

Energy on the Move

Trace how a circuit carries energy from a source to a device.

PS.9.c "electric circuits transfer energy;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each phrase that tells where energy starts, moves, or changes form. Circle each word or phrase that tells whether the circuit path is complete, so you can trace how the circuit transfers energy.

From Source to Device

- ① At a night game, a student switches on a flashlight. Chemical energy stored in the battery begins the story. When the switch closes the circuit, charges already in the wires start moving around a complete path. The battery gives electrical energy to the moving charges. In the bulb, the charges transfer energy to the filament or LED. The bulb changes much of that energy into light and thermal energy. Energy reaches the bulb quickly, even though individual charges move slowly through the wire inside it.
- ② An electric circuit does not create energy from nothing. It transfers energy from a source to parts that use it. A toaster provides another example. Electrical energy from an outlet is delivered through a closed circuit to heating wires. Those wires become hot and transfer thermal energy to the bread and nearby air. The toaster also gives off a little light and sound. If the circuit is open, charges cannot keep moving around the path, so the heating wires do not receive electrical energy and remain cool.
- ③ Engineers use circuit design to control where energy is transferred. In a simple bicycle light, a generator can change the wheel's motion into electrical energy. Wires carry that energy through a closed path to the lamp. The lamp transfers the incoming electrical energy into light and heat. A switch opens or closes the path, controlling whether the lamp receives energy. Thicker or different materials can affect how easily charges move, but energy is still transferred from the source to circuit components.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 In the flashlight, what is the energy source, and what two forms of energy does the bulb produce?

2 What does closing the flashlight switch allow charges to do, and where is energy transferred next?

3 Why do a toaster's heating wires stay cool when its circuit is open?

4 Describe the energy changes in the bicycle light, from the moving wheel to the lamp's outputs.

3 YOUR TURN _____ Your own words

Invent a circuit-powered device that is not named in the reading. Write three sentences that name its energy source, explain how a closed circuit transfers electrical energy to a component, and tell what useful output energy the device produces.

PART 1 • READ AND MARK

Underline each phrase that tells where energy starts, moves, or changes form. Circle each word or phrase that tells whether the circuit path is complete, so you can trace how the circuit transfers energy. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	In the flashlight, what is the energy source, and what two forms of energy does the bulb produce?	The battery is the energy source. The bulb produces light energy and thermal energy.
2	What does closing the flashlight switch allow charges to do, and where is energy transferred next?	Closing the switch allows charges to move around a complete path. Energy is transferred to the bulb's filament or LED.
3	Why do a toaster's heating wires stay cool when its circuit is open?	Charges cannot keep moving around the open path, so the heating wires do not receive electrical energy.
4	Describe the energy changes in the bicycle light, from the moving wheel to the lamp's outputs.	The generator changes the wheel's motion into electrical energy. The lamp then transfers electrical energy into light and heat.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A battery's chemical energy is transferred as electrical energy through wires in a doorbell. Pressing the button closes the circuit, allowing charges to move and energize an electromagnet. The electromagnet moves a striker, which transfers energy to the chime as sound and a little thermal energy.

Accept equivalent descriptions that accurately trace energy from a source through a closed circuit to a component. For the open response, accept other valid devices and output forms if the energy transfer is scientifically sound.