CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Preethi M. Balagani

Project Number
J0701

Project Title
Climate Change: Hurricanes

Abstract

Objectives/Goals
My goal was to see if hurricanes will get stronger over time because of Global Warming. I believe that if Global Warming creates a hotter planet, then the hurricanes will get stronger and increase in number, because hurricanes feed on heat.

Methods/Materials
Data charts on increase of heat each year, due to Global Warming. Also, charts on number of Global Hurricanes each year, for comparison.

In the miniature hurricane experimental model, I poured lamp oil and water in one 2-liter bottle. Connecting the filled bottle and another empty 2-liter bottle with the tornado twister cap, like an hour-glass formation.

Results
Interestingly enough, the data illustrated good correlation between a slow increase in Global Warming to increase in number and strength of hurricanes.

Through tornado twister experiment, though change of water temperature (hot and cold) did not have any significant effect in the intensity, (unlike real cyclone) speed and momentum used to spin, changed each cycle's strength dramatically.

Conclusions/Discussion
From the data charts, I could conclude Global Warming has an impact on hurricanes increasing in amount and getting stronger. But, this problem is still being discussed by scientists around the world, and the correct answer is still under investigation.

Summary Statement
I believe hurricanes are increasing in amount and getting stronger because of Global Warming.

Help Received
Mother helped out on project board. Father & Friends helped in the research information for the data charts.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Noah H. Cudd

Project Number
J0702

Project Title
The Greenhouse Effect

Abstract

Objectives/Goals
My objective is to determine the effect of different gases on the greenhouse effect.

I am doing this project because of the strong interest in the effect of gases like CO(2) and CH(4) on global temperature.

Methods/Materials
Materials:
1. Infrared test cell made up of PVC pipe containing a black-body absorber/radiator and closed off with polyethylene film. (Polyethylene was chosen because it is relatively transparent to IR.)
2. IR source (heat lamp)
3. thermocouple for measuring temperature
4. CO(2) gas
5. Air

Procedure:
Purge test cell with air.
Shine IR source into the cell for a fixed amount of time
Measure temperature rise over time
Purge test cell with CO(2)
Shine IR source into the cell for the same amount of time
Measure temperature rise over time

Results
The temperature rise in the cell when filled with CO(2) was slightly higher than when the test cell was filled with air.

Conclusions/Discussion
After many test runs I determined that there is a greater temperature rise when the test cell is filled with CO(2). That supports the hypothesis that CO(2) enhances the greenhouse effect. On the other hand, the additional temperature rise in a 100% CO(2) atmosphere is not substantially greater than with ordinary air so it is entirely possible that small increases in CO(2) might have only a small effect on temperature rise in the Earth's atmosphere.

Summary Statement
My project is to determine the effect of greenhouse gasses, specifically CO2, on temperature rise in a closed environment.

Help Received
My science teacher helped me to build my test cell. My stepdad helped me get materials like the tank of CO2.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Matthew Estrada

Project Number
J0703

Project Title
Don't Waste Water, Conserve It!

Abstract

Objectives/Goals
The purpose of this project was to see if different mixtures of hardpan and sand could be used to help with California water conservation.
Hardpan and sand are some of the most commonly found soil types within California. Hardpan is clay like substance that has the tendency to repel water. In other words, it does not make a good catalyst for water absorption. Sand consists of loosely packed granular rocks. Due to this, sand is a great catalyst for water absorption, but has poor water retention properties.
By mixing hardpan and sand in various mixtures I hoped to attain a mixture that would allow for water absorption with maximum water retention. In this way, agriculture could use this mixture while cultivating their crops. The goal being to reduce the amount of water needed for proper crop growth. At the same time helping California to conserve water.

Methods/Materials
One (1) shovel; One (1) metal screen mesh ;Five (5) 500 ml measuring cups;
Five (5) 1000 ml measuring cups; Five (5) 250 ml measuring cups; Hardpan; Sand;
One (1) Casio digital camera; One (1) pitcher; One (1) timer; One (1) separate 250 ml measuring cup to mix the soils with.

Results
Based on the results the 75% hardpan/25% sand mixture yielded the the best water retention while allow water absorption.

Conclusions/Discussion
The experiment proved the hypothesis was correct; it stated that 25% sand 75% hardpan was going to work the best for water absorption with maximum water retention. Farming consumes the largest amount of water within the San Joaquin valley and having enough water for crops is an ongoing problem. By finding better soil mixtures may help to reduce the amount of water consumed and increase the amount of crops that can be more effeciently grown.

