CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0701

Project Title
Potential Batteries for the Developing World

Abstract

Objectives/Goals
Is it possible to develop potential batteries for the developing world consisting of inexpensive, commonly available materials useful in powering radios, cell phones, small motors, and other basic devices?

Methods/Materials
(1) Create a simple battery using commonly found materials. Each battery requires two different types of metal (anode and cathode), and another material as an electrolyte, which helps electrons travel between the different metals. This movement of electrons creates an electric circuit, converting chemical energy into electricity. (2) Measure the voltage and current with a voltmeter (which measures volts and current) and compare the amounts of energy gathered by each combination of materials. Materials that produce the most current and voltage will be tested to see how long the different combinations last before the chemical reaction is used up. The most promising combinations will be tested in real life situations to see if they can power lights, radios, small motors, etc. (3) Record the data in tables and duplicates will be inserted in my Log Book. (4) Draw conclusions and support them with data.

Aluminum, Ash, Brass, Charcoal, Copper, Dirt, Galvanized Steel (steel coated in Zinc), Iron, Lead, Salt Water, Sand, Stainless Steel, Steel, Tin, and Water.

Results
After finishing my experiments, I ordered and graphed results from highest to lowest. Salt Water is the best electrolyte for current and Charcoal is the best electrolyte for voltage. Galvanized Steel and Lead together are the best producers of current, and Aluminum and Copper are the best for creating voltage. Current appears more critical. The one consisting of Galvanized Steel, Lead, and Salt Water ran the radio for days, while the other one could barely light an LED, even with multiple cells.

Conclusions/Discussion
I conclude that it is actually quite simple to generate a surprisingly large amount of power with common resources. I believe that my project can improve the lives of poor people in Third World countries. Lead currently trades for $0.21 a lb., and Zinc trades for $0.35 a lb. I estimate that my battery would cost less than $1 in volume. A poor developing nation (with U.N. financial help) could easily gain access to small amounts of local electrical power.

Summary Statement
Creating Inexpensive Batteries for the Developing World

Help Received
Parents drove me to stores, helped cut metals, allowed me to use workbench