CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

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Project Number

38084

Project Title

AA Showdown

Abstract

Objectives/Goals

This project is intended to produce a battery which will save you time and money in various situations such as emergency preparedness, as knowing the better choice is crucial for surviving natural and man-made disasters, camping and hiking preparations, business or work readiness, and obtaining maximum performance in battery-powered devices.

Methods/Materials

We found an Arduino-based battery tester online which we modified by removing the digital display screen and wiring it to show the data on a program called CoolTerm, and building a copy of it to test another battery. The software was programmed by Hans Poggemeyer and remained unmodified by us. We used two resistors to run the battery down and used a Mosfet, an electronic switch, to control when the Arduino UNO took measurements and when it ran the battery down. The data was then transferred to KaleidaGraph, where we plotted our graphs.

Results

The Energizer Ultimate Lithium lasted the longest, at 49.33 hours with an exceedingly low discharge rate at a price of $0.40 per hour and $0.26 per mA. We also found that the Energizer MAX had similar performance while costing less, $0.02 per hour and $0.19 per mAh, even though it pulled in at 41.1 hours. Therefore, the Energizer MAX provided the best cost to performance rate in this experiment.

Conclusions/Discussion

In conclusion, the Ultimate Lithium should be used in devices that require a large, constant current, like digital cameras and RC vehicles, as it boasts a high current with an exceedingly slow discharge rate. Rechargeables should be used in toys which require constant replacement of batteries as they can be recharged multiple times. Alkalines like the MAX can supply good performance for any situation like emergencies, recreation, entertainment, or work efficiency if you cannot afford the more expensive lithiums and rechargeables.

Summary Statement

We built our own tester to monitor the performance of a chosen set of batteries to find which one had the best cost to performance rate, and discovered that the Energizer MAX was the most cost efficient.

Help Received

Hans Poggemeyer; David Wang; Brandon Oldham; John Fazio; Ms. Patty Kasad; Li-Te Wang; Daniel Wang; Valerie Poggemeyer; Sophia Poggemeyer; Elizabeth Wang