Summary Statement
The focus of my project was to discover which soil mixtures between hardpan and sand would have the most water retention with maximum water absorption.

Help Received
Dad helped conducting the experiment by assisting with the pouring of the water into the measuring cups and excavation of soil.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)

Donna Gardner; Morgan Miller; Karolyn Powell

Project Number

J0704

Project Title

Geysers: Earth's Renewable Energy

Abstract

Objectives/Goals

The objective of our project was to determine if the level of water in the eruption tube of a gaeyser would influence the time of the eruption. We believe that the higher the water level in the eruption tube the quicker the geyser will erupt.

Methods/Materials

We used a variety of materials to construct a model of a working geyser. A geyser has three phases:heating, erupting and refilling. We eliminated the refilling phase and filled the 1.4-meter length plastic eruption tube to four different levels and started heating the flask with the same temperature water each time. We tested each level three times.

Results

The water level in the tube seemed not to be a factor in the eruption time. Our results showed only minutes between eruptions at the different water levels.

Conclusions/Discussion

Our conclusion is that the water level in the eruption tube of a geyser does not make the geyser eruption intervals come faster. Some other areas of future study could include how the enrgy generated from the heat and steam of the geyser can produce renewable enrgy. We see now that the refilling stage is very important to maintaning a higher heat that would create more steam.

Summary Statement

We built a model geyser and filled the eruption tube to different levels to see if it would affect the eruption time.

Help Received

Mr. Casey Mcluskey and Mrs. Barbara Maclaughlin helped us by supporting us in this process with feed back, ideas and letting us borrow the ring stand and thermometer. Mr.Powell helped us with engineering and modification of the ring stand and rubber stopper. Mrs.Powell helped us by taking us to get supplies.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Kent Gleim

Project Number
J0705

Project Title
Investigating the Percolation Rate of Volatile Fluids in Different Type of Soils

Abstract

Objectives/Goals
My first objective is to discover how far the volatile fluid I am using percolated down the test soils. My second objective is to find any effects during the process before and after combustion. My last objective is to find the average distance of each test soil and compare the results.

Methods/Materials
How I accomplished my tests was by first inserting 17 inches of the test soil into a 18 inch clear plastic tube. I used three different types of soils for this project, and in the soils consists of very fine sand (all purpose sand), fine sand (play sand), and course sand (which will be formed from all purpose sand, play sand, all purpose gravel). Then I poured two ounces of charcoal lighter fluid on top of the sand and let it percolate for 45 seconds. Then I measured how far the fluid percolated, tilted the tube horizontally, and poured out the sand. Once the test soil is lain out on the ground, I lit the soil with a lighter and measured how far the flame traveled. I did this 9 more times and found the average distance. I also repeat these tests and instead of 45 seconds I let the liquid percolate for 2 minutes.

Results
My one of my results were that the play sand or fine sand had the farthest percolation rate before and after combustion for the 45 second trial and the 2 minute trail. I also discovered that my hypothesis was somewhat right and wrong, I thought that before ignition the course sand would percolate the farthest, but instead it had the 2nd farthest rate. I also thought that the very fine sand would have the the lowest percolation rate which was correct. My other hypothesis was that after combustion the play sand or fine sand had the farthest percolation and that the course sand would get the lowest percolation rate, which was correct.

Conclusions/Discussion
After my project was over I found that 2 ounces of the volatile fluid I used equaled up to about 15 minutes once lit. I even found out that that by compressing the sand the distance of how far the liquid percolates changes. One very odd thing I found was that the fine sand, which was slightly damp, may have causing it to open the pores of the sand allowing the fluid to glide right by. My last discovery was concerning the fine sand; the fluid percolated to a certain point and then flowed down half on one side of the sand. This ends my conclusion with the play sand probably being the most flammable.

Summary Statement
Reseaching how far down flammable fluids go into the Earth.

Help Received
Parents helped setting up the board

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Lourdes M. Gomez

Project Number
J0706

Project Title
The Effect of 0%, 3.5%, 7%, and 20% Salinity Levels on Five Common Rocks

Abstract

Objectives/Goals
My objective was to find out if rocks were affected over time by varying levels of salinity as reflected in a freshwater environment(0% salinity), the average ocean (3.5% salinity), the Baltic Sea (7% salinity), and the Great Salt Lake 20% salinity).

