CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

William F. Abersek

Project Number

J2101

Project Title

A Global Tune-Up: Developing a Performance Index for Green Lubricants

Abstract

Objectives/Goals

My project was designed to determine whether commercially available bio-based lubricants offer viable alternatives to petroleum-based lubricants when all relevant factors (technical performance, costs, and environmental impacts) are taken into account.

Methods/Materials

The technical, economic, and environmental qualities of six 5W-30 motor oils were evaluated. Technical performance was identified with lubricity, and coefficients of friction were measured in an experiment in which an incline plane was gradually raised to determine the slip point angle. 10 trials were taken for each oil, and a t-test was performed to determine whether sample means in bio-based and petroleum-based oils were statistically different. Cost for each oil was assessed, and â#ogreenâ## characteristics (renewable sources,low energy refining, and biodegradability) were determined from Material Data Safety Sheets. Technical performance, cost, and environmental factors were united in a performance index created by the researcher and the overall performance of the oils was evaluated. Viscosities were assessed to establish confidence in lubricity findings.

Results

Coefficients of friction for the 6 sampled oils and an unlubricated control were calculated using the method described above, yielding values ranging from .162 (most slippery) to .694 (control). A difference of means test (t-test) was performed and no statistical difference between the lubricity of bio-based and petro-based oils was found. Viscosities of the samples were assessed and no statistical difference between bio-based and petroleum based lubricants was found. An environmental factor was determined for each sample, giving 1 point for each of the green characteristics identified above. Lubricity, cost, and environmental factors were united in an index with weights .4,.3, and .3. The best performing oils in the index performed well in both price and environmental aspects.

Conclusions/Discussion

My hypothesis posited that green lubricants would compete well with petroleum lubricants and my findings bear this out. Technical characteristics were statistically indistinguishable among the oils, and thus price and environmental characteristics became key performance factors. The index highlights the many ways in which a lubricant can be green and points to trade-offs between user costs and social benefits from environmentally desirable products.

Summary Statement

My project establishes a performance index that unites technical, price, and environtmental characteristics of lubricants to enable a comparison of lubricants..

Help Received

Mother loaned textbook with instructions on t-testing; friend's dad was sounding board in early brainstorming on shape of index

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Hakan S. Alpay

Project Number
J2102

Project Title
Efficacy of Light Shelves?

Abstract

Objectives/Goals
My objective was to examine the effects of light shelves on the distribution of natural light in the interior of a building and the reduction of glare in the area near the perimeter windows.

Methods/Materials
A model of a portion of an office building was constructed, with a large window and a removable light shelf. The scale of the model was 1 in = 1 ft. The model was placed outside at different times of the day: 9 am, 12 pm, and 5 pm. At each of these times, the amount of light in the areas 2 feet, 10 feet, and 18 feet from the window inside the model were measured with a light sensor. The measurements were taken twice. The first time, the measurements of light were recorded without the light shelf on the facade, and the second time, with the light shelf on the facade dividing the large window into two areas. The experiment was executed five times, each on a sunny day.

Results
With the light shelf, there was a moderate amount of light in the area 2 feet from the window, while there was a slightly lower amount of light in the areas 10 feet and 18 feet from the window. Without the light shelf, there was an extremely high amount of light in the area 2 feet from the window and a very low amount of light in the areas 10 feet and 18 feet from the window.

Conclusions/Discussion
The results showed that when the light shelf was in place, the amount of light in the areas furthest away from the window, such as 10 feet and 18 feet, were higher than the amount of light in these areas without the light shelf. In addition, the amount of light in the area closest to the window, specifically 2 feet, was decreased when the light shelf was in place in contrast to the amount of light in this area without a light shelf. The results suggest that light shelves, constructed in conjunction with the south facing exterior windows, increase the distribution of natural light in a building and prevent glare in the areas close to the perimeter windows.

Summary Statement
My project tests a light shelf to see if it distributes light within a space and prevents glare near the window it divides.

Help Received
My father helped me build my model of a portion of an office building.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Therese M. Azevedo

Project Number
J2103

Project Title
The Effect of Flavor on the Dissolving Rate of Mints

Abstract

Objectives/Goals
My science fair project is about the effect of flavor on the dissolving rate of various mints. I was trying to find out which flavor dissolves the quickest. My hypothesis is peppermint would dissolve the fastest.

Methods/Materials
I performed this experiment by getting a water bath and putting it to 37 C. Next I marked all my weigh boats with the appropriate flavor. I took the first set of 15 weigh boats and placed 3 Life Savers of the same flavor in each of the weigh boats. I then placed them in the water bath and recorded the time. I continued checking on them and then recorded the time as they finished dissolving. I emptied and cleaned the water bath. I repeated the same procedure for each flavor.

Results
My results were: the peppermint dissolved at 43 minutes, Wint O Green 51 minutes, Spearmint 55 minutes, Orange 57 minutes, Sugar Free Wint O Green 77 minutes, and Sugar Free Pep O Mint 78 minutes.

Conclusions/Discussion
My conclusion is that my hypothesis is correct since the peppermint flavor dissolved the quickest. The results are useful in everyday life because it makes you look more closely of what ingredients are in the mints.

Summary Statement
My project is about the effect of mint flavor on dissolving time.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Sakina Bambot

Project Number
J2104

Project Title
What's in My Water?

Abstract

Objectives/Goals
The purpose of this experiment is to see which filter takes out the most residue from the water. Another goal is to see what elements the filters leave behind and/or takes out.

Methods/Materials
Method:
1.Fill 1 gallon of tap water in a pot. Boil it and let it evaporate until there is only a small amount left and fill that remaining water into two small vials. Repeat the process using water from the other filters.
2.Evaporate until there is only 10 milliliters left of each type of water.
3.Put a quarter of a milliliter of each water type onto filter paper and let it dry overnight. Measure the weight of the filter paper with and without the residue on it to get the weight of the residue.
4.Take pictures of the residue with a microscope.
5.Put the residue in an XRF and collect data.

