Category: Physics

Student Name: Marcus Augenstein
Team Members (if any):

Project Title: Paper Airplanes

Abstract: Have you ever wondered what type of paper airplane flies the best? I know that I have. The term best" in my experiment meant distance traveled by the airplane. My dad and I folded eight different airplanes. my dad then threw each of the planes equally to the best of his ability. We threw each plane three times and recorded the average. My hypothesis was that an airplane named "The Pablo Picasso" would fly the farthest. I also stated that the airplane "Gimpy" would be the worst. The independent variable in this experiment was the different kinds of paper airplanes. The dependent variable was the distance traveled by the paper airplanes. I controlled my experiment by having my dad throw each paper airplane model equally to the best of his ability. I tested all of the airplanes on the same day in the same room and under the same conditions. My hypothesis was proven wrong because a paper airplane called "The Flying Dart" flew the farthest. I believe this happened because "The Flying Dart" had a good balance of lift weight drag and thrust. Those are the forces needed to have a long flight. The worst paper airplane was called "The Ring of Fire". I hope that this experiment will be effective and informative.

Category: Physics

Student Name: Mitchell Baker
Team Members (if any):

Project Title: Cereal Killers

Abstract: I wanted to see if a serving of cereal had more energy than an equivalent serving of the box it came in. Energy in this case is expressed as calories so to calculate the amount of calories in a substance I built a "calorimeter". A calorimeter is basically two cans (one bigger than the other) and a needle that is placed below the smaller can (which has distilled water in it). It works by first: weighing the sample (m1) and taking the temperature of the water (t1) then impaling the sample on then needle then lighting the sample on fire beneath the smaller can until the sample has burned itself out. Then weigh the burnt remains (m2) and take the temperature of the water again (t2). Then you use the equation $Q = mc(t2-t1)$ to find the amount of calories in the substance. Four different cereals were measured. I found that two of them had more calories per gram than the box one had about the same calories per gram and one was less than the box!

Category: Physics

Student Name: Justin Dorius
Team Members (if any):

Project Title: Fish On!!...Fish off.

Abstract: Does water temperature affect fishing line strength? My purpose for doing this project was to help fishermen who are preparing for either a very warm or very cold water fishing trip. Knowing the results of my experiment could help someone learn in a less heartbreaking way. It is never fun to lose a fish. For research, I had to determine what fishing line is made of, how to measure how strong it is, and characteristics of different types of line. I also researched pound test, spring scales, and force. My hypothesis was that the line soaked in the cold water, and tested in the cold temperature would snap under less force than the control line. I thought this was because the cold would make the line stiff and more brittle, not leaving much room for stretching under pressure. I tested line under three different temperatures cold (22°F), room (70°F), and hot (90°F). To test the line, first soak it in water to simulate fishing conditions. Next, I attached one end to my spring scale, and pulled in ½ lb. increments, until it snapped. I recorded my data and analyzed my results. My results were actually the opposite of my predictions. The warmer temperature caused the line to snap under less force than the cold temperature. The difference between the hot and cold averages was more than 2 pounds. Because of my

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findings, I suggest fisherman fishing in warmer waters use line that is a higher pound strength than is recommended.

Category: Physics

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

Project Title: Hot or Cold

Abstract: Investigative Question Does the temperature of a rubber band effect the length that it stretches? My hypothesis is that the hotter the rubber band is the farther the rubber band will stretch. Procedure 1.Take a 1 gallon bucket. 2.Unbend a paper clip into an S shape and hook one end onto the handle of the bucket. 3.Take a rubber band and hook the other end of the paper clip on it. 4.Place the weights into the bucket. 5.Hang the rubber band with the bucket and wieghts onto the door knob. 6.Wait for one minute and measure the length of the rubber band. 7.Record the lengths on a graph. Repeat steps 1 through 7 five times. 8.Preheat the oven to 150 degrees. 9. Place a rubber band on a cookie sheet. 10.Put the cookie sheet inside the oven. 11.Wait one minute and take the rubber band out. 12.Repeat steps 3 through 7. 13.Repeat steps 10 through 13. 14.Repeat steps 9 through 13 for 250 degrees five times. 15.For the frozen rubber bands, place five rubber bands in the freezer for twenty-four hours. 16.Take the rubber bands out of the freezer and repeat steps 3 through 7 five times. Results In my experiment I measured the lengths of rubber bands at different temperatures with six pounds of weight on them. I concluded that rubber stretches farther when heated. I also found out that when you put twice as much stress on an object it stretches twice as far. So my hypothesis was correct.

