Light the Loop

Trace a circuit and test materials that carry current.

P.4.6A "Students will demonstrate an understanding of the common sources and uses of heat and electric energy and the materials used to transfer heat and electricity..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline materials that let current pass, circle materials that block it, and number the parts of the closed current path in order, starting at the battery's positive end.

Maya's Storm Lamp

1. During a storm, Maya builds a small reading lamp from a battery, wires, a switch, and a bulb. One wire joins the battery's positive end to the switch. Another joins the switch to the bulb. A third joins the bulb to the battery's negative end. When Maya closes the switch, electric current follows this complete loop and the bulb lights.

2. Maya tests materials using the same battery and bulb. She leaves a small gap in one wire and places one material across the gap at a time. The bulb lights with a copper strip or aluminum foil in the gap. It stays dark with a plastic button or rubber band. Copper and aluminum let current pass through, but plastic and rubber block its path.

3. Maya chooses copper wires to carry current and plastic covers to keep the wires from touching by accident. An open switch breaks the loop, so the light goes out. When the switch is closed, the battery's stored chemical energy becomes electrical energy in the circuit. The bulb changes some electrical energy into light and some into heat. Maya checks each connection when her lamp stops working.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why does Maya's bulb go out when she opens the switch?

2. Which tested materials let the bulb light? How are their results different from those of the other two materials?

3. Trace the current's path through Maya's closed lamp circuit, starting at the battery's positive end.

4. What energy changes happen when Maya's lamp is on?

3 YOUR TURN

Your own words

Design a desk signal that makes sound when you press a switch. Sketch a complete circuit with a battery, a buzzer, and a switch; label the current's path and an insulating cover, then write one sentence about the energy change and one sentence about how you would check or improve your device.

ANSWER KEY

Light the Loop

GRADE 4 · P.4.6A

PART 1 · READ AND MARK

Underline materials that let current pass, circle materials that block it, and number the parts of the closed current path in order, starting at the battery's positive end. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why does Maya's bulb go out when she opens the switch?	**The open switch breaks the loop, so current cannot flow through the bulb.**
2	Which tested materials let the bulb light? How are their results different from those of the other two materials?	**Copper and aluminum let the bulb light because they let current pass. Plastic and rubber block current, so the bulb stays dark.**
3	Trace the current's path through Maya's closed lamp circuit, starting at the battery's positive end.	**Battery positive end, wire, switch, wire, bulb, wire, battery negative end.**
4	What energy changes happen when Maya's lamp is on?	**Stored chemical energy in the battery becomes electrical energy. The bulb changes some electrical energy into light and some into heat.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Sketch: battery positive end → copper wire → closed switch → copper wire → buzzer → copper wire → battery negative end, with a plastic cover labeled on a wire. The buzzer changes electrical energy into sound energy. I would press the switch to check for sound, then tighten any loose connection if the buzzer stays quiet.

Accept any clear closed path through the battery, switch, and buzzer. The sketch should show a material that carries current and a separate insulating cover.