Methods/Materials
Materials: 4 identical tubs, caliper, camera, notebook, pen, salt, water, dietary scale, measuring spoons, tape measure, measuring cup, 4 lbs. of Sedimentary rock, and four of the following rocks; Anthracite, Dolomite, Obsidian, Red Lava, and Slate.
Procedure:
1. Fill 4 tubs each with 1/2" of Sedimentary rock.
2. Put one of each of the following rocks into all 4 environments; Anthracite, Dolomite, Obsidian, Red Lava, and Slate.
3. Add the following amounts of salt and water to each environment.
Environment A. 192 tsp. water/0 tsp. salt, Environment B. 185 tsp. water/7 tsp. salt, Environment C. 178.5 tsp. water/13.5 tsp. salt, Environment D. 143.6 tsp. water/48.4 tsp. salt
4. Every three days observe, measure, and weigh the rocks using a caliper and a dietary scale. Record measurements, weight, and visual notes.
5. Observe the change in rocks size and weight and create graphs to reflect the results.

Results
As the salinity level increased, all of the rocks were affected. Dolomite, Anthracite, and Red Lava decreased in weight, whereas Obsidian and Slate increased in weight. Anthracite, Red Lava, and Obsidian decreased in size whereas Dolomite and Slate increased in size.
I observed signs of cracking in all three Obsidian rocks that were placed in saltwater. The pitting in Red Lava increased over time, in all saltwater environments, increasing its buoyancy. Slate was least affected by the salt.

Conclusions/Discussion
My experiment proved that varying salinity levels over time cause chemical weathering to common rocks. My discoveries could be applied to the preservation and conservation of underwater reefs, landforms, and replications of natural habitats. Preserving natural habitats with natural rocks as opposed to synthetic material such as concrete could eliminate pollution of our oceans. Stronger rocks could be used to secure and fortify foundations located in coastal regions.

Summary Statement
My project measured the effects of varying degrees of salinity over time on five common rocks.

Help Received
Hollister Landscape Inc. donated rocks; Ms. Deich of New Brighton Middle School helped with graphs; my mom helped edit report and measure rocks.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Annie M. Kingman

Project Number
J0707

Project Title
The Fingerprints of Erosion

Abstract

Objectives/Goals
The point of this project was to see if the style of jetty on barrier islands affected the amount of erosion on the beach. I modeled my project after barrier island, Plum Island, for this island tends to have heavy erosion problems. Lately, the island has become so thin it is threatening to wash over. I care about the erosion on Plum Island because I have a house there that is also threatened. I wanted to find out if the jetty had any part in how much erosion occurred.

Methods/Materials
I used an apparatus to test my question. I used wood for the base, Olympian sand for the landmass, a fish tank pump for the river, and a six gear motor connected to a plank for the wave maker.
I tested each jetty in the experiment for thirty minutes. I first took a plank and pushed the sand to the sand starting line, and placed a sheet of tinfoil up to the edge of the sand. Afterwards, I took a picture of the ending land mass and recorded the amount of sand that fell on the tinfoil.

Results
I found that the high/long jetty caused the least erosion. Next, was the low/long jetty. Third was the high/short jetty, and fourth the low/short jetty. Last, was no jetty. The longer and higher jetties were able to break down the waves as they came in; taking power away from them, and deflecting the waves further down the shore. The shorter jetties didn't take as much power away from the waves because they didn't reach far enough out to sea. No jetty caused the most erosion because the waves were not blocked by an obstacle and the power was not diverted in any way.

Conclusions/Discussion
Even though the results showed that the longer jetties will make the least erosion and no jetty will make the most, the results for each jetty were fairly scattered. What I found was that the jetty only slightly affected the amount of erosion, but the style of jetty greatly effected were the beach erosion occurred. The longer jetties made a concave semicircle in the middle of the landmass, and the most erosion occurred further down the beach. The short jetties and no jetty created more erosion, but steady everywhere. One problem is that since barrier islands are always changing, the results might have been changed if the experiment had been for a longer period of time. If, for example, I ran the experiment for 24 hours the sand might have circulated back around to the land mass. Also, the results might have varied if there had been a backshore.

Summary Statement
How the jetty affects erosion on barrier island beaches.

Help Received
Dad used power tools to make the apparatus; science teacher helped me get started and answered questions; sister helped lift apparatus to drain it

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Peter N. Krasznekewicz

Project Number
J0708

Project Title
What Are the Effects of Depth and Wave Height on Dissolved Oxygen Levels in Ocean Water?