Results
The elements that Filters A and B removed were different from each other, but the weight of their residue was about the same. The residue from Filters A and B weighed about half as much as the residue from the tap water. The weight of the residue from Filter C was the least from all the filters.Filters A and B left about the same weight of each residue. They also were about the same in what elements they removed or added. Filter C removed a lot of each element for almost all of the elements.

Conclusions/Discussion
I was really surprised to find out that filters A, B, and C had completely different results in what elements they removed. I noticed that Filters A and B added potassium to the water while Filter C added a little bit of sodium to the water. Except for bromine (which was completely removed by all three filters) and magnesium (which the amount in the tap water was about the same with the amount in all three filters), how much of each of the other four elements were removed, greatly varied for the three filters. I was also surprised that none of the filters removed much chlorine, which isn#t good for you. Filter C, the fridge filter removed barely any chlorine.

Summary Statement
I tested three different types of water filters to see which one would filter tap water the best.

Help Received
EAG scientist showed how to use XRF; Parents helped with excel format

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
John Bandek

Project Number
J2105

Project Title
What Color Is the Candy ?

Abstract

Objectives/Goals
Problem
The purpose of this experiment was to see if different candy companies use the same food dyes to color their candies.

Methods/Materials
Method
Label 6 Beakers and the 6 tubes writing initials of the candy color and company. Use the pipette to put 0.5mL of dye extraction solution into each tube. Place each candy inside its beaker and the 0.5mL of extraction from the tubes. Now swirl. Pour the liquid dye into each correct labeled tube. Take the Agarose gel that is solid in the beaker and put it in the microwave for a minute, if doesn#t boil put it in for 10 seconds. Place the gel aside, meanwhile you place the gel box into its chamber and making sure its comb is placed. Place the gel in the gel box. Place the TAE so that it will allow you to take out the comb without harming your progress. Place your samples. On a sheet of paper take note of what order the samples are in. Put the samples in 20 micro liters using the micropipette. Place your micropipette#s tip inside the well that the comb has created.

Results
Skittles and M&M use the same food dyes, the reds color comes from red 40, the orange dye color comes from yellow 6, the green is made from blue 1, and a yellow but not yellow 6 something smaller than yellow 6.

Summary Statement
to see if different candy companies use the same food dyes to color their candies.

Help Received
Mrs. Gevorkian my science teacher

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Fiona P. Bandy

Project Number
J2106

Project Title
The Tear Catcher: An All-Purpose Finger Wipe. It's TEARific!

Abstract

Objectives/Goals
The objective of my Science Project was to determine which of the 5 materials tested (cotton rounds, organic cotton rounds, 2-ply tissues, toilet paper, and napkins) would absorb the most human tears, which was simulated with an I.V. drip. My hypothesis is that the cotton rounds would be the most absorbent material. My goal was to turn the most absorbent material into a new product called "The Tear Catcher", so that people undergoing chemotherapy, whom have lost their eyelashes, would have an alternative product to tissues that would be more convenient when dealing with their weepy/runny eyes. The product could also be used for persons with allergies, flu/cold, shingles, sunscreen or any other foreign substances irritating the eyes.

Methods/Materials
One wooden structure holding an I.V bag and tubing, which curved over a suspended funnel, was constructed. Five different materials were each individually placed into the funnel where water dripped until it leaked through the specific material onto the colored tissue paper. This indicated the maximum absorbency of that material and the counted water drops were tallied. I simply hand-stitched a sliver of cotton gauze to either side of the cotton round and created a slide on the finger wipe called "The Tear Catcher".

Results
The cotton round material with the quilted side consistently held the most drops of water before leaking through the funnel, while the 2-ply tissues, toilet paper, & paper towels - even folded into 4-ply - held the least amount of water drops. As I hypothesized, the tissues, napkins, toilet paper, nor the Organic cotton rounds would not be as absorbent as the regular cotton rounds. The results prove that a "Tear Catcher" made from an absorbent material like the cotton round will make the best product.

Conclusions/Discussion
My conclusion is that regular cotton rounds are the most absorbent material from which I created my new product, "The Tear Catcher". It's registered with a Provisional Patent with designs for different colored wipes to appeal to children. It's TEARific!

Summary Statement
The central focus is find the most absorbent material in which to create a new product (THE TEAR CATCHER) that slides onto the finger and is used to wipe weepy/runny eyes due to chemotherapy, allergies, flu, or any foreign substance.

Help Received
Mother helped with tabulating drops; Father helped with construction of the wooden structure used for testing.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Nicole M. Bialick

Project Number
J2107

Project Title
The Effects of Environmental Gases on the Stability of Inkjet Prints

Abstract

Objectives/Goals
It is known that humidity, temperature, and exposure to bright lights can cause damage to photos and inkjet prints. The object of the study was to investigate whether common environmental gases affect the stability of inkjet prints. The goal is to determine the conditions for long-term preservation of homemade inkjet prints.

Methods/Materials
It is known that humidity, temperature, and exposure to bright lights can cause damage to photos and inkjet prints. The object of the study was to investigate whether common environmental gases affect the stability of inkjet prints. The goal is to determine the conditions for long-term preservation of homemade inkjet prints.

Results
The environmental gases had little to no effect on the color stability of the prints during the first two months. However, dramatic changes were seen after four months of incubation. Very minor changes were observed by the evaluators at each week. At week 16, carbon dioxide caused an obvious break-down of the inkjet ink. The inkjet color most effected by the environmental gases were the skin-tones. Carbon dioxide caused the greatest number of color changes, followed by nitrogen. Oxygen and room air caused the least number of changes in inkjet color stability.

Conclusions/Discussion
An experimental system was devised so that treated inkjet prints could be closely compared to the control prints from which they came from. By placing treated cutout disks directly back into the control color pallet, the observer is able to make an accurate determination if color changes have occurred the most significant color changes were caused by carbon dioxide and nitrogen. At each time point the skin-tone prints were altered by at least one of the gases. The other colors tested (Red, blue, green, yellow and black) were pure color, or a very simple mixture. Skin-tones are a mixture of many colors, and if the gases effected just one of the combination's colors, a change in the overall skin-tone may be seen. At week 16 changes to the skin-tone and pure red color were observed.

