

# Electricity Program of Study Overview

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Inquiry-based Science Curriculum from  
The *Guided Inquiry supporting Multiple Literacies* Project  
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Why does energy flow -- or not?

### CYCLE 1

### CYCLE 2

### CYCLE 3

Getting charged particles to continuously flow

Where is path of the flow within a light bulb?

How does a flashlight work?

1st-hand

1st-hand

2nd-hand

**E** CURRENT ELECTRICITY

**pI** Using batteries

**pI** What is in a lightbulb?

**pI** Examining a scientist's investigation of a flashlight

attractive force between oppositely charged materials  
attraction results in a flow of energy in an electrical discharge  
creating a continuous flow of electrical energy

source of oppositely charged particles that are separated (poles)

examining a lightbulb with a hand lens  
#41 #48

observing the interior of a flashlight

**L/R -cl** How do we get energy in a battery out?

**I** Where do the guide wires go?

**L/R wg** Why do lights dim or go out in a flashlight?

How can we use a wire to get energy to flow from a battery?  
Where do we have to touch a battery to get energy to flow?

draw a model of the interior of a lightbulb

batteries with different amount of voltage  
batteries in series with some in opposite directions

**pI** Making a light bulb part of the circuit

**R wg** Evaluating a model

**L/R -cl** How do we get the flow of electrical energy to light a bulb?

**pI** Making a light bulb part of the circuit

**L/R -cl** How do we get the flow of electrical energy to light a bulb?

with one wire

with two wires

accounts for all data  
simple

Why does a lightbulb light -- or not?

### CYCLE 4

Controlling the flow of electrical energy

1st-hand

**pI** Turning the flow of electrical energy on and off

- introduce battery and lightbulb holders
- have Ss show how the lightbulb is being touched in two places
- introduce switch; ask Ss to describe how it works

**I** Determining what enables electricity to flow

- show packet of materials to test (includes wire)
- prompt Ss in their groups to discuss how to test materials

**R wg** Characterizing materials as conductors and insulators

analysis across groups for range of phenomena

### CYCLE 5

The direction of flow of energy in a circuit

1st-hand

**pI** In what direction does electricity flow in a circuit?

- introduce circuit symbols and how to use in a circuit diagram
- introduce a diode - only lets electricity flow one way
- discuss how to test models

**I** Testing flow models

Ss prepare claim(s) and evidence

**R** Making claims about the flow of electricity in a circuit

The case of multiple lightbulbs

### CYCLE 6

2nd-hand

**pI** Examining others' explanations for circuit phenomena

LP's notebook: Modeling Current in Light Bulbs

**I/R wg** The water flow model explanation and its test

- how did LP use the water flow model to explain differences in lightbulb brightness?
- how did LP test her water flow model explanation?

### CYCLE 7

1st-hand

**pI** What happens to the flow with multiple light bulbs?

Ss make a circuit with both types of light bulb (#41, #48)

Show how to use brightness meter so Ss can measure differences in the bulbs

**I** How does the brightness of different bulbs compare in a circuit?

- brightness changes in series, either bulb
- brightness diff. between bulbs, in series (or not)
- brightness of bulbs in circuit of #41 with #48 bulb

**R** Claims about differences in brightness