Abstract

Objectives/Goals
I was trying to find out whether depth and wave height will have an effect on dissolved oxygen levels in three different dive sites around Monterey, Carmel, and Point Lobos. I thought that depth and wave height will both have an effect because the deeper the water, the lower the temperature, therefore raising oxygen levels. Also, the waves will absorb oxygen, which will be mixed into the water oxygen levels.

Methods/Materials
I chose three dive sites with different wave heights around Monterey, Carmel, and Point Lobos. I took samples of the water at the surface, and at depths of five meters, ten meters, fifteen meters, and twenty meters. I used a Lamotte oxygen test kit to discover the oxygen levels. I also took two dives at each of the three dive sites. At each depth I recorded the temperature. I recorded all the data at the end of the experiment and analyzed my complete data to see the effect of depth and wave height on dissolved oxygen levels around Monterey, Carmel, and Point Lobos.

Results
The results of my experiment show that Coral Street Cove (high wave height) had the highest average dissolved oxygen levels (6.72 PPM), Monastery Beach (low wave height) with the second highest average levels (6.52 PPM), and lastly Breakwater Cove (medium wave height) had the lowest results with 4.94 PPM.

Conclusions/Discussion
Depth seemed to be the major factor in dissolved oxygen levels. At the surface, the dissolved oxygen levels were the lowest and at twenty meters they were the highest at all three dive locations. As the depth increased the temperature decreased, which indicates that temperature is a factor. Colder water generally tends to hold more oxygen then water. On the other hand, wave height seemed to have no effect on dissolved oxygen levels in the ocean. Coral Street Cove, which was high wave height, had the highest results, but Monastery Beach's dissolved oxygen levels were higher than those of Breakwater Cove even though Breakwater Cove had higher wave levels. My experiment is important because as ocean warming becomes a more imminent threat, dissolved oxygen levels decrease and this may kill off habitats and marine animals. This information can be used in the future to monitor dissolved oxygen levels and to see how rapidly ocean environments are deteriorating.

Summary Statement
My project is about the impact of depth and wave height have on dissolved oxygen levels in ocean water.

Help Received
Father drove me to dive sites; Dive buddy took pictures of me while diving

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Taylor P. Lyberger

Project Number
J0709

Project Title
The Effects of Rain on Different Types of Land

Abstract

Objectives/Goals
My goal was to determine which types of land including sand, potting soil, bark chips, and grass, would hold up the best against water erosion. I hoped that figuring this out would help prevent erosion on hills.

Methods/Materials
My experiment required a box with a length of 60 cm, width of 30 cm, and height of 20 cm, a hose, potting mix, sand, bark chips, grass, a timer, and a notebook to record your results. First fill the box with a type of land so that it is a hill with a length of 22 cm and height of 16 cm. Then shower it with a hose for 10 seconds, record the new length and height, and repeat it for 20 and 30 seconds more. Do this with all types of land twice. Once you have collected the information, create a graph showing the length and heght of te hills.

Results
I discovered that the grass held up the best over a total of 1 minute. The sand and bark chips were not very successful against the water. Also, although the potting soil held up well after a total of 30 seconds, it washed away after 1 minute.

Conclusions/Discussion
From my results I concluded that the grass probably held up so well because of its roots used to soak up the water and the actual plant used to reflect the water. I think the sand did not hold up well because of its small particles. The bark chips did not hold up well because the pieces of bark were too light and losely packed. Finally the potting mix eventually failed because it could only absorb a certain amount of water. Therefore adding grass and vegetation to hills would prevent erosion by water.

Summary Statement
I determined which types of land hold up the best against water erosion.

Help Received
Friend helped time experiment

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Travis C. Mitchell

Project Number
J0710

Project Title
Landslides

Abstract

Objectives/Goals
The objective of my experiment was to determine which type of soil (sand, clay or sandy clay mixture) takes the least amount of water to landslide. I believe that sand would take the least amount of water to become unstable because it is has less strength than clay or clayey soils.

Methods/Materials
Materials: Stream table, sprinkling can, graduated cylinder, tare pan, water, soil, paper towels, scale, 30/60/90 triangle

Method:
1. Measure 1360.8 grams (3.0 lbs) of soil being studied
2 Add the measured soil to the 74-1/2 inch stream table. Add the soil to the middle third of the stream table (between 24 and 48 inches)
3. Tilt the stream table to an angle of 30 degrees from horizontal
4. Add water from a sprinkling can, 200ml at a time, at a constant rate, until the soil mass moves. Record amount of water added.
5. Wipe the stream table dry and repeat steps 1-4 two more times.
6. Repeat steps 1-5 with different soil.