Summary Statement
High concentrations of common environmental gases can effect the stability of inkjet prints.

Help Received
My father helped me to fill up the Mylar bags, and my whole family helped me to evaluate the prints.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Lilah M. Blalock

Project Number
J2108

Project Title
The Potential Thermal Dangers of Artificial Turf

Abstract

Objectives/Goals
The goal of this experiment was to determine if artificial turf could be heated to a temperature hot enough to cause thermal injury and to discover the turf to air temperature correlation.

Methods/Materials
This experiment required three samples of artificial turf: green, yellow, and white. A sample of natural grass was used as a control. The samples were tested in a controlled wooden testing chamber. Each sample was heated by three different bulbs: a 50-watt, a 150-watt, and a 250-watt bulb. The 50-watt bulb was much weaker than the 250-watt bulb, and therefore, took longer to heat. This allowed a variety of different amounts of exposure times.

Results
The amount of exposure time did not affect the temperature of the heated artificial turf. The turf was at least 0.1°F-10°F hotter than the air. It was 10°F-30°F hotter than the natural grass. The hottest sample of turf was the whit turf heated by the 150-watt bulb to 100°F, reaching 114.8°F. Despite the color and exposure time, there were no statistical differences in temperature.

Conclusions/Discussion
The results of this experiment showed that the artificial turf, with a few exceptions, cannot reach a hot enough temperature to cause thermal injury. Some samples were hotter than others, and occasionally the turf reached a hot enough temperature to thermally burn human skin: 111.2°F. It is unlikely that a human could get burned at this temperature, because they would have to be in contact with the turf for seven hours. Although in most of the trials artificial turf did not reach a hot enough temperature to burn human skin, it would still be uncomfortable to the athletes utilizing the field. In comparison to natural grass, the artificial turf was much hotter. It was also shown that there wasn't a large difference in temperature between colors or exposure time. There was no particular color that seemed to be hotter than the rest during the experiment.

Summary Statement
Artificial turf has the potential to thermally burn human skin, it is 0.1°-10°F hotter than the ambient air temperature, and it is 10°-30°F hotter than natural grass.

Help Received
Advisor, Mrs. Gillum, helped by editing and helping with the structure of the reports. Parents and sister revised and served as transportation to purchase supplies. Dr. Thomas Serensits served as a mentor.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Dennis Chen

Project Number

J2109

Project Title

The Effects of Thermal Interface Material (TIM) on Computer Performance

Abstract

Objectives/Goals

The goal is to test how computer performs with different thermal interface materials that can be used as part of computer cooling system. With the advent of smart phones and tablets, personal computers have become less popular. As a result, businesses and individuals have found cloud and super-computing more effective because of its information sharing and accessibility. In the super computer environment, the requirement for a high performance silicon has increased significantly, and so does the requirement of high performance computer cooling systems or thermal interface materials.

Methods/Materials

This experiment is to test four different thermal interface materials for an i386-based processor (P68), and record its speed and reliability. These four thermal compounds include diamond powder, ceramic solution, silicon solution, and a pure metal compound. Before starting the experiment, it was theorized that if thermal pastes of different varieties were tested on a Prescott P68 silicon die, one would find that the metal compound would help improve the performance of a silicon die at similar operating temperatures because it is known to produce the lowest temperatures, which leaves more headroom for increased performance.

Results

The test result showed that the ceramic paste was the best material with a 10% increase in computer performance compared to metal compound, which is contradicting to the conventional belief that the computer performs better at a lower temperature with a good thermal interface. As a result, there remains a question of how silicon degrading is effected by temperature and thermal properties.

Conclusions/Discussion

This experiment demonstrates that the computer performance can be effected by the thermal interface material used as part of the cooling system. Changing to a better thermal material such as ceramic compound will improve the computer performance.

Summary Statement

This experiment is to test how computer performs with four different thermal interface materials that can be used as part of the computer cooling system.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Josiah S. Discar

Project Number
J2110

Project Title
Wiping Up the Competition

Abstract

Objectives/Goals
The objective is to determine the best value paper towel by comparing its strength and absorbency with its cost.

Methods/Materials
I used four brands of paper towels: Bounty, Brawny, Kirkland and Scott. I tested each one for its strength, absorbency and saturation. For Strength, I measured how many coins, later converted to grams, a paper towel could hold while wet. For absorbency, I measured how much water the towel can hold before it leaked through the bottom. For saturation, I measured how much water could be squeezed, in milliliters, out of the paper towel when it was fully soaked in water.

Results
Bounty beat the other paper towels in strength and absorbency and Kirkland was the runner-up. Kirkland was the least expensive paper towel brand.

Conclusions/Discussion
My conclusion when I compared the cost factor with their performance showed that Kirkland, even though it ranked second or third in the trial tests, was the best value for the money in terms of performance and cost.

Summary Statement
The purpose of this project is to determine which brand of paper towel has the best value by testing its performance versus the cost of the paper towel.

Help Received
My mom helped edit my paper and my dad helped me with all the charts and putting together the data.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Seth T. Freeman

Project Number
J2111

Project Title
The Temperature Effects on Various Balls

Abstract

Objectives/Goals
Objective or goal: The purpose of this project is to determine if temperature, construction, and material of a ball affects its bounce height.

Methods/Materials
Materials and methods: To conduct these experiments I used ping pong balls, tennis balls, golf balls, rubber balls, and racquet balls (6 balls of each type). To perform my tests, I took three of each type of ball and placed them in my freezer overnight. The next day I took one ball at a time out of the freezer using tongs. I measured the temperature of the ball using an infrared thermometer and placed it in a wooden stand that had a measuring tape on the back side. I set up my video camera on a tripod and recorded when the ball dropped out of the stand and how high it bounced. I repeated this three times for each ball. To get accurate height, I connected the video camera to my TV and recorded the maximum height on the measuring tape.
I repeated this experiment three times.
To measure the bounce height of warm balls, I built a heater using a styrofoam cooler, a hair dryer, and duct tape. I placed three balls of each type in the heater and turned on the hair dryer. I repeated the bounce measurement methods for these warm balls. I also repeated the experiment using three balls of each type that had been sitting at room temperature.

