CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
31896

Project Title
Geothermal Cooling: Energy Savings Grounded in Fact

Abstract

Objectives/Goals
My question is: Can I build a working model of a geothermal unit and find the levels of airflow and heat generation that allow the experiment to work the most effectively? I hypothesized that with enough effort, I could build a working model. I also presumed that the best possible combination of heat generation and airflow were low heat and high airflow. I am trying to prove that geothermal cooling works and is a significant energy source that needs to be explored.

Methods/Materials
The experiment consists of a heat exchanger installed in a model house constructed of foam core and Plexiglas. The experiment includes a water circulation pump, a five foot "ground loop" constructed of copper piping and a tank to simulate the ground at a depth of six feet. Lights were used to generate heat inside the model house.

Results
The experiment shows that the unit worked most effectively with the least heat generation and most airflow.

Conclusions/Discussion
My results showed that airflow plays an important role in the efficiency of geothermal cooling, and that less heat generation resulted in more efficient cooling. The experiment also showed that geothermal cooling works and can cool an area with the proper ground loop length and airflow. Lastly, my project concludes that geothermal cooling should be explored by society for a greener future.

Summary Statement
My project demonstrates the geothermal cooling process, looks at several variables and shows how geothermal energy can be used to save money and reduce reliance on non-renewable energy sources.

Help Received
My father used power tools to make Plexiglas cuts based on my design and to cut copper pipe for me. He also instructed me on how to use a soldering iron and Dremel tool. My mother used cutting tools to cut foamcore based on my design and also instructed me on use of a hot glue gun. Worked with my