Results
My results show that the sand took 1st place at an average of 600 ml of water to become unstable (landslide). Next was the mixture of sand and clay in 2nd place, averaging 1,000 ml to become unstable. And in last place was the clay. It took an average of 11,133 ml to become unstable.

Conclusions/Discussion
The results of my experiment confirmed that sand takes the least amount of water to cause a landslide. This outcome agrees with my hypothesis. The clay adds strength to the soil so the more clay that was in the soil, the more water it took to move it. This is because the clay does not absorb water as much as sand does. I was surprised at how much more water was needed to make the clay move. The sandy clay sample required about 40% more water than the sand to slide. However the clay sample with no sand required over 10 times more water to move than the clay sample containing sand!

Summary Statement
My project is about different types of soil and how water makes them unstable and prone to landsliding

Help Received
My mom is a geotechnical engineer and let me use her her lab and provided me with the soil.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Tori C. Nishimoto

Project Number
J0711

Project Title
Investigating the Measurement of Soil Stability

Abstract

Objectives/Goals
I want to determine which type of soil will have the greatest amount of stability for a foundation with buildings.
Also, does vibrating the soil before building on it make the soil more stable?

Methods/Materials
I collected three different types of soil. Loam, a clay loam, and a sandy soil.
I put 70 ounces of soil into an 80 ounce bucket. Cut holes on both sides of bucket. I then put a dowel with a hook through the bucket. I then tested how much force it takes to remove the dowel. I used a spring scale to measure the force.
2nd test -
same thing, but I vibrated the soil before checking the force. I placed bucket on vibrating platform for 30 seconds. This allowed the soil to settle. I then used spring scale to check force.

Results
There was a big jump in the amount of force it took to remove the dowel after the soil was vibrated.
In all three soils. It took over twice as much force.
The biggest jump was with the clay soil. It took 2.62Newtons before vibration. and 8.72N after vibration.

Clay also took the most force before vibration and least was the soil loam.

Conclusions/Discussion
This shows that developers should try to avoid building on loam soil. Try to build on clay.
In some countries, such as Dubai, they are shaking the soil before building.
If developers have a method of doing this, my experiment clearly shows that the building will be built in soil that is more stable.

Summary Statement
I am investigating how soil stability can change after vibration occurs.

Help Received
Teacher taught scientific method. Dad helped create vibrating platform and collect soil.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Catherine B. Rowen

Project Number
J0712

Project Title
Bam! The Strength of Rocks

Abstract

Objectives/Goals

I chose to study rock fracture because the San Francisco Bay Area is a major earthquake center. An experiment on the strength of rocks would help us understand earthquakes and understand ways of building structures to withstand them. I tested the fracture strength of four rock types: granite, soft granite, marble and slate, to investigate the question, "What type of rock can withstand the most pressure before fracturing?" My hypothesis was that granite would withstand the most pressure without breaking.

Methods/Materials

The strength of a rock is the amount of pressure it can withstand without breaking. There are three kinds of forces in breaking of materials: tension (pulling apart), compression (pushing together) and shear (sliding apart). When a bar of material is pushed down, the bending causes compression on the top and tension on the bottom.

One standard measure of strength of a material, independent of the size of the sample, is the "modulus of rupture." It indicates the strength of the rock when a bar of rock is pushed down until it breaks in half, based on the dimensions of the rock and the force required to break it.

I weighed and measured each of 24 rock samples, 6 each of granite, soft granite, slate and marble. I broke rock samples, each about 30cm long, 2.5cm wide and 2.5cm deep, on a frame made of steel pipes resting on a scale, by having a person gradually increase the weight on the rock until it fractured. I recorded the breaking weight then corrected for the dimensions of the rock to calculate the modulus of rupture.

Results

The results show that slate was by far the strongest of the four rock types. The data shows that slate is most definitely the strongest material of the four, and that the marble is on average the weakest. The fracture weights of the slate and soft granite are spread out on the graph up and down, indicating a wide range of strengths, as opposed to the marble and granite showing consistent strength.

