

Category: Earth & Space Science

Student Name: Hayley Ford

Team Members (if any):

Project Title: Vanish into Thin Air An evaporation study

Abstract: I did my project on water evaporation. I wanted to test if a floating layer of oil affects the evaporation of water, and how much different amounts of oil affect evaporation. I thought that the more oil that was placed on the water, the less the water would evaporate. For my experiment I: -Weighed and numbered 33 cups -Filled each cup with the same amount of water and weighed them -Placed different amounts of oil in the cups of water and weighed them -Placed the cups on my bedroom desk -Observed and weighed the cups for 2 weeks My results showed that my hypothesis was kind of right. I observed that the more oil I placed on the water, the less it evaporated. But, I saw that if the surface area was completely covered, it didn't matter how thick the layer of oil was; no water was lost to evaporation. I only tested for 2 weeks, but it didn't seem to matter how thick the oil layer was. I also concluded that even just a little oil helps a lot in slowing the evaporation of water. To barely cover the surface area of the water (25.6 C) in the cup, it took just over 20 grams of canola oil. But even 4 grams of canola oil reduced evaporation by over 50%. I did quite a bit of research and found out that my experiment has applications in many areas including swimming pools, rain collection systems, and oil spills in the ocean.

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Student Name: Amber Hutchinson

Team Members (if any):

Project Title: Dirty Snow How Much PM Can be Found in Snow From Different Directions?

Abstract: The problem I found was How much PM can be found in snow from different directions? I needed to research: PM, health risks of PM, And what is PM made of? I learned that PM is tiny dust, calcium, and silicon particles in the air and that PM stands for Particulate Matter or particle pollution. I also found that PM can be inhaled and can be hazardous to those with asthma along with other heart or lung problems. PM is also dangerous for those very young or elderly. After learning this, my hypothesis turned out to be: I predict that the storms from the North West will have the most PM collection in them because of all the highly pollutant cities in that direction. My procedure was basically collect snow, melt, pour through filters and weigh before and after pouring. I completed the melting, pouring and weighing process at Central Valley Water Reclamation Center Laboratory. I found that the PM found in the Northwest samples was more common than in the South samples and the weight difference proved as much. I discovered that most of the particles found were composed of microscopic flakes or gobs of calcium and/or silicon, just as my research stated. I collected seven storms; four from the Northwest and three from the South. I rinsed a blank filter twice to be my control, and since the holes in the holster were not lined up the same way as the first time, loose fiber particles were rinsed out along

with the distilled water. Because of some fiber particles being lost, this explains why some of the filters lost weight in stead of gaining it. There was simply too little PM compared to the loose fiber particles. After recording my data, I came to this conclusion; I did not gather enough information to accept or reject my hypothesis that the direction with the most PM would be the Northwest because of lack of snow storms and a mishap in the lab. From what I gathered, the northwest snow had a higher level of PM than the south not only because of the highly pollutant cities in that direction and a higher number of storms collected from that direction, but because of the week or so between storms which gave it time to enlarge the inversion. This brought to my attention that we need to work together with these other cities to clean up our air quality. If the air quality from the snow is this bad in a clean area such as Heber Valley, imagine how bad it must be in larger cities. In addition, the next time this project is attempted, I suggest that snow samples are collected from several different areas.

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Student Name: Robert Lewis

Team Members (if any):

Project Title: Sandstone Erosion

Abstract: It was hypothesized for this science project that more erosion would occur to the sandstone from wind carrying sand than water carrying sand with the same amount of pressure being applied. In this experiment, there were three samples of the two independent variables, water carrying sand and air carrying sand being tested. A media blasting gun and an air compressor was used to deliver the wind and pump the water. Each sample was tested by weight with a digital scale and then measured with a micrometer for sample thickness before and after the experiment. An average of the three samples for each set was obtained and the percentage of change was identified. All measurements were obtained utilizing the metric system. The results of this experiment were that all samples were found to have a decrease in weight and thickness with both independent variables. The most change occurred in the independent variable of water and sand. Therefore, my hypothesis was incorrect that more erosion would occur with air and sand than with water and sand. This experiment supports that more erosion occurs to sandstone with water and sand than with air and sand, with the same amount of pressure being applied.