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Category: Physics

Student Name: Andrew Hulterstrom
Team Members (if any):

Project Title: Electromagnets

Abstract: My science project tried to determine which gauges of wires worked best in an electromagnet. The question I had was: In an electromagnet, does a longer thinner wire work as well as a shorter thicker wire of the same total weight? My hypothesis was: If the total weight of the electromagnets is the same, the magnets strength should be the same. I thought that if the wire used for an electromagnet weighed the same, then they would make electromagnets of equal strength. To make the electromagnets I wrapped the different gauge wire around each nail and connected the two ends of the wire to the ends of the battery. I tested three electromagnets with different gauge wire. Each magnet weighed three ounces total. I held the electromagnet into a tube of steel BB's. The electromagnet was activated and held in the tube for five seconds. It was then pulled out and the BB's attached to the magnet were counted. I repeated this experiment five times for each electromagnet. Each electromagnet had a fresh D cell battery. I discovered that the magnets made with wires that were thinner and longer were stronger magnets than the magnets made with shorter and thicker wire of the same total weight. My hypothesis was incorrect. Magnets made with equal weight of wire do not create equal magnets

Category: Physics

Student Name: Brandon McLauchlan
Team Members (if any):

Project Title: The Facts on Wax

Abstract: I tested 4 types of all temperature wax on a 300 ft. downhill with my snowboard with a consistent riding each time. I also tested my board with the control of no wax with the board just base cleaned. i thought the racing wax would work the best because it's made for racing. my results showed the racing wax worked the best then as following; spring solution, no wax, hot-sauce wax, and swix universal

Category: Physics

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

Project Title: Tension on Your Knees Do sports effect the tension on your knees?

Abstract: The knee is the largest joint in the body and is often the cause of most injuries. Purpose: The purpose of this experiment was to find out if sports effected the tension on the knee. Hypothesis: My hypothesis is that sports do effect the tension on your knees because there is much more pressure and force on your knee while playing sports. Procedure: To do this experiment I had to build a wooden model of the human leg. With this model I tested how much tension was on the knee as I bent it at different angles. I used a guitar string that was connected to a spring to show what happened to the quadriceps muscle and tendon when more tension was created. With the information I gathered, I recorded the data on graphs showing the increase of tension as I increasd the angle on the knee. Results: The experiment showed that for every fifteen degrees I bent the knee, there was a linear equation between the tension on the string and the distance the spring stretched. Conclusion: My results proved that my hypothesis was correct and that sports do effect the tesnion on your knees. The more you bend in sports, the more tension you get on your quadriceps muscle causing injuries.

Category: Physics

Student Name: Logan Rhoades
Team Members (if any):

Project Title: Straight As An Arrow

Abstract: None

Category: Physics

Student Name: Tyler Richardson
Team Members (if any):

Project Title: Batter Up

Abstract: This project wanted to gather data to help determine whether the material that a baseball bat is made of really make a difference in the distance a baseball travels after impact. Trial were done on a wood, aluminum, and composite bat. The data seems to support the hypothesis that the harder surface material that a bat has, the greater the rebound distance will be. Wood bats have a slight degree of softness even though they seem very hard. Yet the difference between an aluminum bat and the wood back was nearly two inches greater. This was not really surprising for the aluminum surface was harder that the wood surface. In addition, it seems that the aluminum does not absorb as much energy from the baseball as the wood bat does. As a result, this would make the rebound distance greater. The composite bat, on the other hand, looks much like an aluminum bat although its overall weight is much lighter. The composite bat has a hard surface like aluminum but it outperformed aluminum by a considerable margin. It appears that the composite construction provide both a very hard surface and a construction that actually has a trampoline effect when that ball hits the bat. This means that the hardness of the surface not only rebounds the ball but the trampoline effect also gives the ball an extra push (recoil force) as well. It is obvious that the result show this combination gives the best results.

Category: Physics

Student Name: Grant Valentine
Team Members (if any): Grant Valentine and Nathan Thorsen

Project Title: Buckle Up, Don't Lose Your Yolk

Abstract: Our project, Buckle Up, Don't Lose Your Yolk, examined if seat belts can prevent injury. The research question was, Do Seat Belts Really Prevent Injury? We used an egg as the passenger in a small toy car which was rolled down a ramp into a wall. We did ten trials with the egg unrestrained and ten trials with the egg strapped with electrical tape. We developed an egg crash rating (ECR) system to determine how badly the eggs were damaged after the crash. The restrained eggs were not damaged 80% of the time, while the unrestrained eggs were not damaged 20% of the time. We learned the importance of always buckling up.

Category: Physics

Student Name: Dominic Zappala
Team Members (if any):

Project Title: I Know Who You Are...