Conclusions/Discussion

My project compared the breaking strengths of different kinds of rocks. The data shows that slate was drastically stronger than the other types of rock. On average it is more than five times stronger than marble, the weakest on average. Our hypothesis was that granite would be the strongest and it is strong - more than twice as strong as marble - but it is much weaker than slate. Two types of rock, the marble and the granite, showed little variation in strength within the rock type. However, the slate and the soft granite, showed more variation in strength. One possible reason for the variation in the slate strength is weak points in along the bedding planes in the rock. One possible reason for the variation in the soft

Summary Statement

My project tested the breaking strength of four types of rocks, by calculating the modulus of rupture for marble, slate and two types of granite

Help Received

My father helped me set up the equipment, provided weight to break the rocks and did some typing. Lyons Marble and Tile supplied the cut rock samples.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Alexandra J. Vaughan

Project Number
J0713

Project Title
The pH Problem

Abstract

Objectives/Goals
By adding vinegar to different types of soil, which soil will change in pH level the most?

Methods/Materials
Materials: Digital pH meter, pH calibration liquids, 2.268 kg each of diatomaceous, alkaline, compost and sandy soil, car and driver, (16) 350 mm cups, (5) 49.2 Litre trash bags, (2) shovels, 3.7843 litres of water and Vinegar, (4) clean stirring spoons, (1) 150mm cup, (2) 150mm bowls, (1) 250mm cup, (1) 2050mm cup
Methods: After collecting the materials, I calibrated my pH meter, thin I added 0.1183 L of soil to each 350 mm cup. Next, I added teh same amount of water. To get my base, I took the pH of each cup. Then I mixed 0.4732 L each of vinegar and water together to get a 50% solution. I then added the solution to four (4) new cups. I then took the pH of the cups to get the change. After that, I repeated the process with 25% and 75% solutions. Finally, I recorded and charted the results.

Results
The highest change in pH was the sandy soil, then the alkaline soil, followed by compost and ending with diatomaceous soil.

Conclusions/Discussion
My hypothesis was proven incorrect. The alkaline soil had the highest change. My hypostesis, however, was correct beacuse the soil with the highest alkalinity had the largest change.

Summary Statement
My project is about measuring pH change in different soil types when acid is added.

Help Received
Father drove me to get different soil and Mom helped calculate the results.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Avi G. Vogel

Project Number
J0714

Project Title
Determining Which Rocks Put Out More Heat by Boiling Them

Abstract

Objectives/Goals
In this experiment, the purpose was to discover the heat output of rocks. Which rocks would produce more heat: Igneous (Pumice/Basalt), Sedimentary, or Metamorphic?

Methods/Materials
This would be done by putting the rocks in boiling hot water for 240 seconds while an oven thermometer would record the heat output. The experiment called for 6 Igneous pumice rocks, 7 Igneous Basalt rocks, 5 Sedimentary Limestone rocks, 6 Metamorphic Rose quartz rocks, 2 pots that were 2 1/2 liters, 2 oven thermometers that are NSF, and 1 liter of water for each of the rocks in each experiment.
Results

Results
The tables that were derived from this experiment show that the pumice rocks overall released the third most amount of heat in the experiment. They also were the lost heat more gradually than the rest of the rocks. The basalt rock#s heat measurement were radical and went up and down in the middle of the experiment. It also had the second highest overall heat output. The metamorphic rock had the highest overall heat output. The temperature of the rock rose gradually, and only sometimes fell into a lower heat. The sedimentary rock had the lowest overall heat output. On every experiment, it was either of medium temperature, or of a low temperature. This is what caused it to have the least overall heat output. Both of these charts and graphs show the overall outcome of this experiment.

Conclusions/Discussion
In the experiment, the results showed that the metamorphic would export the most heat. The results suggest that ancient man could have used rocks, but in order to generate adequate heat, it would have to include great quantities. This project is important because it could contribute to revealing how ancient man kept warm. What rocks did he use, and was it even possible that he could use rocks to provide warmth to his caves. Research in this area would also contribute to discovering if rocks could be used to power electronics such as toy cars, gaming consoles, and maybe one day, cars. One last reason that this would be important is that it could lead future generations into taking this topic into more extensive research How have rocks endured on this planet? Why haven#t all of them eroded into sand? Can rocks absorb carbon dioxide and make this planetary body cleaner?

Summary Statement
Determining Which Rocks Put Out More Heat by Boiling Them.

Help Received
Teacher helped me with testing the rocks, Mother helped me design board