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Student Name: Haydn Schaefermeyer

Team Members (if any):

Project Title: Going, Going, Gone

Abstract: The size and shape of a rocket are key factors that determine the distance a rocket will travel. Isolating specific design factors, such as weight, thrust and fuselage length, allow scientists and engineers to develop more efficient rockets. My hypothesis is that the maximum altitude a rocket can obtain is directly related to the length of the fuselage. My second hypothesis is that there is an optimum range in fuselage length. A bell curve will be visible as the data from. I built several rockets with different fuselage lengths using the same design and the same weighted paper for each rocket. I then followed these procedures for each rocket: I launched each rocket a total of three times using an air-pressurized launcher built for this experiment. I launched each rocket using the same amount of thrust. In this experiment each rocket is launched at an air pressure of 25 psi. An observer tracked the flight of each launch with an altitude tracker in order to establish the maximum altitude reached in each launch. I repeated the procedure for each of the rockets. I Calculate the altitude using the formula a (altitude) = $\tan A$ (angle) \times b (baseline), or $a = \tan A(b)$. I averaged the maximum altitude for each rocket. I then compared the data to determine how fuselage length influences the

height of each launch as well as the optimum window for fuselage length. I determined that there is a window for optimum fuselage length.

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Student Name: Tiffany Cain

Team Members (if any):

Project Title: Sand Under Lateral Compression

Abstract: The question I had for my science project was, which creates better folding of land mass rocky sand or regular sand? For my hypothesis I believed that both the rocky sand and regular sand would create just a regular anticline and syncline land movement. Anticline is when there is an arch-shape of land mass. Synclines are trough-shape. I built a sand box out of wood and placed Plexiglas on the sides so you could see the sand. I placed $\frac{1}{2}$ in of regular sand then $\frac{1}{4}$ in of colored sand on top of that. I did this once more. I cranked a threaded rod to compact the sand. For the rocky sand I placed $\frac{1}{2}$ in of sand mixed with gravel and $\frac{1}{4}$ in of colored sand and cranked the sand just as I had done for the regular sand. The results I received were very surprising to me, the regular sand had created recumbent folding and the rocky sand had created anticline and syncline land movement.

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Student Name: Ashley Coxe

Team Members (if any): Summer Bailes

Project Title: Earthquakes in different soil conditions

Abstract: How much damage is done to buildings when earthquakes happen with different types of soil? What we mean is what would happen to buildings when earthquakes happen with a specific soil. The relationship between earthquakes and soil and the strongest soil to be clay soil and the structure will last longer with one earthquake happening and the sand would not last long. What we mean is that when an earthquake happens, clay soil would be the strongest, and sand would be the weakest when trying to keep the structure standing. Put 1200 ml of soil in a plastic shoebox, pick out 30 sugar cubes, and make a foundation out of 8 large popsicle sticks. Put the foundation on top of the soil and place the sugar cubes in a pyramid on the foundation. Next, place the shoe box on the massager and turn it on for 2 minutes; use a scale of 1-10 (1 being worst, 10 being best) and record your data on the data table of what happened with the experiment. It turned out that sand was the best and clay was the worst. It was figured out that when the soil is solid like clay, as in very little holes, the earthquake can get a grip on the big chunk of soil and it would shake violently, but if the soil was loose like sand, as in a lot of holes, the earthquake can't get a grip on the soil, it would shake harmlessly.

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Student Name: Chet Oxborrow

Team Members (if any):

Project Title: Boiling Water at Altitude

Abstract: My project, Boiling Water at Altitude is basically a question of how does the altitude of a given location affect the boiling point of water. My question was does the elevation of a given location affect the temperature and speed at which water boils. My hypothesis was that at a higher altitude water will boil quicker and at a lower temperature than at lower altitudes. This is because of the lessened amount of barometric pressure exerted upon the water at higher altitudes. I went and boiled water at various altitudes in Utah to see if there was a change. It turned out that at a higher altitude water will boil faster. Therefore my hypothesis was proven correct showing that after sea level where water boils at 100 degrees celcius the boiling point would slowly decrease. This is what my project is about.