at high altitudes, you need to adjust the recipes because of the reduced atmospheric pressure. One factor we hadn't considered when baking the brownies and the cakes was the weather conditions outside. We did our second tests on a snowy-rainy day. When the heights of all the cakes and the brownies were lower than the first test day, we wondered if the humidity had anything to do with it.

Category: Physical Science - Chemistry

Student Name: John Fluhman
Team Members (if any):

Project Title: Stain,Stain, Go Away

Abstract: My Question was: Which stain remover works the best? MY hypothesis was that the most expensive one would win. So I gathered some stain removers and stains. I placed the four stains evenly across a common dish rag. Then Each stain got sprayed by a stain remover. Then I let the stains and stain removers soak for 3 hours. After they finished soaking I put them in the washer. I determined which one was best by which stains came out the best.

Category: Physical Science - Chemistry

Student Name: Sydney Friesen
Team Members (if any):

Project Title: Yeast and Bread Dough

Abstract: The purpose of my project is to find out if the amount of active dry yeast put into bread dough affects how long it takes for the dough to double in size. 1. Put 2 t. of yeast in 3/4 c. of warm water. 2. Mix 2 c. bread flour with 1 t. of salt in a mixing bowl. 3. Add yeast mixture to flour mixture and stir until a rough ball forms. Knead dough for about 8 mins. 4. Form a ball with the dough then place it in a tall clear container. 5. Check the time on the clock and record time. 6. Measure the height of the dough and mark the height on the container using a washable marker. Double the height using a ruler and use the washable marker again to mark the doubled height. On the containers write batch 1, 2 and 3. 7. Make 2 new batches of dough only for batch 2 use 1 t. and for batch 3 use 1/2 t. When each batch reaches the doubled height record the time. Do the experiment 3 times. My hypothesis was incorrect because I thought the most amount of yeast would make the dough rise the fastest. But the batch with 1 t. rose faster than the batch with 2 t. by 1 min. The batch with 1/2 t. yeast did the worst. I think the during my experiment there was changes in the temperature of the house so that could have made the dough do better or worse.

Category: Physical Science - Chemistry

Student Name: Taylor Ann Gasser
Team Members (if any):

Project Title: Fat vs. Soap

Abstract: My scientific area of interest is molecules. I learned through my research that fat molecules in milk and soap molecules in dish soap react, and that by adding food coloring to a sample of milk and then adding dish soap, this reaction could be observed. Scientific Question Do fat molecules and soap molecules react? Hypothesis I started with the hypothesis that if fat molecules react with soap molecules, then by changing the amount of fat in a milk sample, the milk samples with more fat would react longer and more actively to the soap. Method I developed an experiment using the scientific method where I conducted several tests holding all variables constant except for the amount of fat in each milk sample. Then I observed and timed changes in the reactions of each sample. By doing so, I wanted to show that it is the fat molecules reacting with the soap molecules. Results My experiment proved my initial hypothesis to be incorrect. My initial hypothesis was that milk samples with more fat would react longer and possibly more actively to the soap. While it is true that in all my samples except for the samples of water and whipping cream there were visible reactions, I did not find it to be true that the more fat in the sample the longer or more active the reaction.

Category: Physical Science - Chemistry

Student Name: Jacob Gill
Team Members (if any):

Project Title: The Electrolyte Challenge

Abstract: Sports drinks claim to be a good source of electrolytes, but do you need a sports drink to get electrolytes, and is there anything better? My hypothesis is that there are other drinks that contain as much if not more electrolytes than sports drinks because common substances like sodium, calcium, and potassium can be electrolytes. Electrolytes are ions, or atomic particles that can conduct electricity. For this experiment, the amount of electrolytes was measured by measuring the amount of electric current that the liquid could conduct. I assembled a circuit with a current meter, a resistor, battery, and probe in a cup. My controls were the voltage (battery), resistor, amount of liquid, and distance the current travels through the liquid. The distance was kept constant by wrapping the wires around the ends of a plastic tube to make a probe that was inserted into the liquid. My variable was the liquid in the cup. I poured a measured amount of liquid in the cup, then connected the wire to the battery, and recorded the current measurement. After each measurement, the cup and probe were cleaned to remove any residue from the test. My test results showed my hypothesis to be correct. Both orange juice and milk contain more electrolytes than all sports drinks tested. Apple juice contained more than all but one sports drink. A couple of non-drinks (salt water and pickle juice) contained more than anything else tested.

Category: Physical Science - Chemistry

Student Name: Jeremy Green
Team Members (if any):

Project Title: Does Your Bike Have Gas?

Abstract: I wanted to see what type of air would last the longest in bicycle tires. I choose four types of air; Helium, CO2, Nitrogen, and air to fill the tires. My hypothesis is that the gas with the largest molecules will last the longest because the larger molecules will not escape from the tube as quickly. My results proved that Nitrogen, which has the largest molecule size, did last the longest.

Category: Physical Science - Chemistry

Student Name: JD Hadfield
Team Members (if any):

Project Title: Flying J.D.'s Oil Company

Abstract: Question: Can I really make biodiesel at home? Hypothesis: I believe that I can make biodiesel at home using common household products. Method: Make 3 batches of biodiesel and test these 3 batches using a water wash test. Result:My experiments proved that I can make biodiesel at home.

Category: Physical Science - Chemistry

Student Name: Louisena Harris
Team Members (if any):

Project Title: Play Doh Magic

Abstract: Question How do different kinds of flour affect the drying out of Play-Doh? Procedure 1. Make Play-Doh using different flours as the variable and controlling everything else except the temperature they dry out in. a.Follow the recipe 2. Use a ¼ Cup measuring cup to make three different balls from each of the kinds of dough. 3.Place one ball on the window sill, one in the oven on a cookie sheet, and one in a plastic bag with a tie. 4.Turn on the oven to 170 degrees, take the temperature of the window sill 5.Observe the Play-Doh's dryness after 1 hour, 2 hours, and 12 hours. Conclusion If you want normal or easy Play-Doh to play with or to build easier you could make the Play-Doh with all purpose flour. If you want Play-Doh to last longer but not easy to build with make the Play-Doh with whole wheat flour. But if you want Play-Doh to be rubbery and fun to play with but can not build anything then make it with garbanzo bean flour. Results Garbanzo bean Play-Doh dried out the fastest. Whole wheat flour was in the middle so it was maybe second for the driest. All purpose did the best for not drying out in 170 degrees. In 60 degrees garbanzo bean Play-Doh still dried out the fastest. This time all purpose flour was the second Play-Doh to dry out. But whole wheat did the best at not drying out.

