

Instructional materials (text; kit) *FOSS Magnetism and Electricity*

Grade Level 3

Lesson: Lighting a Bulb, Investigation 2, Part 1

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|--|---|-----------------------------|------------------------------|------------------|----------------|--------------------------|--------------|--------------------|------------------|---------------------|---------------|-----------------|-----------------|
| <p>Big Idea: Electricity, one form of energy, can be transferred (moved) from place to place and can be transformed (changed) to other forms of energy.</p> <p>4-5 PS3E Electrical energy in circuits can be changed to other forms of energy, including light, heat, motion, and sound. Electrical circuits require a complete loop through conducting materials in which an electric current can pass.</p> | | | | | | | | | | | | | |
| <p>Lesson Learning Target:</p> <p>Describe how electrical energy can move from place to place and can change to another form of energy.</p> | <p>Common Misconceptions:</p> <ul style="list-style-type: none"> Electricity flows from a cell to a bulb through 1 or 2 wires. In a circuit the bulb uses up some of the electricity and less electricity returns to the battery. | | | | | | | | | | | | |
| <p>Success Criteria: I can build an electrical circuit that moves electrical energy from an energy source to a receiver.</p> <p>Process Focused Criteria: To show what is happening in my circuit I can:</p> <ul style="list-style-type: none"> Draw a diagram of my circuit Label all of the components of my circuit <ul style="list-style-type: none"> ➤ Label the energy source ➤ Label arrows to show movement of electrical energy through my circuit ➤ Label the energy receiver ➤ Label at least two kinds of energy in my circuit ➤ Describe what is happening in my circuit | <p>Vocabulary:</p> <table> <tr> <td><i>circuit</i></td> <td><i>transform</i></td> </tr> <tr> <td><i>energy</i></td> <td><i>diagram</i></td> </tr> <tr> <td><i>electrical energy</i></td> <td><i>label</i></td> </tr> <tr> <td><i>heat energy</i></td> <td><i>component</i></td> </tr> <tr> <td><i>light energy</i></td> <td><i>source</i></td> </tr> <tr> <td><i>transfer</i></td> <td><i>receiver</i></td> </tr> </table> | <i>circuit</i> | <i>transform</i> | <i>energy</i> | <i>diagram</i> | <i>electrical energy</i> | <i>label</i> | <i>heat energy</i> | <i>component</i> | <i>light energy</i> | <i>source</i> | <i>transfer</i> | <i>receiver</i> |
| <i>circuit</i> | <i>transform</i> | | | | | | | | | | | | |
| <i>energy</i> | <i>diagram</i> | | | | | | | | | | | | |
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| <i>light energy</i> | <i>source</i> | | | | | | | | | | | | |
| <i>transfer</i> | <i>receiver</i> | | | | | | | | | | | | |
| <p>Elicitation Activity*:</p> <p>Steps 1-3:</p> <ul style="list-style-type: none"> Introduce “No hands up except to ask a question.” Introduce the D-cell and the lightbulb. Pre assess ideas about current flow. Teachers draw and label a diagram of a battery-bulb circuit. | <table> <tr> <td>Discourse structures</td> <td>Discourse techniques:</td> </tr> <tr> <td>Teacher to class</td> <td>Oral</td> </tr> <tr> <td>Individual work</td> <td>Graphic</td> </tr> </table> | Discourse structures | Discourse techniques: | Teacher to class | Oral | Individual work | Graphic | | | | | | |
| Discourse structures | Discourse techniques: | | | | | | | | | | | | |
| Teacher to class | Oral | | | | | | | | | | | | |
| Individual work | Graphic | | | | | | | | | | | | |

Do the Science

Topic introduction/lesson Activities:

Steps 4-6:

- “Your challenge is to find out how to get the electric energy from this electrical energy source, the battery, to the lightbulb.”
- When everyone has succeeded, have a student share his/her method. Did anyone do it differently?

Student to partner Oral

Student to class Oral

Steps 7-9:

- Introduce vocabulary: *electrical energy receiver*
- Draw two lightbulbs on the board. Have two students come up and each draw a battery and connections to the bulb that shows the method they used to light the bulb.
- Introduce vocabulary: *circuit, transfer (move), transform (change), light energy, heat energy and components.*
- Trace the circuit in one of the drawings from the – end of the battery, to the tip of the bulb, through the filament, back to the + end of the battery, and back to the starting point. This is a circuit. The parts of the circuit are the components.
- Current flows from negative to positive. Draw an arrow on the diagram.

Teacher to class Oral

Student to class Graphic

Teacher to class Oral

Teacher to class Graphic

Do the Science

Embedded Formative Assessment/s:

Step 10:

- New challenge: Make a one wire circuit that changes electrical energy to light energy.
- On Student Sheet #7, draw and label a diagram of your circuit. Use arrows to show the movement and amount of electrical energy flowing through your circuit.
- Describe how the energy flows through your circuit.

- While everyone is working, pass around a light bulb that has the filament exposed.

Adjustment Trigger *What level of student performance will necessitate an instructional adjustment?*

I can build an electrical circuit that moves electrical energy from an energy source to a receiver.

Process Focused Criteria:

To show what is happening in my circuit I can:

- Draw a diagram of my circuit
- Label all of the components of my circuit
 - Label the energy source
 - Label arrows to show movement of electrical energy through my circuit
 - Label the energy receiver
 - Label at least two kinds of energy in my circuit
 - Describe what is happening in my circuit

Instructional Adjustment (if needed):

Lesson Closure*:

Step 13: Clean up

Step 14: Group question: Students talk in groups. Draw a student number from each group.

1. You can't see electricity. How do you know when it is flowing in a lightbulb circuit?
2. Where do you need to make connections on the battery?
3. Where do you need to make connections on the bulb?
4. How did you make a complete circuit with only one wire?

Steps 15-16: Write in science notebook first, then-- Word bank, Content/Inquiry Chart

* Opportunity for formative assessment