CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

22271

Project Title

The Prediction of Geyser Eruptions

Abstract

Objectives/Goals

Will a size and heat controlled geyser erupt on a consistant schedule allowing for multiple advanced eruption predictions.

Methods/Materials

7 gal trashcan, 3ft braided plastic tubing, 20ft copper tubing, 2 coffee cans, charcoal/lighter fluid, welding mat'l, heat radar gun, water, stop watch and a lighter.

To build the geyser a 1/2" hole was drilled into the trashcan about 2" from the bottom and another 12" above. A copper 4" tube was welded in place in both locations sealing it completely. The braided plastic tubes were then attached snuggly over each 4" copper tube and clamped in place. Remaining 19ft of copper tubing was coiled tightly/vertically inside the stacked coffee cans with each end clamped tightly to other ends of plastic tubing.

Charcoal and lighter fluid is placed in the middle of the copper coils and lit. Using a heat radar gun the core temperature of the coal is taken. Once the coal temperature reaches 450 degrees 5 gals of water is poured into the trashcan. The stopwatch is started and each eruption is timed.

The pressure of the water level in the trashcan causes water to flow over and up through the 1/2" copper tubing. As the charcoal heats the copper tubing it applies pressure to the water causing it to erupt. Steam escapes first followed by the fluid eruption. Due to the eruption the water evacuates the copper tubing. The water pressure in the trashcan pushes water back up into the copper tubing starting the process over.

Results

My geyser erupted around 2 mins 39 sec apart. By controlling the core heat, water temp/amount, the tubing diameter and continuous flow of the tubing the geyser erupted on a regular schedule unlike Old Faithful which you can only predict one eruption in advance. I was able to predict 10 eruptions in advance with-in a 5 second variable.

Conclusions/Discussion

Having a controlled environment enabled me to make advanced, accurate predictions. If the water filled caverns of Old Faithful were exactly the same dimension throughout and coiled around the molten rock so it was evenly heated I conclude that we could predict several eruptions in advance. Unfortunately today we are only able to predict one eruption at a time. Think of the possibilities of a harnessed timely eruption.

Summary Statement

Predicting the eruption of a controlled environmental geyser vs. the natural geysers.

Help Received

My father welded and built the geyser. My mom typed up my notes/report and helped me with my display board.

Preliminary