Category: Physical Science - Chemistry

Student Name: McKay Harris
Team Members (if any):

Project Title: Alessandro Volta's Voltaic Pile (The First Reliable Battery)

Abstract: For my science fair project I used Alessandro Volta's Voltaic Pile (it was the first reliable battery that was invented), to see which combination of metals produced the most voltage. The metals I tested were brass, galvanized steel, stainless steel, copper, and zinc. I tested piles of 6 washers and piles of 12 washers for each combination. I thought copper and zinc would do the best because they were the metals Alessandro Volta used. I also thought 12 washers would do better than 6 because they would give the battery more strength. I tested each combination of metal with the different size piles. I couldn't get very reliable readings because the gauge on the voltmeter jumped up and down. I did the tests again to check my results. The readings were still very unstable. I decided to do more research to see if I was doing something wrong. I learned that the volts came from a chemical reaction between the metals. I realized that I had used a metal nail to hold the piles of washers. I decided to do all the tests again. This time I used a wooden stick. The results were very stable. I double-checked some of my results and they were good. I found out that stainless steel and galvanized steel with 12 washers each did the best.

Category: Physical Science - Chemistry

Student Name: Rachel Hatch
Team Members (if any): Megan Johnson

Project Title: Splish Splash

Abstract: What source of water has the least amount of alkalinity and calcium hardness and a neutral PH. We think that Smart Water will have the least amount of these substances--meaning that Smart Water is the healthiest for you--and that tap water will have the most--meaning that it is the worst for you. We tested Smart Water tap water drinking fountain water and Arrowhead water using test strips that measured alkalinity PH and calcium hardness. We found that Smart Water did have the least of these three substances. To our surprise ArrowHead water had the most--not tap water.

Category: Physical Science - Chemistry

Student Name: Tessa Hatchett
Team Members (if any): Cameron Cox & Tessa Hatchett

Project Title: Are Permanent Markers Permanent?

Abstract: Are Permanent Markers Permanent? The purpose of our experiment is to observe what types of solvent will be able to remove a dot/circle of permanent marker on different types of material. We predict that solvents containing alcohol will be the most effective in removing permanent markers since alcohol is found in many cleaning products. We began by preparing small rectangles of material. The materials we used were paper, aluminum foil, felt, cotton fabric and cardstock. Then we used a permanent and put a ½ inch circle/dot on the center of each piece of material. We filled a bowl with water (this was our control). Using tweezers we dipped each of the marked materials into the water and held it for 10 seconds. Then we removed it and allowed to dry on a flat surface. We repeated this process using rubbing alcohol, bleach, vinegar and nail polish remover. Once the materials were completely dry we observed: The water had no effect on the marker. Vinegar's effect was similar to water. Bleach faded the marker, but did not remove the pigment. Rubbing alcohol had begun to lift the ink and redistribute it throughout the fabric Nail Polish remover had a similar effect as alcohol, but to a lesser degree. We also noted the effect on the foil was quite different from the more porous materials. Our hypothesis was correct: Permanent markers are not permanent. It can likely be removed given enough time and using an alcohol-based solvent.

Category: Physical Science - Chemistry

Student Name: Wyatt Heaton
Team Members (if any):

Project Title: Got Gas?

Abstract: Question: will carbon dioxide,(CO2) weigh heavier or lighter than air? Hypothesis: I believe that the carbon dioxide (CO2) will weigh heavier than the air around us because of the things that i have learned in the past. Test with experiment: I did three diffrent stages and in each stage I tested it six times. Analyzed results or conclusion: My hypothesis was right and I have found two ways of figuering it out. The first way is that carbon dioxide is also commenly known as CO2 (one part carbon and two part oxygen) so carbon dioxide has two more atoms than oxygen (o) itself. The other way I is I made a very sensitive scale using a stick, wire, string, and 2 paper bags. Then I made carbon dioxide using baking soda and vinegar. The gas is invisible but flows like water so I can pour it out of the jar and into the bag and the bag will slightly go down I have also figured out that you need the right amount of baking soda and vinegar to produce enough carbon dioxide to pour And that is my full lab report.

Category: Physical Science - Chemistry

Student Name: Alinda Heder
Team Members (if any): Emma Lundell and Alinda Heder

Project Title: Acid Time

Abstract: With the focus on Global Warming and Going Green we wanted to see if we could use nature as a source of power. We had heard of experiments where lemons were used to make a clock run instead of a battery. We wanted to know if it was true and if other foods could be used. We researched the principle behind the lemon clock and found that Alessandro Volta invented the battery in Italy , in 1880, combining zinc, copper and an acid to create energy. A common lemon can provide the acid needed for the chemical reaction between zinc from a galvanized nail and copper wiring. First, we used a manufactured potato clock. It had a battery and almost every food we tested worked with it. We then concluded that the food was acting only as a conductor of the battery current and was not helping create the energy. Second, we replicated the manufactured clock using copper wiring, electrician clips and galvanized nails. This system did not contain a battery and we felt it was a better way to check our hypothesis. We tested various foods and found that the potatoes, cucumber, pickles and lemon juice would work while we could not get lemons, marshmallows and water to create a natural chemical reaction to produce electrical power. We concluded that the manufactured clock uses the moisture from foods to act as an electrolyte, while the homemade clock used the principle of acid electrolysis to make a digital clock run when connected with foods containing acid.

Category: Physical Science - Chemistry

Student Name: Brian Hoschouer
Team Members (if any): Jordan Butler

Project Title: What is the best way to de-salt se water

Abstract: Our hypothesis was that boiling and evaporation would be the best way to de-salt sea water. We wanted to see how we could make sea water drinkable. We made the sea water and then we tested it by boiling, evaporation and put some in the freezer. Boiling got rid of the water and just left us with salt. Evaporation made the salt level rise. Freezing was the best way because all of the salt went to the bottom and the top part of the frozen water had a much lower salt level. We also decided that if you could collect the steam during boiling it would be drinkable.

Category: Physical Science - Chemistry

Student Name: Jaden Howell
Team Members (if any):

Project Title: Got Cold Soda?