Results
Results: The results of my experiment show that the hotter the ball, the higher it will bounce, with a gradual increase in bounce height with a mean of 31.43" for cold balls , 38.64" for warm balls, and 40.3" for hot balls. The balls of different construction (hollow or solid) also acted the same with increase bounce height when temperature rises. When material changed from rubber to plastic or a rubber-plastic combination, the balls did not follow the expected bounce pattern.

Conclusions/Discussion
Conclusions/discussion: My hypothesis before the experiments was that the warmer the ball the higher it will bounce regardless of material and construction. After results it indicated that I was correct on construction and temperature, but the data for type of material did not support my hypothesis. In the future I would like to repeat this experiment using a larger number of balls made from materials other than rubber.

Summary Statement
The temperature effects on bounce height of various balls of diffrent material and construction (hollow or solid)

Help Received
Mother helped suppy all materials needed to do my project; My Father helped build wooden measuring stand, heater and also helped out in test conduction; Science teacher Mrs. Griffith who overlooked my project to give me tips and edits on project data and writing.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
John F. Gomez

Project Number
J2112

Project Title
Are Helmets Really Safe?

Abstract

Objectives/Goals
The objective of this experiment was to test the protective abilities of three select helmets that represent the three different levels of lacrosse helmets, beginner, intermediate, and advanced.

Methods/Materials
The helmets used for the experiment were the clh, clh2, and the Pro7 lacrosse helmets. Each one of these helmets was put on Styrofoam head which had paintballs evenly placed and labeled in areas covering the head to represent where the brain would be. The helmets were hit 40 times each with a concussion causing force of 20 mph. The number of paintballs popped in each area was recorded after each test and all broken paintballs where replaced.

Results
The results from each of the three helmets were compared by calculating the number of paintballs popped. The Pro7 far surpassed the other helmets in protective abilities and revealed a considerable gap between the qualities of the individual helmets. The Pro7 only had eight paintballs pop out of all the trials and surpassed the clh which had 32 paintballs pop. The clh2 was in the middle of the other two helmets with 15 popped paintballs throughout all the tests. The helmets didn#t have any observed internal/external damage after the tests.

Conclusions/Discussion
Although all three helmets were comparable, the tests showed that one helmet did rein superior over the other helmets. The Pro7 did out preform the other helmets and would be the smartest choice for any player as far as protective abilities. This helmet will protect against concussion the best and minimize damage to each player#s brain. All players should be recommended to play with this helmet to improve their safety and the safety of the game.

Summary Statement
In this experiment, three popular lacrosse helmets where tested for their ability to protect against impact to improve the safety of lacrosse players and the sport of lacrosse.

Help Received
Parents proof read my report; Dr. Amayr answered some of my questions; Mrs. Gillum my science fair teacher helped guide me through science fair

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Lynsey R. Gookin

Project Number
J2113

Project Title
The Effects Different Leavening Agents Have on Baking Cupcakes

Abstract

Objectives/Goals
My project was to determine if baking soda, baking powder or yeast is the best leavening agent when baking cupcakes. I believe that the cupcakes with baking powder as a leavening agent will produce the best results.

Methods/Materials
I baked eighty cupcakes following the exact same recipe with the only variable being the leavening agent. I started with a control batch of twenty cupcakes containing no leavening agent. The remaining batches of twenty cupcakes each contained either baking soda, baking powder, or yeast. I further broke down each of the four batches of twenty into two batches, varying only the measured amount of batter into each tin. I then measured the height and diameter of each cupcake to compare the averages to one another. I then recorded my results and came up with my conclusion.

Results
Baking soda produces the best results, with each cupcake having a consistently greater average height and diameter per cupcake, thus disproving my hypothesis. Yeast was the least effective leavening agent, with each cupcake having height and diameter averages close to that of the control batches.

Conclusions/Discussion
Although baking soda is not the single most called for leavening agent in cupcakes, it produced the best results in my experiment, in spite of my hypothesis. When baking cupcakes, many recipes may require the use of one or more leavening agent such as baking powder and baking soda. In my research of cake recipes, I found that most called for baking powder. Most recipes probably call for baking powder because it must affect the taste of the product. That is why I thought that baking powder must be the best leavening agent for cupcakes.

Summary Statement
The proper use of leavening agents produces a more desirable taste and texture when baking cupcakes.

Help Received
Mother helped me bake the cupcakes and assemble my display.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Schafer M. Kraemer

Project Number
J2114

Project Title
Battle of the Bulbs

Abstract

Objectives/Goals
The objective of this project is to find out how different types of light bulbs perform and to answer the question, "which type of light bulb has the best practical value based on cost, brightness and thermal properties?"

Methods/Materials
There are four basic types of light bulbs available today: the incandescent bulb, the halogen bulb, the fluorescent bulb and the LED (light-emitting diode) bulb. In this experiment, all four types of common light bulbs were tested. An insulated box with a light fixture and a grease-spot photometer were constructed to test temperature and relative brightness. A voltmeter, ammeter, thermometer and tape measure were used to collect power consumption, temperature and relative brightness data. Each test trial was repeated three times. Cost information was collected from the Internet. The data was analyzed and observations were recorded.

Results
There was a 24 degree Celsius increase in temperature in the light box for the incandescent bulb and only a 16 degree Celsius change in temperature for the Halogen bulb. There was very little heat created for the LED and fluorescent bulbs, about 4 degrees Celsius. The greatest changes in temperature were observed within the first 5 minutes for all the different bulb types. The LED was the brightest followed by the fluorescent bulb. The incandescent and halogen bulbs were about 60% as bright as the LED and fluorescent bulbs. All of the light bulbs pulled the same amount of power over time, except the fluorescent, which drew about 75 Watts during the first few minutes, even though it is rated at only 15 Watts. Once it warmed up, it worked normally and pulled less than 15 Watts.

