

**BENCHMARK SC.5.P.10.4**

<b>Reporting Category</b>	Physical Science
<b>Standard</b>	<b>Big Idea 10</b> Forms of Energy
<b>Benchmark</b>	<b>SC.5.P.10.4</b> Investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion. (Also assesses SC.3.E.6.1, SC.4.P.11.1, SC.4.P.11.2, SC.5.P.10.3, SC.5.P.11.1, and SC.5.P.11.2.)
<b>Also Assesses</b>	<p><b>SC.3.E.6.1</b> Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.</p> <p><b>SC.4.P.11.1</b> Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.</p> <p><b>SC.4.P.11.2</b> Identify common materials that conduct heat well or poorly.</p> <p><b>SC.5.P.10.3</b> Investigate and explain that an electrically charged object can attract an uncharged object and can either attract or repel another charged object without any contact between the objects.</p> <p><b>SC.5.P.11.1</b> Investigate and illustrate the fact that the flow of electricity requires a closed circuit (a complete loop).</p> <p><b>SC.5.P.11.2</b> Identify and classify materials that conduct electricity and materials that do not.</p>
<b>Benchmark Clarifications</b>	<p>Students will explain that electrical energy can be transformed into heat, light, and/or sound energy, as well as the energy of motion.</p> <p>Students will explain that energy from the Sun can be used to heat objects, and that when sunlight is not present, heat may be lost.</p> <p>Students will identify the flow of heat between hot and cold objects and/or that heat may cause objects to change temperature.</p> <p>Students will identify common materials that conduct heat well or poorly.</p> <p>Students will explain that an electrically charged object can attract an uncharged object and/or either attract or repel another charged object without any contact between the objects.</p> <p>Students will determine that the flow of electricity requires a closed circuit.</p> <p>Students will identify and/or classify materials that conduct electricity and materials that do not.</p>

**Content Limits**

Items will not assess parallel and series circuits.

Items assessing electricity will not refer to electrons or the movement of electrons in producing electrical charge.

Items that refer to positive and negative charges in attraction and repulsion properties must be in the context of static electricity.

Items will not use more than two energy conversions.

**Stimulus Attributes**

Scenarios are limited to abiotic systems.

Scenarios referring to energy from the Sun will not use the term *radiant*.

**Response Attributes**

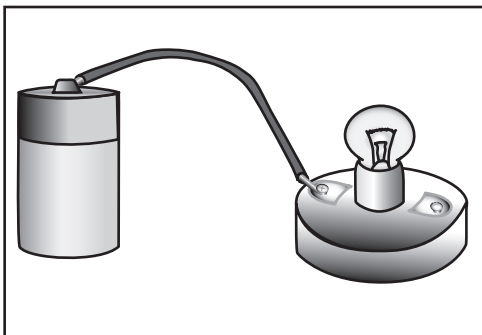
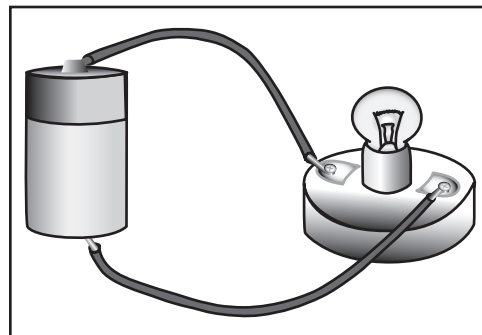
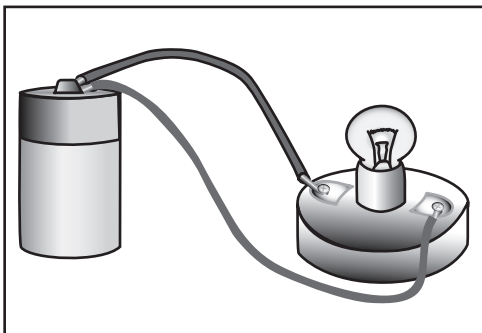
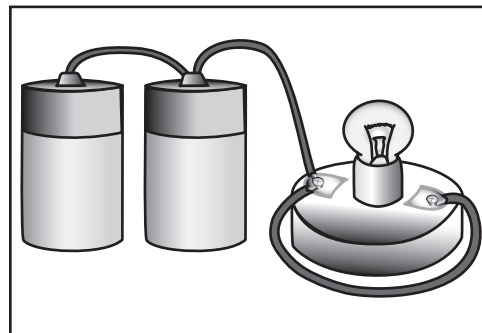
None specified

**Prior Knowledge**

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from SC.2.P.10.1.

**Sample Item 17****SC.5.P.11.1**

Electric circuits must be properly connected or electricity will not flow. Which of the following shows a properly connected circuit that would allow electricity to flow and light the bulb?

**A.****★ C.****B.****D.**