Abstract: My project is called Got Cold Soda?. What I was trying to do is find the fastest way to cool a soda. I decided on testing 4 different methods of cooling a soda. They were the refrigerator, the freezer, ice water and ice water with salt. I put 3 sodas in each cooling place and recorded the temperature of all 12 sodas every 5 minutes. The starting temperature of each soda was 62.5 degrees Fahrenheit. I used the same thermometer, the same type of soda, and got the sodas out of the same box of sodas. I found that the Ice Water with Salt cooled the soda the fastest. But after 50 minutes the Freezer got the soda coldest overall. I found this idea on sciencebuddies.com. It was approved by my teacher and highly recommended. I wanted to do this experiment so that during the summer if I wanted a cold soda, I would know the quickest way to cool my soda for a refreshing drink. Because I did this experiment my family and several others now know how to cool sodas fast and efficiently.

Category: Physical Science - Chemistry

Student Name: Michael Jensen
Team Members (if any): Logan Selley

Project Title: Firestarter""

Abstract: Out of Oak, Alder, Poplar, and Pine which wood will burn the longest? Soft woods such as pine are more porous and burn faster. Hard woods are more dense and less porous and will burn longer. Because Oak is a hard wood I think that it will burn longer. I gathered the materials and cut the wood. I placed charcoal evenly on bottom of fire pit and poured lighter fluid on it. When charcoal was heated evenly, I placed 4 pieces of wood on it. When the wood turned to ashes, I recorded the time. In my experiment I saw that all of the wood ignited evenly, but burned at different rates. Even though the wood pieces were the exact same size, they burned differently because of their density. The Pine burned out the fastest:18.2 minutes. Followed by Poplar:24.0 minutes. Then the Alder:25.2 minutes. Followed by Oak which burned the longest:42.0 minutes. My hypothesis was correct, the oak burned the longest.

Category: Physical Science - Chemistry

Student Name: Megan Johnson
Team Members (if any): Rachel Hatch

Project Title: Splish Splash

Abstract: See Rachel Hatch's abstract because we both work together on it.

Category: Physical Science - Chemistry

Student Name: Victoria Knight
Team Members (if any):

Project Title: Electrolysis to create chlorine

Abstract: I wanted to know if the chlorine would vary if the amount of time and salt changed during electrolysis and if salt or time would have the greater affect on the amount of chlorine. I started by measuring one cup of water and one teaspoon of salt. The first time I tried one minute then two then three. After I did that, I did the same thing only with 1/2 tablespoon then one tablespoon. I microwaved the salt and water solution for one minute to dissolve the salt. I put one end of the wires on each pole of the battery and the other end on the ends of the pencils facing the ceiling. After I timed it for one minute, I put in a chlorine test strip and stirred it around. I then compared the color with the chart found on the container of the test strips. I repeated this process with two minutes and three minutes. Once I repeated my procedure with all the variables, I found that my conclusion matched my hypothesis. The amount of time made more of a difference than the salt. When I did this I found that the hydrogen was flammable. I wish I could do this project again and focus on the flammable part instead. I had a lot of fun doing this project, it taught me a lot.

Category: Physical Science - Chemistry

Student Name: Carlee Kolibar
Team Members (if any):

Project Title: Affects of Acid on Teeth

Abstract: What effects the acids in foods we eat have on our teeth. I thought the citric acid in lemon juice would have the greatest effect on our teeth. I measured and photographed five wisdom teeth. I put the five teeth in cups with the different acids for seven days. I then compared the changes, and re-measured the teeth. The results proved that my hypothesis was correct, while other interesting facts were observed.

Category: Physical Science - Chemistry

Student Name: Rachel Lott
Team Members (if any):

Project Title: Crystal Clear Pool Water

Abstract: I wanted to find the best way to clean pool water. My hypothesis was that if I use the correct amount of chlorine and acid to adjust the pH levels, the water would be clean. I took a sample of water that had algae growing in it and tested it with different combinations of chemicals. During my research I found that a clarifier and the use of a filter is helpful in this process and added them to my testing. I found that the best way to keep pool water clean is the use of chlorine, acid and clarifier with the use of a filter.

Category: Physical Science - Chemistry

Student Name: Emma Lundell
Team Members (if any): Alinda Heder and Emma Lundell

Project Title: Acid Time

Abstract: With the focus on Global Warming and Going Green we wanted to see if we could use nature as a source of power. We had heard of experiments where lemons were used to make a clock run instead of a battery. We wanted to know if it was true and if other foods could be used. We researched the principle behind the lemon clock and found that Alessandro Volta invented the battery in Italy, in 1880, combining zinc, copper and an acid to create energy. A common lemon can provide the acid needed for the chemical reaction between zinc from a galvanized nail and copper wiring. First, we used a manufactured potato clock. It had a battery and almost every food we tested worked with it. We then concluded that the food was acting only as a conductor of the battery current and was not helping create the energy. Second, we replicated the manufactured clock using copper wiring, electrician clips and galvanized nails. This system did not contain a battery and we felt it was a better way to check our hypothesis. We tested various foods and found that the potatoes, cucumber, pickles and lemon juice would work while we could not get lemons, marshmallows and water to create a natural chemical reaction to produce electrical power. We concluded that the manufactured clock uses the moisture from foods to act as an electrolyte, while the homemade clock used the principle of acid electrolysis to make a digital clock run when connected with foods containing acid.

Category: Physical Science - Chemistry

Student Name: Gavin Marquez
Team Members (if any): Gavin Marquez,Bryce Parker,Chance Osbourne

Project Title: Salt Water and Air Battery

Abstract: In our experiment our purpose ask's How can we increase the production of electricity from a saltwater battery? Based on our reasearch which includes three reasources a book the internet and a personal interview we think adding hydrogen peroxide to the solution of a salt water battery will increase the production of electricity. The experiment is broken up into four steps. First the list of materials which shows all the equipment and materials needed to perform the experiments.The following materials are controlled variables which means they stay the same ours includes two electrodes two wires with alligator clips a light base a light bulb screws a container for the solution the solution and a wood base.The experimental variable which means it changes does not stay the same during the experiment is the hydrogen peroxide. Next is the step by step procedure which includes preparing the solution setting up the container and light base installing the light bulb to the light base placing the electrodes inside the solution container and attaching the the clips and wires. We then prepare to record our findings. Now for the experiment.We add the salt water solution to the container we time how long the light stays on for and we record out findings.We do the experiment twice changing the amount of hydrogen peroxide four times per experiment. We found that the amount of elecricity produced increased everytime we increased the amount of hydrogen peroxide.