Conclusions/Discussion
The fluorescent light bulb was shown to be the most cost efficient option. It costs a lot less than the LED bulb, about 80% less, and is similar in brightness and energy consumption. It has a long life and uses much less energy and creates less heat than the incandescent and halogens bulbs.

Summary Statement
This project compares the performance of the most common 60 Watt equivalent light bulb types, by measuring brightness, temperature and power consumption, and ranks them accordingly based on their benefits and trade-offs, including cost.

Help Received
Father helped with electrical wiring and box construction

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Rebecca L. Markowitz

Project Number
J2115

Project Title
I Scream, You Scream, We All Scream for Ice Cream

Abstract

Objectives/Goals
This experiment intended that ingredients when mixed with vanilla ice cream, would prolong the frozen nature and retard the melting process.

Methods/Materials
In this experiment the control group was a formula for basic vanilla ice cream and six experimental ingredients were used in individual batches and tested against each other for both melting rate and taste. Heat and time tests, and taste tests were conducted. During the heat and time tests, measurements of melted liquids (ml) were taken at 5 minute intervals for 30 minutes, at 5 heat settings. During the taste test, 100 middle school students (6th through 8th graders) tasted seven different ice creams and rated them on a scale from one to four.

Results
This experiment showed us Guar Gum, Xanthan Gum, and Pectin mastered the heat and time test, with zero ml of melted liquids, but lost the taste test because of their textures with an average score of 1.1 to 1.4. Conversely, Agar-Agar, Potato Starch, and the Control Group, failed the heat and time tests but tasted delicious scoring an average of 3.3 to 3.9. Tapioca Starch proved best in this experiment, averaging 3.056 in the taste test, which means on the scale from one to four it tasted pretty good, and melting 62 milliliters at the most.

Conclusions/Discussion
The ingredient that did the overall best was tapioca starch, this may happen because Tapioca starch is a carbohydrate consisting of a large number of glucose (sugar molecules) units joined together by glycosidic bonding (joining a carbohydrate to another molecule), because of this Tapioca Starch thickens the substance just enough so it melts slowly and still taste yummy.

Summary Statement
To find an ingredient that slows the melting process of ice cream while remaining tasty.

Help Received
Kaitlin Rosichan, Erin Schumacher, Yosi Yedid, Joy Wasserman, Nadja Lancelot, Fiona and Stephen Markowitz.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Zachary C. McGaugh

Project Number
J2116

Project Title
What Material Is Best for Lining the Inside of a Surf Bootie to Prevent Foot Penetration from a Stingray Barb?

Abstract

Objectives/Goals
The goal of the project was to analyze 10 puncture resistant fabrics to determine which material would best resist penetration from a Round Stingray barb strike when lined in a neoprene surf bootie.

Methods/Materials
The goal of the project was to analyze 10 puncture resistant fabrics to determine which material would best resist penetration from a Round Stingray barb strike when lined in a neoprene surf bootie. Three control tests were conducted in the process of the experiment. A stingray barb was attached to a pendulum that swung into a force probe at different angles for test #1. Data obtained showed an increasing max force and impulse generated by the striking barb at various angles of release. The second test involved measuring the max force and impulse generated from a real Round Stingray [Urobatis halleri] by provoking the ray to strike a force probe. These stingray data obtained correlated to a pendulum release angle of 25 degrees. The third test involved releasing a stingray barb via pendulum into simply 2mm neoprene to simulate a strike into a typical surf bootie. Depth of penetration was measured in millimeters at various angles of release. The final and most important test was to release the stingray barb into the 10 puncture resistant fabrics. Each fabric was glued to a piece of neoprene then clamped onto a plastic box filled with ballistics gel and screwed onto the pendulum base. The barb, attached to the pendulum arm, was then released at 20, 25, and 30 degrees- angles corresponding to the upper range of maximum impulse data from the stingray strikes.

Results
The data collected revealed that all fabrics were found to reduce penetration at all angles, compared to neoprene. However, the most resistant fabric, Rhinoguard, showed no penetration at both 20º and 25º, and at only 0.5mm penetration at 30º.

Conclusions/Discussion
It was concluded that the registered material "RhinoGuard" made by Tilsatec# would be best for lining a surf bootie. The information received potentially benefits surfers and beach goers.

Summary Statement
Various materials were tested against a swinging stingray barb attached to a pendulum that released at angles corresponding to a stingray's impulse.

Help Received
Handled Round Stingrays with Grad Students at Cal State Long Beach, Dr. Chris Lowe at CSULB provided information for the project, Teachers Dan Lavine and Mena Abdo at SRHS provided physics help, Metalshop teacher at KHS helped with welding the pendulum, Father helped collect data and

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Metta T. Nicholson

Project Number

J2117

Project Title

Lost at the Solar Maximum? The Effect of Solar Flares on GPS

Abstract

Objectives/Goals

The objective of this experiment was to study the impact solar flares can have on GPS receivers and determine the importance of WAAS in correcting errors made by GPS receivers. It was hypothesized that a geomagnetic storm resulting in a Kp-index of 6 would cause GPS receivers to have a significant error of 20 meters.

Methods/Materials

Two GlobalSat BU-353 WAAS GPS receivers were placed on a metal ground plane on the roof of a house. A cable was used to attach the receivers to a laptop. Using SiRFDemo.exe, WAAS, a second set of signals, was disabled on one of the two receivers. NMEA.exe, a data logger, was then used to record one data point per second of information gathered by the receivers. Microsoft Excel 2010 was used to process the data and find the difference in altitudes between the two receivers. The altitude differences were then graphed versus time.

Results

The control data (Kp-0) had an average error of 2.338 meters and an error range of about 18 meters. Data from when the geomagnetic field was disturbed (Kp-4) had an average error of 1.053 meters and an error range of 16 meters. Data from a geomagnetic storm caused by a solar flare (Kp-6) had the least average error of 0.409 meters as well as the smallest error range of about 11 meters.

