CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
James L. Creech

Project Number
J0707

Project Title
Building Basic Batteries: The Effects of Different Metal Combinations on Battery Voltages

Abstract

Objectives/Goals
The objective of this experiment is to determine which battery between zinc and copper, zinc and lead, or copper and lead gives off a higher voltage. The hypothesis is zinc and copper battery will give off the highest voltage reading because copper conducts heat very easily and zinc is a good material for plates in batteries and it is a good conductor.

Methods/Materials
After the three batteries were assembled in a plastic container (the metals were separated by sponges on a nylon screw), one cup of lemon juice was poured on the batteries and their voltages were recorded with the voltmeter. This process was repeated three times.

Results
The copper and lead battery had the highest average voltage reading of 0.93 volts. This is because the copper gave off a positive voltage reading and the lead gave off a negative voltage reading (this allowed them to make a strong battery). Although the zinc also gave off a negative voltage reading, it did not give off as strong a reading as the lead (this is because the lead conducts better, therefore making a better battery with the copper than the zinc did). The lead and zinc battery gave off low voltage readings because the lead and zinc both give off negative voltage readings and therefore making a weaker battery.

Conclusions/Discussion
In conclusion, the hypothesis was incorrect because the copper and lead battery gave off the highest voltage reading instead of the copper and zinc battery. If commercial batteries today were made from copper and lead instead of copper and zinc, less of the metals would be needed to provide the needed voltage keeping costs low for the company, saving money for consumers, and preserving more of the earth's natural resources.

Summary Statement
The objective of this experiment is to determine which battery between zinc and copper, zinc and lead, or copper and lead gives off a higher voltage.

Help Received
Father helped cut metals; Parents helped do display board.