Abstract: The goal of this project is to identify whether a speaker is an adult or a kid by measuring the frequencies and amplitudes of his or her voice. I recorded people's voices using a computer and analyzed their voice for several characteristics. I calculated their pitch change over time using fundamental points and amplitude peaks. I found that it is very easy to tell that a person is an adult or a child by only looking at their frequencies and that looking at their amplitude does not help because the amount of air pressure measured depends on the placement of the microphone. The closer the microphone is to you the more air pressure it records.

Category: Physics

Student Name: Tanner Atkinson
Team Members (if any):

Project Title: Liquefaction: Where and When?

Abstract: My project is on liquefaction and where it is most likely to happen. I thought that the soil near the bodies of water would liquefy the fastest, and the samples from places without very much water would take a lot of water to liquefy. I tested this by pouring water into the bowl with dirt and vibrating it until the dirt liquefied, and a Lego house I built sank down to a certain point. I found that it would take a seven-one water-dirt ratio to make the soil near my home liquefy. I also found that the sample from just north of Utah Lake liquefied with the least amount of water added.

Category: Physics

Student Name: Vladyslav Boyko
Team Members (if any):

Project Title: High Fuel Economy Can Be Achieved Through The Design and Technology of Vehicles

Abstract: Can better fuel economy for vehicles be achieved through design and techology? Fuel economy is very important to the global market. Once the oil-based fuel is used it can not be replaced. Through design and technology different applications for power can help or replace the oil-based fuels altogether. Five vehicles from each category; sub-compact, compact, mid-size, full-size and sport-utility will/was driven over a 15-mile predetermined route. Each vehicle will/was driven 7 1/2 miles one way and then turned around and driven back the exact same way. Each vehicle was filled with Chevron 87-88 octane gasoline. Each vehicle fuel consumption was measured and recorded. My Hypothesis is: If each of the twenty-five vehicles are driven over the same predetermined route using Cheveron 87-88 Octane fuel then the vehicles with the best design and technology will have the better fuel economy. In Conclusion my Hypothesis Was Correct! I learned that the Newer Vehicles with the most Current Technology; Hybrid Power Trains Variable Valve Timing Active Fuel Management Lighter Structural Components and Aerodynamic Designs Increased Fuel Economy for each of the New Vehicles in each of the five categories that I tested. Compariable Older Vehicles With-out These Technologies Had Worse Fuel Economy. Smaller and Lighter Vehicles with the Current Technology had better

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Fuel Economy than the Larger Cars and Sport Utility Vehicles which were heavier and had higher drag air coefficients.

Category: Physics

Student Name: Jacen Christensen
Team Members (if any): Ethan Robinson

Project Title: Messin With Magnets

Abstract: Our question was what material would be best to block or divert a magnetic field from reaching the gauss-meter. Our hypothesis was that aluminum and copper would do the best because they are great conductors of electricity, and because of the relation between magnetism and electricity they would work the best. The reason that they are similar is because they and water both take the path of least resistance. At first what we tried was placing an NIB magnet down onto a table. We would then proceed by placing a compass on the other side. Between the two objects we would place our variable which was what kind of material. After this we then proceeded by doing the same procedure except with our gauss-meter. We learned that our hypothesis was incorrect. It seemed as if steel was the only thing that made a noticeable difference. What would happen was that the magnet would be attracted to the steel instead of the magnet. This was because steel has a very week magnetic field. That means that this would be useful in the real world so you could protect information from being wiped out by magnets.

Category: Physics

Student Name: Joshua Fallon
Team Members (if any):

Project Title: Best Fabric Insulator

Abstract: I did my project on The Best Fabric Insulator. For my question I wanted to know which fabric retained the most heat. My hypothesis was that of the natural fabrics the wool would do the best. The fabrics I used were wool, silk, denim, thinsulate and primaloft. I heated up an eight oz. potato in the microwave for 5.5 minutes. Then I checked the temperature and wrapped it in the fabric. Next I put it in the refrigerator and checked the temperature with a thermo coupler every 15 minutes. Checking the potato every 15 minutes I got a more accurate graph. I tested all the fabrics twice. The wool was the best of the natural fabrics, but the synthetic fabrics did even better than the natural fabrics.

Category: Physics

Student Name: Adam Goff
Team Members (if any):

Project Title: The Sound of Temperature: How does temperature affect the pitch of a stringed instrument?

