Nova’s Electrifying Science Challenge

Learning objective: To identify common appliances that run on electricity, construct simple series circuits, and understand the role of components like cells, wires, bulbs, and switches.

Join Nova the owl in her observatory! Read each question carefully and circle the correct answer or write your explanation in the space provided. Remember to think like a scientist.

Answer Key: 1. B, 2. True, 3. False (it is a switch), 4. Cell, 5. False (wood is an insulator), 6. C, 7. A, 8. True, 9. Bulb, 10. A. Higher-order thinking responses should mention that a break in the circuit prevents the flow of electricity.

Word bank: Circuit · Component · Conductor · Insulator · Cell · Voltage · Filament · Switch

1. 1. Which of these is the correct symbol for a cell in a circuit diagram? A) A wavy line, B) A long and short parallel line*, C) A circle with a cross, D) A zigzag line (1 mark)

2. 2. True or False: For a bulb to light up, electricity must travel in a complete, unbroken loop. (1 mark)

3. 3. True or False: A component that allows you to open or close a circuit is called a battery. (1 mark)

4. 4. What is the technical name for the object that provides the energy (often called a battery) in a simple circuit? (1 mark)

5. 5. True or False: A wooden ruler is an excellent conductor of electricity. (1 mark)

6. 6. Which material would be best to use as a wire to conduct electricity? A) Plastic, B) Rubber, C) Copper*, D) Glass (1 mark)

7. 7. What happens to the brightness of a bulb if you add more cells to the circuit? A) It gets brighter*, B) It gets dimmer, C) It stays the same, D) It goes out (1 mark)

8. 8. True or False: A bulb will not light if the filament inside it is broken. (1 mark)

9. 9. What component is designed to change electrical energy into light energy? (1 mark)

10. 10. If a circuit has a gap, the electricity cannot flow. What is this type of circuit called? A) Incomplete*, B) Closed, C) Series, D) Parallel (1 mark)

Draw: Draw a circuit diagram containing one cell, one switch, and one bulb. Ensure the switch is drawn in the 'open' position and label the components.

Extension challenge: 1. Explain why copper is used for electrical wiring instead of plastic. 2. Compare and contrast a series circuit with two bulbs versus a circuit with one bulb; what do you observe? 3. Justify why it is dangerous to touch electrical appliances with wet hands. 4. What might happen if you replaced the wire in a circuit with a piece of string? 5. If Nova wants to make her stargazing torch brighter, should she add more bulbs or more cells? Explain your reasoning. 6. Design an experiment to test which household materials are conductors and which are insulators.