Conclusions/Discussion

Surprisingly, the control data had the greatest amount of error, while the Kp-6 data had the least. This indicates that solar flares and other forms of solar activity do not have a strong impact on GPS receivers. There may also have been many other error sources interfering with the GPS receivers# calculations. Therefore, it was concluded that there must be an exceptionally powerful solar flare to significantly impact a GPS receiver#s accuracy and cause the user of a GPS receiver without WAAS to become disoriented.

Summary Statement

This experiment compared altitude measurements between a GPS receiver with WAAS and a receiver without WAAS to determine how strongly solar flares and other forms of solar activity impact GPS receivers.

Help Received

My father helped gather materials, made suggestions about the procedures, and assisted in my understanding of GPS receivers. Dr. Demoz Gebre also helped increase my understanding regarding GPS satellites, WAAS, and receivers.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Aisha Raheem

Project Number
J2118

Project Title
Q-Riosity: What Is the Optimum Distance of a QR Code?

Abstract

Objectives/Goals
Many companies are using QR (quick response) Codes to market their products, and QR Codes are being printed on many different things from tiny codes on medicine bottles, to clothes on jewelry, to signs in store windows, and even on the sides of buildings and billboards. Advertisers need to know how big to make their QR Codes so that it could be accurately scanned by their target audience. In addition, QR Codes are being developed in color and embedded pictures. Advertisers also need to know if these or other features affect the distance in which the QR Codes can be scanned. In this experiment, I plan to measure the maximum distance to QR Codes of varying sizes and density and see how well it compares to the maximum scanning distance predicted by a formula in use by a printer of QR Codes. I also plan to see how adding colors or embedded pictures affects the scanning distance.

Methods/Materials
I downloaded the app "QR Reader" in an iPhone. I searched for QR Codes of low, medium, and high density. I also searched for colored QR Codes and QR Codes with logos to find out if features affect a QR Code. Then, I printed each QR Code of approximately 1 inch, 2 inch, and 6 inch. I measured the distance scanned from an iPhone to a QR Code using a metric ruler. I used the formula to find out the predicted maximum distance of a QR Code and compared it with the actual measured maximum scanning distance.

Results
My results showed that that the difference between the measured and predicted scanning distance of a QR Code was only 2-3%.

Conclusions/Discussion
The formula seems useful for predicting the correct scanning distance or helping advertisers to select the right printed size for QR Codes in their advertisements. I concluded that the formula worked well for QR Codes with high contrast in their colors (black print on white background). It also worked well at high data densities. The formula didn't work well when the QR Codes were printed in different colors (blue, red, etc.) and embedded pictures.

Summary Statement
My project is about comparing the measured and predicted scanning distance of a QR Code and to see how adding features (color and logo) would affect it.

Help Received
My mother helped me paste the board and Mrs. Muna Moinuddin guided me throughout my project.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Jodi R. Sanders

Project Number

J2119

Project Title

Soccer and Concussions: They Don't Mix

Abstract

Objectives/Goals

The goal of this experiment is to find a soccer headgear that will lessen the probability of concussions when playing soccer.

Methods/Materials

concussions when playing soccer.

The materials used was a radar gun, a Force Field headgear, a Donjoy Hat Trick, a Full 90 headgear, a soccer ball, a baseball, an accelerometer, a dummy head, tape, and a bench. The accelerometer was placed into a hole in the center of the dummy's head. Then, a ball was dropped from a height of 11 feet and 9 inches onto the side, forehead, and back of the head at an average speed of 15 miles per hour. This was repeated 20 times on each side of the head without a headgear on. Then, the steps were repeated, except with the three headgears on, each hit being recorded by the accelerometer.

Results

The control groups results were forehead 104.7gs, the side of the head 127.5gs, and the back was 147gs. Using the Force Field headgear, the foreheads results were 148gs, the side of the head 138gs, and the back of the head 116gs. Using the Donjoy Hat Trick the back of the head results was 102gs, the side of the head was 91.5gs, and the forehead was 147.5gs. Using the Full 90 Headgear, the back of the heads result was 133.5gs, the side of the head was 90gs, and the forehead was 141gs.

Conclusions/Discussion

The Full 90 headgear reduced the force on the head the most when hit on the forehead, and side of the head. The Donjoy Hat Trick reduced the most force when hit on the back of the head. Out of these three headgears, the Full 90 headgear works the best. All soccer players should wear this headgear to reduce the probability of receiving a concussion.

Summary Statement

This project tests three different soccer headgears to see which one reduces the probability of recieving a concussion the most

Help Received

Neighbor drilled a hole into the dummy;Dad proof read papers and helped with experimentaion;Dr. Ian Purcell provided the accelorometer

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Emmanuelle C. Scott

Project Number
J2120

Project Title
How Do the Ingredients in Nail Polish Affect Its Properties?

Abstract

Objectives/Goals
To test the durability and drying time of five(5) different nail polish samples.

Methods/Materials
Five unique nail polishes were tested for efficiency in two related experiments. Both experiments were repeated multiple times with similar results. The first experiment was to test length of drying time by checking whether a nail polish sample is still wet at ten second intervals. The second experiment was to test durability by measuring how long it takes to wear away a patch of dry nail polish when being sanded with a small electric hand sander.

Results
Through my experiments I was able to find that Sally Hansen's "Insta-Dri" Nail Color was overall the most efficient in terms of durability and drying time. It was the first to dry and the second most durable. The most durable was Revlon "ColorStay" bonding color, but it was one of the last to dry. The least efficient overall was Orly "Instant Artist" Water-Based Nail Paint. It both was the first to be worn away, and the second last to dry. Both Essie Nail Lacquer and Wet 'n Wild "Wild Shine" Nail Color were mid-range in both tests.

Conclusions/Discussion
The experiment was successful, I did get results, but there were limitations. Because each polish is made with a different procedure that is usually not published for consumer use, I was not able to find a direct correlation between the ingredients and the properties. If I were to continue my research, I would attempt to find more information on the ingredients and manufacturing procedures.