Category: Physical Science - Chemistry

Student Name: Taran Marshall
Team Members (if any):

Project Title: What Types of Gas Make a Basketball Bounce the Highest?

Abstract: What Types of Gas Makes a Basketball Bounce The Highest? I believe that a basketball filled with Freon will bounce the highest due to its atomic weight. I will test the basketball not only filled with Freon, but also Helium, Nitrogen, pure Oxygen and the air we breathe. The basketball was filled first with the air we breathe and dropped from the top of a ladder exactly eight feet above the ground. I performed the same controlled test with each of the remaining gases and measured the results with a camcorder in slow motion. My results showed that Freon made the basketball bounce the highest due to its atomic weight. I found that the higher the gases atomic weight, the more the basketball would bounce.

Category: Physical Science - Chemistry

Student Name: Morgan Martin
Team Members (if any): Joaquin Coronel and Morgan Martin

Project Title: Lemon and Potato Battery

Abstract: My project is a LEMON AND POTATO BATTERY it works by metal and citric acid.First we tried to figure out how it would work,so we connected the wires into the nails and pennies,but it would not work.That was because we did not have enough power,and that was because we only had one lemon,so we added another one which made two but we still did not have enough power,then we added two more which made four,and it finally worked.Our hypothesis was would we make electricity with lemons and potatoes".Our goal was to create electricity without wasting energy.Actually you do not need to waste any more money on batteries because you have them at home.All you need is pennies nails alligator wires and lemons and potatoes.

Category: Physical Science - Chemistry

Student Name: Rylee Maughan
Team Members (if any):

Project Title: Ice & Salt

Abstract: Abstract Why does salt appear to melt ice? After watching people put salt on the ice on their sidewalks and entryways, I decided to find out why. When I did some research, I found that salt water has a lower freezing temperature than fresh water. For my experiment I tested the temperature of ice, and the temperature of an ice/salt mixture. I found out that the ice/salt mixture temperature was below 0 degrees Celsius. If water freezes into ice at 0 degrees, then the salt is keeping the water from freezing.

Category: Physical Science - Chemistry

Student Name: Hannah McKay
Team Members (if any):

Project Title: What liquid dissolves a Tootsie Roll the fastest?

Abstract: Purpose: The purpose of this science fair experiment was to find which of six types of liquids would dissolve a piece of a Tootsie Roll. Problem Statement: The hypothesis was that the vinegar would dissolve the candy first followed by water, hydrogen peroxide, dissolved baking soda, lemon juice and lastly the laundry detergent. Procedure: When I started the experiment I made sure to get a dark room so know light would affect the dissolving procedure. I covered the area from spills, put straws in the measured Tootsie Rolls to know where they were, measured the liquids, and waited hours for the Tootsie Rolls to dissolve. Results: I did four total experiments; the first was in November where I waited overnight. By the morning, they had all completely dissolved except the laundry detergent. The next experiment was during the day. The results of this trial in order of dissolution (from fastest to slowest) were: water, baking soda dissolved in water, hydrogen peroxide, lemon juice, vinegar, and laundry detergent. On the next trial I got the same results, except hydrogen peroxide dissolved second and baking soda dissolved third. On the last trial I got the same as the second. Conclusion: The results of my experiment negate my hypothesis. I hypothesized that vinegar would dissolve the candy first because it was an acid. The results of this experiment showed that water, hydrogen peroxide, baking soda, and lemon juice all dissolved the candy faster than vinegar.

Category: Physical Science - Chemistry

Student Name: Mekinzie Meeks
Team Members (if any):

Project Title: How Slow Will They Go?

Abstract: My question for the science fair was: Which of the following candies will dissolve the least in six and a half hours? The candies I used were Smarties, Skittles, M&Ms, jellybeans, gumdrops, marshmallow, and gummy bears. I predicted that the jellybean would dissolve the least because it had a hard glaze coat and is harder to chew. The first step I took was to get everything ready, such as the water. Then I measured each candy and recorded the data in my journal. I began the experiment by having family members drop a piece of candy into a bowl of water when I said go. Every half hour I measured the candies and recorded the results in my journal. This experiment went on for six and a half hours. When I finished there was more than one candy left. I changed the beginning and end measurements into volume and subtracted them to see which one dissolved the least. My conclusion was that the M&M dissolved the least. I think that is because the center is made of chocolate. And because the M&M is made out of chocolate it might of helped it be preserved from the water. M&Ms also have lots of gelatin and gelatin dissolves slowly, I that gelatin was put into the center of the M&M. Because of that, it slowly dissolved as the water eroded it away. I was pretty close with my prediction for the jellybean.

Category: Physical Science - Chemistry

Student Name: Bryson Meiling
Team Members (if any):

Project Title: Calcium Smackdown: Acid vs. Base

Abstract: I learned that calcium is highly reactive. I wanted to find out if it was equally reactive with acids and bases. My hypothesis was that it would react equally with the strongest acids and bases. I used egg because their shells are made of calcium. I soaked the shells in different strengths of acid and bases. I measured the solutions with pH strips. I recorded my observations and at the end of four days I broke the eggs (or what was left of them) and measured the shell thickness with calipers. I discovered that vinegar (pH 4) completely dissolved the egg shells. However, lemon juice (pH 3.5) only partially dissolved the shells. I learned that the lemon juice combined with the calcium to form a new solution. The nuetral solution and weakest base had no effect on the shells' thickness. The strongest base, washing soda (pH 11) caused the shell to dissolve in some spots and become grainy and thick in other spots. Vinegar was the most reactive with the calcium.

Category: Physical Science - Chemistry

Student Name: Kaelin Morphis
Team Members (if any):

Project Title: The Power of Calcium

Abstract: Purpose: To demonstrate the true importance of calcium in our daily lives. Problem: A lack of calcium in our daily diet can lead to osteoporosis and, as demonstrated in my experiment, a weakening of the bone structure causing softness and breakage. Procedure: I used vinegar, which contains a mild acid, as a means to break down the calcium in the eggs and chicken bones to see if it would cause the egg shell and bones to deteriorate. Results: After soaking the eggs shells and chicken bones in vinegar for 3 days, the egg shells and bones Became weak and soft. Conclusion: If our bones do not have enough calcium to maintain their structure, they will bend and break easily.

