

Battery Power

Grade

6

Topic: Energy
Grade: 6
Duration: 45 minutes

Students will examine how much energy they use in the form of battery power. They will then examine the cost of using regular vs. rechargeable batteries. They will also examine the effect on the environment of the two types of batteries.

Curriculum Expectations

- 6s53: Identify uses of electricity in the home and community and evaluate the impact of these uses on both our quality of life and the environment
- 6s64: Compile data gathered through investigation in order to record and present results, using tally charts, tables, labelled graphs, and scatter plots produced by hand or with a computer
- 6s73: Identify the different ways electricity is produced
- 6e1: Communicate ideas and information for a variety of purposes (to inform, to persuade, to explain) and to specific audiences
- 6e5: Produce pieces of writing using a variety of forms (e.g., newspaper articles, lyrics, summaries of information), techniques and resources (e.g., library resources) appropriate to the form and purpose, and materials from other media (e.g., film clips)
- 6e6: Produce media texts using writing and materials from other media
- 6e22: Integrate media materials (e.g., computer graphics) into their writing to enhance their message
- 6e36: Plan a research project and carry out the research
- 6e47: Make reports, describe and explain a course of action, and follow detailed instructions;
- 6e66: Create a variety of media works
- 6m106: Systematically collect, organize, and analyse data
- 6m107: Use computer applications to examine data in a variety of ways
- 6m114: Design surveys, organize the data into self-selected categories and ranges, and record the data on spreadsheets or tally charts
- 6m116: Evaluate and explore how data were collected and how the results represent the population
- 6m121: Make inferences and convincing arguments based on the analysis of tables, charts, and graphs
- 6a38: Produce two- and three-dimensional works of art (i.e., works involving media and techniques used in drawing, painting, sculpting, printmaking) that communicate a range of thoughts, feelings, and ideas for specific purposes and to specific audiences

Background Information

A battery turns chemical energy into electrical energy. Dry-cell batteries contain a damp chemical paste called the electrolyte. This is made up of millions of positive and negative charges. The electrolyte is inside the battery case made of zinc. In the middle there is a carbon rod. This carbon rod has a metal tip. This makes a better connection to the equipment being used. The carbon rod and the zinc case are electrodes of the battery. They are connected to the + and – terminals that are seen on the outside of the battery. When a dry-cell battery is placed inside a flashlight and it is switched on, a chemical reaction starts in the paste that generates an electric current. Electrons go to the zinc case and positive charges go to the carbon rod. The flow of electrons makes the bulb light up. When the electrolyte cannot react any more, the battery is dead and no more current will flow.

Once a battery is dead, it can no longer be used as a form on energy and it must be “thrown away”. Batteries cannot go into the regular garbage or the recycling bin. Batteries contain toxic materials such as mercury, a dangerous metal that can leak into the ground. They must be disposed of separately. Most people do not do this so batteries end up in the landfill and chemicals are leached into the ground.

Accountability

Students will understand that the use of rechargeable batteries will result in significant energy savings at the school.

Teacher Notes

1. Discuss this scenario with the students:

Your class carries out many science and technology experiments. Many of the materials that are used require batteries as the form of energy. This can be very expensive since the life of most alkaline or NiCad batteries is quite short and they are a form of non-renewable energy. You realize that rechargeable batteries would be more cost and energy efficient but it will cost much more money initially to purchase these batteries. You need to create an experiment to demonstrate the cost savings of these batteries.

2. Create a survey to determine how many batteries are in used at the school. Record this on a chart.
3. Carry out research to discover the cost of the batteries. Calculate the cost of these regular batteries over the course of the school term and school year. Use a spreadsheet to record these data.
4. Do some market research to discover the cost of rechargeable batteries and a battery recharger. Create a business plan for the school that will outline the benefits of converting to the rechargeable batteries. Determine the cost savings over a period of time.
5. Examine what happens to batteries if they are not disposed of properly and the effect on the environment. Find out how batteries are disposed of in the school, in the board and in the municipality. Create a poster that shows people how to dispose of batteries properly. Post in the school.
6. Develop a media presentation that could be used at a School Council meeting to find the funds to acquire these batteries for the school.
7. Encourage students to create an experiment to demonstrate the benefits of using rechargeable batteries.

Home Extension

Examine how many devices each student has at home that operate on batteries. Do this for every member of the family. Calculate the cost of running all these devices per week, per month and per year. Examine ways that this usage can be reduced.

Lesson Comments

Teachers, feel free to add in your own comments for this lesson.