Summary Statement
To find more information about the efficiency of different nail polish samples, I tested unique samples for durability and drying time.

Help Received
Father helped proofread report, held sander in place for part of durability test, and helped me to come up with ideas; Mother helped to print board elements, and glued some board elements.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Jonathan Shaklan; Julian Tayarah

Project Number
J2121

Project Title
Comparing Cooling and Heating of Athletic Shirts

Abstract

Objectives/Goals
The purpose of this experiment is to test what athletic shirt companies claim their shirts do, which is to keep you warmer or cooler in different conditions. We compared athletic shirt performance to the standard t-shirt.

Methods/Materials
We tested with steamy water and used dry heat from a hair dryer on single shirt and layered shirts. We used an infrared thermometer to measure the temperature of the shirt for a few minutes after adding heat.

Results
Measurements showed that with dry heat there is almost no difference on the sport and cotton shirt. With wet heat we could see the sports shirt cooling off faster.

Conclusions/Discussion
The t-shirt gets the warmest, stay the warmest longer, therefore our hypothesis was correct, and the claims of these shirts working better are true. If you are sweating it would be better to wear the modern sports shirts. If hot air is blowing on you, the standard t-shirt won#t get as much hot air in the inside. If you need to wear two shirts and you were sweating you should wear the UA heat gear under the cotton shirt, because it will let the moist heat out faster. It will depend on how much you are sweating, and how hot it is outside, to determine which kind of shirt keeps you cooler.

Summary Statement
We are testing athletic shirts to see if the claims made by companies that the shirts keep you cooler are true.

Help Received
Father helped with idea, usage of thermometer and formatting of graphs.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Meha Shezad

Project Number
J2122

Project Title
Dissolution Rate of Painkillers

Abstract

Objectives/Goals
The purpose of this experiment is to find out which commonly used, over the counter painkiller dissolves the quickest in water which is at body temperature.

Methods/Materials
Measure 200 ml of tap water.Pour 200ml of water into a microwave safe container.Heat water in microwave to 37º Celsius/ 98.6º Fahrenheit (body temperature).Pour heated water into 300 ml glass beaker (Only up to the 200 mark).Put it onto magnetic stirrer#s base.Drop in magnetic stirring capsule. Turn on magnetic stirrer to high (Let the stirrer get going fast before you drop in the pill.Drop in one Tylenol caplet.Immediately start stopwatch.
When the pill dissolves (disappears) stop the stopwatch then the stirrer
Record the dissolution time of the pill in minutes and seconds.
Repeat steps 1-11 for the other pills of this same brand 3 more times
Repeat steps 1-12 using the next brand of pills.Repeat steps 1-13 with the remaining brands. Average the dissolution rate for each brand. Compare brands.

Results
6 seconds after dropping in the Tylonal, it started to break up in little chunks. After 39 seconds the tablet was no longer visible. All you could see was a cloudy liquid with a white suspension. 45 seconds after dropping the orange Advil pill into the stirrer it turned white. The tablet did not break into pieces until 1 minute and 59 seconds. After ten minutes there was a white suspension, but still small chunks visible.The aspirintablet dissolved in 31 seconds. There was a white suspension in the beaker. A white powder had settled too the bottom after one minute of being removed from the magnetic stirrer.

Conclusions/Discussion
After trying all those painkillers, Advil, Tylenol, and Aspirin I found out that Aspirin was the best, which dissolved in an average of 31 seconds. My hypothesis was proven correct that aspirin would dissolve the fastest.

Summary Statement
This project explores which over the counter pain killer dissolves the fastest at body temperature, in an effort to discover what medication can offer pain relief the in the most efficient manner.

Help Received
My parents helped me purchase supplies and my arm was broken so my mom helped me paste my board together for me.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Ronak S. Singh

Project Number

J2123

Project Title

The Effect of Ambient Temperature on the Performance of Hybrid Cars

Abstract

Objectives/Goals

The objective of this experiment was to determine the effect of ambient temperature on the performance of a hybrid car.

Methods/Materials

A lithium-polymer battery was used to simulate the electrical component of the powertrain in the gasoline electric hybrid car. The battery was charged at four different temperatures: 31F (freezing), 42F (mild winter), 72F (room temperature) and 125F (summer in the Northern California valley). The battery was discharged by connecting it to a motor and running it at a fixed current until the battery was discharged. The battery was then charged to full capacity and the amount of charge it took was recorded.

Results

When the battery was charged at the summer temperature of 125F, it held the most charge. It also charged to capacity at 72F and 42F. When the battery was charged at the freezing temperature of 31F, it did not hold much charge. When the frozen battery was warmed up and recharged, it attained full capacity.

Conclusions/Discussion

Based on my findings, a hybrid car would work well in my hometown, Chico, CA. The electric component of a hybrid car would not work well in temperatures below freezing until the battery warmed up. A hybrid car would not perform as efficiently in colder climates such as in Alaska, especially on shorter commutes. A plug-in hybrid, which solely works on battery power, would be most negatively impacted.

Summary Statement

My project is to determine the effect of ambient temperature on the performance of a hybrid car.

Help Received

My father helped with the experimental setup.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Michelle A. Stevens

Project Number
J2124

Project Title
Dawn vs. Ivory with Wave Movement

Abstract

Objectives/Goals
To determine which soap (Dawn or Ivory) will break down more oil in an ocean environment.

Methods/Materials
In this experiment I used 296 ml cups to hold the sea water with oil and dish soap on a machine that mimicked wave movement. The machine used a hurst motor, a baking sheet, a plywood sheet and a non-slip shelf liner. While the cups were on the machine, I weighed three coffee filters and a paper bowl, so that I had the number to subtract from my data. After the cups were finished with their time on the machine, I drained the water using a strainer and three coffee filters (one to filter and two to swipe). I then let the water evaporate out of the filter and weighed the oil. Finally, I recorded the data.

Results
My results were inconclusive.

Conclusions/Discussion
Because my results were inconclusive, I decided that there might have been errors in the measuring.

Summary Statement
My project is about trying to help clean the ocean case of oil spills.