Category: Physical Science - Chemistry

Student Name: McKenna Murdock
Team Members (if any):

Project Title: To Smell or Not to Smell...

Abstract: When I'm sick and have a stuffy nose, foods don't taste very good to me. It made me wonder if the sense of smell has an affect on the ability to taste. I decided to found out by conducting a taste test. I hypothesized that volunteers wouldn't be able to taste as well when they couldn't smell what they were eating. I chose foods that included salty, sour, bitter, and sweet flavors because our tongues have taste buds to recognize them. I changed the texture of the foods so they couldn't be identified by their texture. I also served them at room temperature, because temperature can affect taste. I invited volunteers to come into a room one at a time blindfolded, and asked them to describe each flavor and to identify the food if they could; first with their nose plugged, and then without. I had them rinse out their mouth with water between each food. After my experiment, I accepted my hypothesis. I found that the volunteers used more descriptive words to describe foods, and they could identify more foods correctly when their noses were unplugged. It was interesting that when they were given the candy mint, all of them described the flavor as being sweet, but since the tongue can't identify mint, no one tasted mint until their noses were unplugged. In my research I found that the nose can identify over 1,000 different smells, but the tongue only has taste buds for salty, sour, bitter, and sweet flavors. So the nose is responsible for 70 percent of our ability to taste! I also found that the nose and mouth passages

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come together at the back of the throat. I think this explains why some people were still able to identify certain strong smelling foods even when their noses were plugged.

Category: Physical Science - Chemistry

Student Name: Jennica Orton
Team Members (if any):

Project Title: Without A Trace--Forensic Frenzy or Laundry Liberty?

Abstract: My science fair project was titled Without A Trace Forensic Frenzy of Laundry Liberty. I read an article on Science News about some scientists who tested an oxy cleaner on blood samples to see if it removed all traces of blood undetected by forensic tests. I thought it was so cool I wanted to try a similar test. I didn't have the cool forensic tests so I had to try something else. My question was is it possible to remove all traces of blood with an oxy-cleaner? Is there a chemical reaction involved in the process? I hypothesized that the oxy-cleaner will remove all blood traces from all fabric samples because the iron in blood attaches itself to oxygen. I used hydrogen peroxide as a control because I new it had a chemical reaction. Liquid Tide was used for a comparison cleaner. I further hypothesized that blood traces will be detected in the fabric samples using hydrogen peroxide and liquid Tide. I used a microscope to observe the reactions. The results were cool! I concluded that Hydrogen peroxide chemically reacted with blood by bubbling. It didn't have enough oxygen to saturate the blood and totally remove the blood. Liquid Tide didn't really take away any of the blood of any of the materials but it got it out of the cotton the best. The oxy-cleaner was awesome! It got out all the blood on most of the materials as seen through the microscope. It worked the best.

Category: Physical Science - Chemistry

Student Name: Chance Osborne
Team Members (if any): Gavin Marquez and Bryce Parker

Project Title: Salt Water and Air Battery

Abstract: Are purpose is, how can we increase the production of electricity from a salt water battery? Hypothesis: adding oxygen to the solution of a salt water battery will increase the production of electricity. Two of our research sources said that increased oxygen in the solution increases the rate the electrons move from one electrode to the other electrode or that the process is more efficient. Based on our research we think adding oxygen to the solution will increase the production of electricity. The methods that were used were: purpose, research, hypothesis, experiment, analysis and conclusion. The results of our experiment confirmed our hypothesis. Adding oxygen in the form of hydrogen peroxide increased the production of electricity in the salt water battery. We learned that adding oxygen to the salt water solution increased the life of the battery. We learned that changing the components of a battery can change the life of the battery. We also learned that batteries use chemical reactions to produce electricity.

Category: Physical Science - Chemistry

Student Name: Megan Oscarson
Team Members (if any):

Project Title: Everlasting Gobstoppers

Abstract: Question: What liquid will dissolve a Gobstopper the most after 10 hours, lemon juice, distilled water, tap water, vinegar, or condensed milk? Hypothesis: I thought that the lemon juice would dissolve it the most, because it is an acid, and acids eat away at things. Methods: I put each of the liquids in a separate clear cup. Then, I put a Gobstoppers in each of the cups for ten hours. After ten hours I took them out of the liquids. Results: It turned out that all that were in the liquids, except for the condensed milk dissolved.

Category: Physical Science - Chemistry

Student Name: Bryce Parker
Team Members (if any): Gavin Marquez & Chance Osborne

Project Title: Salt Water And Air Battery

Abstract: First is the purpose which is a question about our project that can be answered using the experimental process. Our purpose is asking how can we increase the production of electricity from a salt water battery. Next we did research. We researched three sources which were a Chemical Engineer, a book and the internet to gather our information about or project. We found out that there is more than one way to increase the production of electricity in a salt water battery. Our hypothesis is: Adding oxygen to the solution of a salt water battery will increase the production of electricity. Our experiment was to increase the oxygen in our battery to see if more electricity was made. We prepared a salt water solution, placed a 250 ml container with metal electrodes in it on a table, connected the electrodes to a light bulb and measured 200 ml of solution to pour into the 250 ml container. We did this four times increasing the oxygen level with hydrogen peroxide each time. When finished we did the experiment again. All of the materials in our experiment were controlled except for the solution with added hydrogen peroxide which was an experimental variable. Our conclusion is that adding oxygen to the salt water solution will increase the production of electricity of our battery. Our experiment confirmed our hypothesis.

Category: Physical Science - Chemistry

Student Name: Sienna Peck
Team Members (if any):

Project Title: Operation Soap: Clean Chemical Reaction

Abstract: I became interested in the chemistry of soap when I learned about how when certain molecules bond, the end result forms a completely different type of product. This made me wonder how a waxy bar of soap can clean since the main ingredient is fat/oil. The question I asked was: how is soap made and which type of oil/fat would create the best chemical reaction? The hypothesis I formed: liquid oils mixed with sodium hydroxide would take longer than solid fat/oil. Using the basic recipes, I made 3 types soaps. Each type of soap had the same amount of oil/fat, sodium hydroxide, and distilled water. I also used the same process for making the soaps to ensure the control agent for the recipes were exactly the same. My hypothesis of liquid oils and sodium hydroxide taking longer chemically bond was entirely wrong. The olive oil soap actually took the least amount of time to trace, or saponification to take place. My conclusion is that oils in liquid form are quicker to heat and maintain it's heat at a steady level. Therefore, when the liquid oil mixes with the sodium hydroxide, the chemical reaction is much quicker since there are no other solid molecules that already exists. Compared to the soaps made of shortening and butter, which are in solid forms to begin with, the saponification for solid oil/fat takes longer to process. However, the quicker saponification, the more separation of the oil due to it's original liquid form.

