POWERHOUSE
SCIENCE CENTER
3615 Auburn Blvd., Sacramento 95821 (916) 674-5000

Topics
Physical Sciences

Grades
3-5

Duration
60 minutes

Vocabulary
atom, electron, electric current, circuit, switch, open-circuit, closed-circuit

Next Generation Science Standards

Practices
Asking Questions and Defining Problems

Planning & Carrying Out Investigations

Constructing Explanations and Designing Solutions

Core Ideas

PS3.A Energy can be moved from place to place by moving objects or through sound, light, or electric currents.

Charge It Up

Overview

In this fun introduction to electricity, students learn what happens when you flip on a power switch. They are introduced to the basic structure of an atom, with a focus on electrons and how their flow along a wire is responsible for an electric current. Students understand how a battery works.

Students work with a partner and use electric components like switches, lightbulbs, fan, batteries, alligator clips and wires to understand ways to create paths for the flow of electrons. Working with electrical circuits, students complete a series of challenges as they convert energy from one form to another.

Objectives

- Students identify the basic structure of an atom.
- Students understand the role electrons play in electricity.
- Students observe how electrical energy can be transferred into mechanical, light and heat energy.
- Students design and test their own circuits.

Teacher Preparation

- Please arrive at Powerhouse with enough time to allow students and chaperones to use the restroom before the program begins.
- If program starts late, content will be altered to fit available time.
- The teacher is required to remain in the lab throughout the presentation.
- Students will work in pairs. Be sure to assign pairs who will work well together.

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Next Generation Science Standards

Core Ideas

PS3.B Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.

ETS1– Engineering Design

Crosscutting Concepts

Energy and Matter– Energy can be transferred in various ways and between objects

Performance Expectations

4-PS3-2. Make observations to provide evidence that energy can be transferred from one place to another by sound, light, heat, and electric currents

4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another

Charge It Up

Extended Learning Activity

US Energy Information Administration
Activity Book:
https://www.eia.gov/kids/resources/teachers/pdfs/Activitybook_web.pdf

Resources

-NASA Climate Kids
https://climatekids.nasa.gov/power-up/

- NASA Electricity for Educators
https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/What_Is_Electricity.html

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Vocabulary

Atom: smallest unit into which matter can be divided

Electron: negatively charged subatomic particle of an atom

Wire: long thin piece of metal that is used to carry an electoral current

Electric current: the flow of electrons along a path (e.g. wire)

Circuit: a path for transmitting electric current

Switch: A devise designed to open or close a circuit

Open-circuit: a break in the path for the electrons to flow from one end od the battery to the other

Closed-circuit: an uninterrupted flow of electrons along a path from one end of the battery to the other

Charge It Up

Basic Structure of an Atom