CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

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Project Number

S0814

Project Title

Phase V: Cost-Effective and Pollution-Free Natural Recycling of Impure Water

Abstract

Objectives/Goals

The objective was to develop a method to naturally recycle impure water in an economic, environmentally friendly, easily maintainable, and efficient process.

Methods/Materials

Three identical water recycling models were constructed, each consisting of a water unit, a condenser unit, a final water collection unit, and a heat source unit. Before inputting a contaminated, undrinkable water source into the water compartment, the resistance, concentration, pH, and chemical content were recorded. The recycling systems were then placed outside in an area exposed with ample sunlight. Temperature recordings were made during the morning, afternoon, and evening. During the evening, the total water condensation produced was measured with a scale. After a ten-day trial period, the final resistance, pH, concentration, and chemical content were recorded. The entire process was replicated with pond water samples, followed by a distilled water sample, which acted as the control.

Results

Although there was not a high efficiency rate, the effectiveness of separating the impurities from the original impure water samples was apparent. Through the analysis of pH, concentration, resistance, and chemical tests, the resulting water samples, produced from the recycling model systems, indeed had results closely similar to the pH, resistance, concentration, and chemical content of distilled water.

Conclusions/Discussion

Even though we had improved means of insulation for the models, the efficiency was low because there was not adequate energy input from the environment. The total amount produced was 225.7g of water, which was drinkable. The experiment cost under $40, produced no pollution, ran on natural energy, and was easily maintainable. Further modifications are to implement mirrors to increase the amount of energy input and to utilize fiberglass to conserve heat for the heat compartment of the recycling models.

Summary Statement

In place of artificially driven water treatment processes, our water recycling models utilize naturally induced temperature changes to recycle water through a pollution-free, modestly maintainable, and economic method.

Help Received

Our parents provided helpful suggestions to improve our project and models, purchased model and board materials, and were our main source of support for this project. Our science teachers also provided useful tips and equipment to analyze our water samples.