Category: Physical Science - Chemistry

Student Name: Alyssa Phillips
Team Members (if any):

Project Title: Does Chewing gum affect the temperature of your mouth?

Abstract: I was curious if the flavor of the gum made a difference in the temperature of your mouth when chewing, or does chewing nothing increase the temperature of your mouth. My hypothesis was that the act of chewing nothing will still increase the temperature in your mouth a small amount. Chewing cinnamon flavored gum will increase the temperature more than chewing mint flavor because it is a hotter flavor. I divided my class into 3 groups of 10 for my experiment. 1 group chewed nothing, 1 chewed mint gum, and 1 chewed cinnamon gum. I took their temperature before starting the experiment, 2 minutes after chewing, and then they chewed for 2 more minutes and threw their gum away keeping their mouths closed after which I took a 3rd temperature after 5 minutes. My hypothesis was correct because all three chewing experiments increased mouth temperature. However, chewing either flavor of gum increased mouth temperature more than just the act of chewing. Mint gum increased the average mouth temperature by about .6% and cinnamon about 1.2%. In conclusion, energy is produced when you chew which increases the temperature no matter what you are eating. This is similar to exercise. Although certain things you eat can make a chemical reaction in your mouth which can increase the temperature more.

Category: Physical Science - Chemistry

Student Name: McKelle Pierce
Team Members (if any): Kaylie Pierce

Project Title: Which Liquid Keeps a Rose Fresh the Longest?

Abstract: We heard that Sprite in water will keep a flower fresh longer than plain water. If this is true; is it the sugar in the soda pop or the carbon dioxide? If it isn't true then what other liquid works the best. We had 5 roses. We put them in 5 different liquids; 3 C. plain water, 3 C. water & 6 1/4 tsp. sugar (same amount as in 1 C. of soda pop), 3 C. water and 1 packet commercial flower preservative, 2 C. water and 1 C. lemon-lime soda pop, and 2 C. water mixed with 1 C. club soda. One of us thought the flower presevative would be the best. The other person thought the club soda would be the best because it has carbon dioxide in it and that's what plants use. Two liquids were the best, in two different ways. The stem of the flower in plain water stayed firm the longest but the bud fully opened early in the process. The flower in the commercial preservative lasted nearly as long as the one in plain water and kept a nice tight bud the whole time. Flower preservative works so if you get some with your flowers, you might as well use it. But if you don't have any, plain old water seems to have everything a plant needs. Nature knows what it's doing!

Category: Physical Science - Chemistry

Student Name: Kaylie Pierce
Team Members (if any): McKelle Pierce

Project Title: Which Liquid Keeps a Rose Fresh the Longest?

Abstract: We heard that Sprite in water will keep a flower fresh longer than plain water. If this is true; is it the sugar in the soda pop or the carbon dioxide? If it isn't true then what other liquid works the best. We had 5 roses. We put them in 5 different liquids; 3 C. plain water, 3 C. water & 6 1/4 tsp. sugar (same amount as in 1 C. of soda pop), 3 C. water and 1 packet commercial flower preservative, 2 C. water and 1 C. lemon-lime soda pop, and 2 C. water mixed with 1 C. club soda. One of us thought the flower presevative would be the best. The other person thought the club soda would be the best because it has carbon dioxide in it and that's what plants use. Two liquids were the best, in two different ways. The stem of the flower in plain water stayed firm the longest but the bud fully opened early in the process. The flower in the commercial preservative lasted nearly as long as the one in plain water and kept a nice tight bud the whole time. Flower preservative works so if you get some with your flowers, you might as well use it. But if you don't have any, plain old water seems to have everything a plant needs. Nature knows what it's doing!

Category: Physical Science - Chemistry

Student Name: Dillon Platt
Team Members (if any): Luke Davis

Project Title: How Much Oxygen Is in Air.

Abstract: Our purpose is to determine how much oxygen is in air by burning the oxygen out of a glass tube sealed at the bottom by water. Our references tell us that air is about 21% oxygen. We believe that the volume of gas inside a tube will be reduced by almost 21% when we use a candle to burn the oxygen out of the air in the tube. If we put the bottom of the tube in water, the water should come up into the tube to make up for the volume of the oxygen that gets burned out of the air. We put the candle on the candle stand and used a match to light the candle and placed the tube over the candle. We marked the water level on the tube after the candle went out. We repeated this experiment twice filling the tube with play-doh 3 inches deep and with play-doh 6 inches deep. We ended by calculating the fraction of the volume of gas removed by the candle burned during each test After the flame has been burning for a few seconds and it starts to go out, the water rise is noticeable. After the flame goes out the water level doesn't change. The bigger the volume of gas to start out, the higher the water level rises in the tube. The three tests gave almost exactly the same results and were a little less than the 21% number 19.5-19.6%.

Category: Physical Science - Chemistry

Student Name: Austin Prete
Team Members (if any):

Project Title: How does bleach affect various materials over different lengths of time?

Abstract: The purpose of my experiment was to find out how various materials would react to being exposed to bleach. My hypothesis was that the materials with natural fibers in them would be affected more by the bleach than materials with synthetic fibers. To find this out, I bought six different materials for testing: 100% silk, 100% nylon, 100% cotton denim, 100% wool, 87% nylon/13% spandex, and vinyl. I then cut each material into six even pieces. Then I got six plastic containers and labeled each one of them with a different material name. I put five pieces of each material in the container that it belonged in. I left one piece out of each material so I would know what it looked like before being exposed to bleach. Then I poured two cups of Clorox bleach into each container. I pulled a piece out of every container at: 1 hr., 3 hrs, 12 hrs, 24 hrs, and 48 hrs. After pulling out the pieces after one of the intervals, I rinsed them off under water and observed the results. When I pulled out pieces of material from the bleach, I wore safety glasses and gloves for protection. After the first hour the silk pieces had fused together and it had turned from blue to yellow. The other two materials with natural fibers were badly damaged also. The materials with synthetic fibers were not damaged as much. From the results of my experiment I can determine that my hypothesis was correct.

