

Nova's Night-Time Circuit Challenge

Learning objective: To identify common appliances that run on electricity, construct a simple series circuit, and explain the function of components.

Nova the Owl is stargazing in her woodland observatory, but she needs help setting up her equipment! Use the word bank to label the components in the diagram below. Then, answer the questions to demonstrate your understanding of how electricity powers Nova's tools. For the final task, draw a diagram of a complete circuit that would light up a small bulb.

Word bank: Cell · Battery · Switch · Bulb · Wire · Conductor · Insulator · Circuit

1. Nova uses a torch to read her star charts. Explain why the torch will not turn on if there is a gap in the circuit. (2 marks)

2. Compare and contrast a battery and a cell. Why might Nova choose a battery pack instead of a single cell for her long-range telescope? (3 marks)

3. If Nova connects a rubber eraser into her circuit instead of a metal wire, the bulb does not light up. Justify why this happens using the terms 'conductor' and 'insulator'. (3 marks)

4. What might happen to the brightness of the bulb if Nova adds a second cell to her simple circuit? Explain your reasoning. (2 marks)

5. List three common electrical appliances Nova might find in her woodland home and identify whether they are mains-powered or battery-powered. (3 marks)

6. If Nova's switch is 'closed', is the current flowing or stopped? Explain your answer. (2 marks)

Draw: Draw a clear, labelled diagram showing a simple series circuit including a cell, a switch, a bulb, and connecting wires. Use arrows to show the direction of the electrical current.



Extension challenge: Design a 'Fail-Safe' warning system for Nova's observatory. Write a short paragraph explaining how you would incorporate a buzzer into your circuit to alert Nova if her telescope's battery power drops too low. Use technical vocabulary such as 'current', 'pathway', and 'component'.