

# CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s)

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**Project Number** 

22217

**Project Title** 

They Say Their Batteries Are Best ... BUT ... Are AA-Batteries Really Different?

# Objectives/Goals

The purpose of my experiment was to (1) determine if battery advertisements on TV fre telling the truth and (2) help people decide which brand of AA-batteries gives them the best value for their money.

**Abstract** 

### Methods/Materials

I tested eight brands of batteries, including popular name brands and common generic brands: ACE Alkaline, Duracell Coppertop, Duracell Ultra, Energizer e2, Energizer Max, Eveready Super Heavy Duty, RadioShack Alkaline, and Sav-On Alkaline. I built a high current draw test rig to mimic toys like a Game Boy or a remote control car. The test battery powered an electromagnetic switch that controlled a clock. When the battery could no longer keep the switch closed the clock stopped and I recorded the time. I tested each of the brands of batteries for the amount of time they continued to supply power to my test rig. To make statistical comparisons possible, I used four replicates of each brand. I used an ANOVA and a multiple range test to see which batteries lasted longer and cost the least per minute of use.

#### Results

With respect to running time, six out of the eight battery brands to the were statistically indistinguishable. One brand stood out as being the worst (Eveready Super Heavy Duty) and one brand obviously outshined the pack, the Duracell Ultra. With respect their cost of operation, the Energizer e2 cost the most to operate per minute. The three other major name brands (Duracell Coppertop, Duracell Ultra and the Energizer Max) performed in the middle of the pack and were not statistically different. The four brands that cost the least per minute of use and that were statistically the same were the Eveready Super Heavy Duty, Sav-On Alkaline, ACE Alkaline, and RadioShack Alkaline. Of this group, the RadioShack Alkaline cost the least per minute and it was the most predictable based on the small range for its 95% confidence limits.

## **Conclusions/Discussion**

My experiment showed that you shouldn't trust idvertisements because they mislead you into believing that their product is the best. Ideternine what the RadioShack Alkaline AA battery provided the best value, it lasted the second longest and cost the least per minute to operate.

# **Summary Statement**

I compared eight brands of batteries with respect to how long they lasted and cost per minute of use.

## **Help Received**

My dad helped me design and build my test rig. He also instructed me in the statistical analyses I used and in the interpretation of the results. My mom helped me design the major table layouts in Excel. They both drove me around to get the materials and information I needed.