Category: Physical Science - Chemistry

Student Name: Anya Ragnhildstveit
Team Members (if any):

Project Title: Air Pressure

Abstract: Question: Will the pressure of a soccer ball affect the distance it travels? Hypothesis: I think that if you put more pressure into the ball it will travel a further distance. Usually at soccer games the referees ask for a harder ball so I thought it had to do with the air pressure. Procedure: To test my hypothesis I had people in my family kick the soccer ball with different amounts of air pressure. I was going to measure and record my results, but I realized that no one could kick the soccer ball with the same power and speed. How could I kick the ball with the same power and speed each time? I thought of something I could build out of wood. It is a swinging foot and at the end of it there is a soccer shoe. I used my model to kick the soccer ball with different amounts of air pressure in it. I then measured and recorded my results. I also wondered if the surface affected the distance it traveled instead of the pressure. I tested my experiment on 3 different surfaces: grass, pavement and carpet. Conclusion: I learned from my experiment that it doesn't matter how much pressure you put on the ball it still travels the same distance. But the surface does affect the distance it travels.

Category: Physical Science - Chemistry

Student Name: Daniel Rentfro
Team Members (if any):

Project Title: Environmentally Friendly Ice Bulb

Abstract: My Question was if you could run an Ice Bulb off of lemons,could you provide an alternative energy source. My Hypothesis was that i thought it would work, because it should provide sufficient power to run the LED Light inside the Ice Bulb, while also showing the physical properties of ice, such as the fissures and cracks. I was able to run the LED Light off of the lemons, but I did not get enough Amperage to run the LED Light efficiently.

Category: Physical Science - Chemistry

Student Name: Valeria Rodriguez
Team Members (if any):

Project Title: How does the size and weight of a potato affect the amount of electricity it can make?

Abstract: My purpose is How the size and weight of the potato affect the amount of electricity it can make? My hypothesis is that the biggest potato will produce more electricity because I thought it had more water soluble chemicals.The results were that my first potato had a voltage of .934 and my second potato had a voltage of .910 and the last potato had a voltage of .886

Category: Physical Science - Chemistry

Student Name: Logan Selley
Team Members (if any): Michael Jensen

Project Title: Fire Starter

Abstract: Out of Oak, Alder, Poplar, and Pine which wood will burn the longest? Soft woods such as pine are more porous and burn faster. Hard woods are more dense and less porous and will burn longer. Because Oak is a hard wood I think that it will burn longer. I gathered the materials and cut the wood. I placed charcoal evenly on bottom of fire pit and poured lighter fluid on it. When charcoal was heated evenly, I placed 4 pieces of wood on it. When the wood turned to ashes, I recorded the time. In my experiment I saw that all of the wood ignited evenly, but burned at different rates. Even though the wood pieces were the exact same size, they burned differently because of their density. The Pine burned out the fastest:18.2 minutes. Followed by Poplar:24.0 minutes. Then the Alder:25.2 minutes. Followed by Oak which burned the longest:42.0 minutes. My hypothesis was correct, the oak burned the longest.

Category: Physical Science - Chemistry

Student Name: Jonathan Shawgo
Team Members (if any):

Project Title: Chromatography II: Man vs. Nature

Abstract: Do naturally colored substances or artificially colored substances have more variations of pigments? I hypothesize that artificially colored substances will have more variations of pigments. To test this hypothesis, I dot a filter paper strip with a solute, repeating multiple times to build up a sufficient quantity. Next, I mark the original location of the solute and suspend the paper in a small amount of solvent so that the end nearest the dot just touches the liquid. After the solvent rises up the paper to 1-2 centimeters from the top of the filter paper, I remove the paper and mark the height of the solvent and each color variation along the length of the paper. I then measure the distances traveled by the different color elements of the solute and the distance traveled by the solvent and calculate the Rf value (solute distance/solvent distance). Carrots and Orange Skittles each only had two pigment variations while all the others had three variations. Green Dye had the highest average Rf value followed by Orange Dye. Next came Spinach and Flower Petals. The most distinct and unexpected color variations were in the flower petals. Neither variations in color nor Rf values seemed to indicate whether a substance was naturally or artificially colored. This would seem to indicate that chromatography needs to be taken to the next step of identifying actual elements in a substance by name to determine whether they are artificial.

Category: Physical Science - Chemistry

Student Name: Tallin Shelley
Team Members (if any):

Project Title: The Chemistry of Crystals

Abstract: Growing crystals is an important scientific activity. Scientists are using different methods to grow silicon crystals to use as semiconductors. Other well-formed crystals are used in many different products. Some of these include microchips, video cameras, radiation detectors, digital watches, semiconductors, infrared sensors, and tiny solid-state lasers. In this project, I grew three different types of crystals: salt, sugar, and alum. I used the metric system to measure the ingredients for each crystal and used sterile equipment. I wanted to find out which crystal would grow the largest, which one the fastest, and which one the most. I hypothesized that the salt crystals would grow the fastest, the sugar crystals would grow the most, and the alum crystal would grow the largest. It took me several days to grow all of the crystals, except for the sugar crystals. Other things I noticed were that the alum crystals did not accept the food coloring. The salt crystals were really beautiful, but very fragile. The alum crystals grew overnight from the solution. The results showed that the sugar crystals grew the fastest, the salt crystals grew the most, and the alum crystals grew the largest. I learned that there are many different types of crystals and each have unique properties. I also learned about the different uses of crystals in technology. I also learned how to change liquids into solids. Finally, I thought that crystals were just parts of rocks found in the earth, not something that could be grown.

Category: Physical Science - Chemistry

Student Name: Abigail Stallard
Team Members (if any):

Project Title: Germs and Water

Abstract: What will kill germs better, cold water or hot water. I believed that hot water would kill more germs because I don't think germs can live as well in steamy climates. I used germ juice gel to simulate germs on my hands and washed them in cold water and in hot water for the same amount of time and in the same way. My hands had less germ juice on them under a black light after I washed them in hot water than withthe cold. I also coated two petri dishes and got the same result.