Abstract: My science project is to understand the effect temperature has on a guitar. I'm testing whether hot or cold affects a guitar more. For my experiment, I put my guitar in a room with a temperature between 35-38 degrees Celsius (95-100 degrees Fahrenheit). I let it sit there for 30 minutes. I would then come in the room, and play the guitar for about 3 minutes, simulating a performance someone might do. After that, I would measure the pitch of the guitar strings with a tuner, and find the difference of it. I repeated this test three times, allowing the guitar to cool to room temperature for at least 10 hours in between tests. I then did this procedure in a colder climate between 1.6-7.2 Celsius (35-45 degrees Fahrenheit). In my results, I found that the hotter temperature tests had a greater effect on the guitar than the colder temperature tests.

Category: Physics

Student Name: Elliot Hatch
Team Members (if any):

Project Title: The Aerodynamics of Parachutes

Abstract: The purpose of my experiment was to see which of eight different shaped parachutes would descend the fastest. I used simple regular polygons and circles, with varying numbers of risers. I thought the circle with eight risers would fall the slowest and the ring the fastest. The circle with four risers was the control, and the variable I was changing was the shape of the parachute. My constants were the height of the drop, surface area of chutes, weight attached, and environmental effects such as temperature and altitude. I started my experiment by making parachutes. I cut them out of plastic and attached the risers and weights to them. I then went to the Salt Palace where I tested the parachutes. I dropped each three times and recorded how long each one took to fall, using a stopwatch. I took this information and averaged it for each of the three tests. The triangle with six risers fell the slowest, while the square with four risers fell the fastest.

Category: Physics

Student Name: Jenica Jessen
Team Members (if any):

Project Title: Is Water Magnetic

Abstract: None

Category: Physics

Student Name: Bryce Lund
Team Members (if any):

Project Title: Pratt vs. Howe Truss comparison

Abstract: My project was a comparison between the Pratt vs. the Howe trusses. THe question I proposed was which truss used in bridge building, the Pratt or Howe, will hold more weight? I hypothesized that the Howe truss will be able to hold more weight because it spreads out the weight. I built a model of the trusses using popsicle sticks and hot glue. I rested each between two barstools and then suspended a paper plate held by yarn from the ecenter point of the bridge. I added one water bottle at a time, each weighing 17 oz., to the paper plate. I chose water bottles because they are packed according to weight so they would each weigh the same. I continued to stack the water bottles until the bridge snapped. My conclusions showed that the Howe Truss did hold more weight than the Pratt Truss.

Category: Physics

Student Name: Tanner Moss
Team Members (if any):

Project Title: The Longest Golf Ball

Abstract: My science fair question was which golf ball will go the farthest when struck with an equal amount of force. I determined that bouncing a ball from a set distance from the ground would be the same as hitting a golf ball with a golf club with the same amount of force. My research told me that softer golf balls would go farther than harder ones. I learned that Compression (hardness of the ball) is what makes the difference in distance. I setup a lab to prove my hypothesis. I used a magnetic pole, metal fence, measuring tape, concrete slab,and video camera in my lab. I looked up the compression values of seven different golf balls. Each ball had a different compression value. Note: There are usually one of three different compression values advertised about a golf ball. They are usually 80, 90, or 100 compression. An 80 compression golf ball is softer than a 100 compression golf ball. I recorded each ball bouncing at least three times. I documented the apex of each bounce and calculated an average for each ball. Shockingly, my results proved the hypothesis wrong. Hard balls bounced higher than softer ones and vice versa. There was no conclusive evidence in my results that compression had anything to do with the distance of the bounce. In the end, I concluded that there are more factors involved with determining distance in a golf ball than just compression.

Category: Physics

Student Name: Katie Nelson
Team Members (if any):

Project Title: Does saltwater retain heat longer than water?

Abstract: For my Science Fair Project, I came up with the question Does saltwater retain heat longer than water? I found this idea when my science teacher gave us time to look up ideas on the Internet. This one was perfect for me because my dad works with accurate digital thermometers, so he could help me get precise measurements. The thermometer connects to the computer, where you can set up a program that takes all the numbers from the thermometer and records them. To carry out my experiment, I first measured 2 cups of water into a pan and placed it onto a propane camp stove. Then I placed the thermometer into the center of the pan. Next, I waited five minutes so that I could get an average temperature of the water before heating it. After the five minutes, I lit the stove and timed for 2 minutes. When the 2 minutes were over, I turned off the stove and let it sit for 30 minutes so that the computer could record a decrease of temperature. After the 30 minutes, I repeated the experiment, only with 2 cups of water and 1 tablespoon of salt. After I did both of the experiments, I took the numbers from the program and put them in Microsoft Excel to figure out the average temperature before heating and the percent of change during and after heating for the water and saltwater. From the numbers, I got the results of water gaining heat faster and losing heat slower.