Help Received
Cousin helped me build the machine; Mother helped me type.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
J. Elijah Suchard

Project Number
J2125

Project Title
Does Temperature Affect Bounciness of a Lacrosse Ball?

Abstract

Objectives/Goals
The objective of my project was to determine if temperature affects the bounciness of a lacrosse ball. I hypothesized that a colder lacrosse ball would bounce higher than a room temperature or hot lacrosse ball, because it is more rigid.

Methods/Materials
I dropped lacrosse balls of three different temperatures (freezer -2C, room temperature, boiling water 100C) onto a marble slab, and measured the height of the first bounce. Each measurement was repeated 3 times, and the results were averaged. The height that the ball was dropped from (H) and the height of the first bounce (h) were used to calculate the Coefficient of Restitution, which is the square root of (h/H).

Results
The room temperature lacrosse ball bounced the highest (71cm from a drop of 100cm). The cold lacrosse ball bounced the least (46cm from a drop of 100cm), and the hot lacrosse ball was in between (62cm from a drop of 100cm). The Coefficient of Restitution was 0.85 for the room temperature ball, 0.68 for the cold ball, and 0.79 for the hot ball.

Conclusions/Discussion
My hypothesis was incorrect. The cold lacrosse ball did not bounce the highest. The room temperature ball bounced higher than either a cold or hot lacrosse ball. The cold ball may have been too rigid to bounce as well, and the hot ball too squishy. From this I infer that lacrosse balls are probably manufactured to bounce best at room temperature.

Summary Statement
My project was to measure how temperature affects the bounciness of a lacrosse ball.

Help Received
My mother and father helped measure, edit and organize.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Duncan A. Welch

Project Number
J2126

Project Title
Which Air Filter Removes the Most Particles from the Air?

Abstract

Objectives/Goals
The object is to determine if high efficiency air filters (HEPA filters) really catch more air particles then a standard air filter. I believed that the high efficiency would perferm better than the standard air filter.

Methods/Materials
In my project I used two types of air filters, a High efficiency (HEPA) filter and a standard filter. I cut the two filters in half and measured their weight. I then taped the two different filters together with packing tape and place those newly constructed filters into to separate air vents in my home. After 30 days they were removed, taken apart, and weighed again for the results.

Results
The high efficiency filter from both vents did weigh more then the standard filter. However, the difference was not a lot. Since the difference was not that big, it makes me question if paying the price for the high efficiency is really worth the money.

Conclusions/Discussion
My conclusion is that while a high efficiency air filter does hold more air particles, I would have to advise people that unless you needed it for medical reasons, such as asthma and allergies, buying the standard filter is almost just as good and will save you some money.

Summary Statement
High efficiency filters may work better but it may not be enough to pay the higher price for one.

Help Received
Mom helped with the look of the board. Dad helped put the filters in & take them out.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Trevor C. Williams

Project Number
J2127

Project Title
Build vs. Buy a Computer

Abstract

Objectives/Goals
My objective was to learn whether it was more cost efficient to build your own computer or to buy one. I believe computer companies are charging too much for their computers. Most people, when thinking about buying computers, do not think that they could build one by themselves. I chose to conduct this project to demonstrate the economics of how and why people should build their own computers.

Methods/Materials
I took the steps to build my own computer by ordering all the parts individually and then assembling the computer. My computer was built using a budget of $250 because I wanted to show that you could actually build your own computer very cost efficiently. However, my build vs. buy analysis was based on a more expensive computer. First I went onto www.dell.com and found a $1000 computer. Then, I went onto www.hp.com and did the same thing. I then looked at the parts of each brand computer and went online and found each individual part based on the parts from the brand computers. I added up the price of the individual parts of each computer and compared it to the brand computers.

Results
My research showed that when building your own computer you could save 20-30% off name brand computers.

Conclusions/Discussion
My data proves that my hypothesis was correct because when a computer company sells a computer they have to markup the price so the company can make a profit, therefore when you buy the parts on your own you do not have to pay the extra markup that the company charges.

Summary Statement
Is it more economical to build your own computer versus buying one? I found, if you are looking for the most economical choice it is very smart and cost-efficient to build your own computer.

Help Received
My mom helped with some cutting and gluing on my display board.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Ria Angelica T. Laxa

Project Number
J2199

Project Title
UV Detection for Medicine Protection

Abstract

Objectives/Goals
To determine which type of medicine pill bottle is most effective in blocking UV rays.

Methods/Materials
Equal amounts of UV beads were placed in a plastic bag (control) and 5 different types of medicine pill bottles (clear, orange, white, green, and brown in color). They were placed in 3 different locations (indoors/fully shaded, on a window sill/slightly shaded, and outdoors/direct sunlight). The bottles were left for 1 minute in each location. After 1 minute, color change in the UV beads was recorded by a single person.

Results
The brown pill bottle blocked all UV rays. The beads contained within the bottle showed no color change in all three locations. The orange and green bottles both blocked some of the UV rays. Only a few of the beads within the bottles showed a color change when exposed outdoors. In the white pill bottle, the beads steadily changed in color as the amount of sunlight increased in the different locations. The clear bottle and plastic bag (control) did not block any UV rays and their beads were able to change color upon exposure. These results are recorded in the chart and depicted in the photographs.

Conclusions/Discussion
Using UV beads inside the different pill bottles as a substitute for medicines, the experiment showed that the brown pill bottle blocked the largest amount of UV rays. This was followed by the orange and green pill bottles, then the white bottle. The clear bottle and plastic bag (control) blocked the least amount of UV rays. In conclusion, the damaging effects of UV rays on medicines as reflected in the color change of UV beads can be prevented by using the brown pill bottle which blocked the largest amount of UV rays regardless of storage location

The limitations of the study relate to weather conditions and the kind and quality of the UV beads. Depending on the weather, the strength of UV rays may differ. Certain color UV beads are more sensitive than others.

Summary Statement
Using UV beads as a substitute for medicine, I will be able to test how effective the UV protected plastic in pill bottles is in preserving the medicines.

Help Received