Category: Physical Science - Chemistry

Student Name: Sarah van Dijk
Team Members (if any):

Project Title: Great Globs of Gluten

Abstract: For my project I did it about gluten. I wanted to see what type of flour would have the most gluten, I had strong baking flour, whole wheat flour, real pastry flour from panderia flores bakery, pastry flour from lehi roller mills, turkey flour, western family white flour, and cake flour. For my hypothesis I thought that strong baking flour would have the most gluten because the flour looked like it had lots of gluten in it. As my research and background I found out that gluten is made out of two proteins, gliadins and glutenin. Gliadins are amino acids that are clumped up in a ball. Glutenins are also amino acids that are long chains that are winded around each other. For my experiment I weighed 80g. Of flour and added ¼ a cup of water. I did this to each flour. I rinsed the dough ball through water to wash away the sugar (starch). I did each flour 3 times then added them up and averaged each flour. Then made a bar graph and found out that whole white wheat had the most gluten. So I was wrong that strong backing flour had the most gluten. But really it depends on what you're making if you are making like fluffy stuff you want less gluten and if you are making hard bread you want more gluten. So this is my project and I hope that you like it. :)

Category: Physical Science - Chemistry

Student Name: Kennedy Voran
Team Members (if any):

Project Title: Nail Oxidation

Abstract: My science project is based on the hypothesis that I believed salt water would rust a nail faster than several other solutions. To test this hypothesis I placed a nail in a cup with an equal amount of each solution being tested in a plastic container. I then checked the nails three times on weekly intervals for three weeks. The progress of oxidation for each nail was tracked for each week. At the end of the three week period I found that my hypothesis was incorrect. My finding showed that tap water rusted the nail the fastest.

Category: Physical Science - Chemistry

Student Name: Jake Whiting
Team Members (if any):

Project Title: Crazy chemicals and he safety of our local water.

Abstract: For my project I wondered if the local water was safe to eat and drink from. I tested ph, nitrates, phosphates and mercury levels. My question was which water source has higher ph, nitrates, mercury and phosphate levels-- tap water, Deer Creek or Jordanelle? I chose this project because water safety is important to the environment. My variables were Jordanelle Reservoir, Deer Creek Reservoir and tap water. I collected 500 to 600 ml of water in clean mason jars. Then I tested with Lamotte PH, nitrate and phosphate testing kits. I tested for mercury with a Boris Mercury Check water test strips testing kit. I tested for each three times and recorded my results. I found that Jordanelle has higher levels of nitrates and phosphates than Deer Creek. Jordanelle has lower levels of pH than Deer Creek and equal mercury levels. I tested the water in my three variables but found no mercury levels, because my mercury test kit was probably not very accurate and would only detect really high levels of mercury. I found that Heber city's tap water is safe to drink. I have also concluded that Deer Creek is safe, but not ideal for fish to live in because of high nitrate levels in the water. Jordanelle has very high levels of nitrates which may be caused by the golf course just upstream of the reservoir because chemical fertilizer is used on golf courses and contains a lot of nitrates and phosphates.

Category: Physical Science - Chemistry

Student Name: Sydney Willes
Team Members (if any):

Project Title: Cooked To Perfection

Abstract: I chose my project because I love baking. I picked 3 different kinds of cookie sheets to test which one will cook the best tastng cookie and best looking cookie. I will also test to see if it matters to use a hot pan or a cold pan. My hypothesis is... If I test 3 different kinds of cookie sheets then I predict the stone ware pan's cookies will be kind of gooey because the pan is so thick." My question is... "Which cookie sheet cooks the most consistent and best cookie?" My experiment... Starting with a cold pan I will put it on the pan and cook it for 10 minutes at 375 degrees F. My ingredients are... Betty Crocker Chocolate Chip Cookie Mix Blue Bonnet Stick Butter (softened) and 1 egg. Then imediately after the first batch take them out and while the pan is still hot put another batch of cookies on the pan giving you the pre-heated pan. Then repeat with the other 2 pans. I took a survey on the best looking and tasting cookie and put it into graphs. My results came out as the stone ware pan was best both cold and pre-heated. I feel my project can help a lot of people and I am glad I got the oportunity to do this.

Category: Physical Science - Chemistry

Student Name: Spencer Wilson
Team Members (if any):

Project Title: Thermal Transfer of Various Synthetic and Natural Fiber Weaves Subjected to Wet and Dry Cooling (i.e. Which Cloth is the Best Insulator?)

Abstract: In this project I decided to question the wet and dry insulating quality of three different kinds of socks: wool, cotton, and nylon. I used a metal water bottle, a thermometer, a boiling pot of water, a fan, and a timer. First, I filled the metal water bottle with the boiling water and I recorded the initial temperature of the water in the bottle. I put the sock over the bottle. I turned the fan on and started the timer and recorded the water temperature every minute for eight minutes. After taking measurements for each sock, the water from the bottle was replaced in the pot of boiling water and then the water bottle was refilled from the pot. I used each sock in dry and wet form, and also took measurements on just the bare bottle as a control. Based on those results, I made a graph of how the temperature dropped with each sock. I concluded that dry wool is the best insulator. I also figured out that wet cotton would be the worst, and that wearing no socks or clothes is better than wearing wet material of any type.

Category: Physical Science - Chemistry

Student Name: Christian Wright
Team Members (if any):

Project Title: The Effect of Temperature on Battery Performance

Abstract: I experimented to answer the question, How does temperature affect battery performance? I learned that batteries function because of electron flow of the chemicals inside them. Knowing that because heat excites atoms whereas cold slows them I hypothesized that the colder a battery is kept the better it will perform. I experimented by putting battery-operated flashlights in the freezer refrigerator at room temperature and over a heat source to see how temperature affected the batteries by observing the brightness of the lights. I conducted two trials using a different type of batteries each time and determined the brightness of the lights by shining the lights on a photocell connected to a multimeter in a mini darkroom that I made. I recorded the resistance which was measured in ohms for each flashlight and compiled the data into a chart. From here I determined that my findings were not completely consistent with my hypothesis; the flashlight in the freezer did not perform as well as the one in the refrigerator. I conclude that using batteries in very high or very low temperatures has negative effects on their performance. In order for the batteries to perform their best they should be used at a range of temperatures from slightly cool to slightly warm.