Nova’s Circuit Challenge: Powering the Stargazing Station

Learning objective: To understand the effect of changing components in a circuit and how to represent these using standard symbols.

Nova the owl is building a light-up display for her stargazing station. Below is a list of components and their descriptions. Match the component to its correct scientific symbol and decide if the circuit will work as intended. For the questions, explain why the changes might affect the brightness of the bulbs.

Word bank: Cell · Battery · Bulb · Switch · Buzzer · Motor · Resistor

1. Nova adds a second bulb to her simple series circuit. Explain why the original bulb becomes dimmer. (2 marks)

2. If Nova replaces her 1.5V cell with a 9V battery, what might happen to the bulb? Explain your reasoning. (2 marks)

3. Draw the circuit symbol for a closed switch and a bulb. Why is a switch important in a circuit? (2 marks)

4. Nova wants to make a sound when the lights turn on. Which component should she add, and how does it fit into the circuit? (2 marks)

5. If a wire is disconnected in a series circuit, what happens to the components? Explain why. (2 marks)

Draw: Draw a circuit diagram for Nova. It must include one cell, one closed switch, and two bulbs connected in a series. Use standard scientific symbols for each component.

Extension challenge: Nova wants to experiment with resistance. Research what happens to the brightness of a bulb if you add a variable resistor to the circuit. Write a short prediction about what you think will happen as the resistance increases.