Circuit Detectives

Use a bulb test to sort materials by what they do.

P.4.6A.2 "Plan and conduct scientific investigations to classify different materials as either an insulator or conductor of electricity."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the steps Mina uses to check her circuit, and circle the words that tell whether each object made the bulb light.

Mina's Material Test

1. At the science table, Mina wants to find out which objects let electricity pass through them. She uses a small battery, wires, and a tiny bulb. The wires leave one gap in the circuit. Mina will put one object at a time across the gap so it touches both wire ends. First, she connects the wire ends and checks that the bulb lights.

2. Mina tests an aluminum foil strip, a steel washer, a plastic ruler, and a rubber eraser. She keeps the same battery and bulb for every test. The foil strip makes the bulb light, and so does the washer. The ruler and eraser do not make it light. She writes down what happened each time instead of guessing from how the objects look.

3. A dark bulb can mean a poor connection, not just a material that blocks electricity. Mina presses each object firmly against both wire ends and tests it twice. Her results stay the same. After the tests, she connects the wire ends again, and the bulb still lights. Now she can sort the objects: materials that let electricity pass are conductors; materials that do not are insulators. She never tests wall outlets.

2 ANSWER WITH EVIDENCE

Use the passage

1. Before testing the objects, how does Mina check that her circuit works?

2. Which two objects should Mina classify as conductors? What did the bulb show?

3. Which two objects should Mina classify as insulators? What did the bulb show?

4. If the bulb stays dark during a test, what should Mina do before classifying the object?

3 YOUR TURN

Your own words

Plan a test for a metal spoon and a dry cloth square using Mina's circuit. In three or four sentences, explain how you will test each object, check the circuit, and use the bulb to classify each one without guessing the results.

ANSWER KEY

Circuit Detectives

GRADE 4 · P.4.6A.2

PART 1 · READ AND MARK

Underline the steps Mina uses to check her circuit, and circle the words that tell whether each object made the bulb light. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Before testing the objects, how does Mina check that her circuit works?	**She connects the wire ends and checks that the bulb lights.**
2	Which two objects should Mina classify as conductors? What did the bulb show?	**The aluminum foil strip and steel washer are conductors because each made the bulb light.**
3	Which two objects should Mina classify as insulators? What did the bulb show?	**The plastic ruler and rubber eraser are insulators because neither made the bulb light.**
4	If the bulb stays dark during a test, what should Mina do before classifying the object?	**She should press the object firmly against both wire ends, test it again, and check that the circuit still lights when the wire ends touch.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will first touch the wire ends together to check that the bulb lights. I will place a metal spoon across the gap so both wire ends touch it, then test a dry cloth square the same way. I will test each object twice and check the circuit again by joining the wire ends. If an object makes the bulb light, I will call it a conductor; if the bulb stays dark after I check the contact and circuit, I will call it an insulator.

Accept answers that use the bulb's behavior, not an object's appearance, to classify materials. For Part 3, students should plan to test both new objects and check that the circuit works before treating a dark bulb as evidence.