Category: Physics

Student Name: Elizabeth Obray
Team Members (if any): Marina Walker

Project Title: Dominant Dome

Abstract: Our question was, Does the length of the strut affect the strength of the dome? Our hypothesis was It is hypothesized that smaller struts will result in a stronger dome. Our method was to cut different sized struts out of newspaper and use duct tape to hold them together. Then we used bricks to hold the dome in place while we put weights on top until the dome failed. The 10cm domes held an average of 6.07kg the 15cm held an average of 4.08kg and the 5cm held an average of 10.2kg.

Category: Physics

Student Name: Ethan Robinson
Team Members (if any): Ethan Robinson and Jacen Christensen

Project Title: Messing With Magnets

Abstract: We were wondering which materials would best block a magnetic field. We hypothesized that copper and aluminum would channel the magnetic field. We took a magnet and a compass and placed a piece of material between them. Then we built a Gauss meter and replaced the compass with it. We discovered that steel was the only material to have any effect on the magnetic field.

Category: Physics

Student Name: Kolton Smith
Team Members (if any):

Project Title:

Abstract: Question: From the same pitch, which bat will hit the ball farther, on average, a wooden bat or a metal big barrel bat? Hypothesis: A metal fat bat will hit a ball farther because it has a bigger Sweet Spot. Because it has a bigger Sweet Spot it has a greater chance of getting a good solid hit. A metal bat has a 2.75 inch wide sweet spot, while the wooden bat is 2.50 inch sweet spot. Methods: 1.Set up the pitching machine 25 feet from home plate 2.Adjust pitching machine with practice pitches until the machine is pitching the desired pitch, at approximately 48 mph. 3.Hit 10 pitches from the pitching machine with wood bat and then 10 from the metal bat. This was competed four times, for a total of 40 pitches from each bat. 4.Measure each ball for distance of the hit. 5.If the pitched was missed, it was not counted.the 10 pitches are contact pitches 6.Throw out the 2 shortest distances from each bat for each 10 balls hit 7.Average the distance of the farthest 8 hits from each set and put in the left column. 8.Now Average the Averages of the Sets and determine the overall average of each bat. Results: My hypothesis was incorrect. My data shows that the metal bat did not hit the ball a further distance. The average distance for the Wood Bat: 161 ft The average distance for the Metal Bat: 153 ft

Category: Physics

Student Name: Devin Sudweeks
Team Members (if any):

Project Title: Which Wavelength Works Worst?

Abstract: I looked at what happened to the electricity produced by a solar panel when different wavelengths of light were isolated using filters.

Category: Physics

Student Name: Chad Taylor
Team Members (if any):

Project Title: Static and Humidity

Abstract: My project was on how humidity affects static. I wondered why I don't see as much static when the weather is wet and humid so I came up with the question: Does the humidity surrounding a static generator affect how much static electricity is produced? I tested a static generator in a room with a humidifier. I used a hydrometer to measure the humidity in the air surrounding the machine. I tested this in 3 different levels of humidity. My hypothesis was that the higher percentage of humidity in the air would result in a greater time for the machine to spark. I measured with seconds by turning the generator 1 turn a second and taking the time when it sparked. In the end my hypothesis was correct. It does take longer for a static charge to build up to a level high enough to discharge in a humid environment than in a dry one.

Category: Physics

Student Name: Robb Joshua Tracy
Team Members (if any):

Project Title: Einstein's Theory of Relativity: Can we measure it?

Abstract: My project is about Einstein's theory of relativity. More specifically, it is about measuring it at everyday speeds with everyday equipment. My hypothesis was that it wouldn't be measurable with our equipment because the time dilation is so slight. How did we do it? First off, we synchronized two computers. We left one home while we took the other for a drive to Orem Center street. We came home and tested the times. We found that they were indeed slightly off. We recorded this information and re-synchronized the computers. We then let them run for the same amount of time that we were gone. They were again slightly off, but not as off as before. In conclusion, we don't know if it was clock inaccuracy or actual dilation. It's just a little mystery that will haunt us for the rest of our lives!

Category: Physics

Student Name: Marina Walker
Team Members (if any): Elizabeth Obray

Project Title: Dominant Dome

Abstract: Our question was, Does the length of the strut affect the strength of the dome? Our hypothesis was It is hypothesized that smaller struts will result in a stronger dome. Our method was to cut different sized struts out of newspaper and use duct tape to hold them together. Then we used bricks to hold the dome in place while we put weights on top until the dome failed. The 10cm domes held an average of 6.07kg the 15cm held an average of 4.08kg and the 5cm held an average of 10.2kg.