

Nova's Night-time Circuit 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.

Read each question carefully and use your knowledge of electrical circuits to provide detailed answers. Remember to use scientific vocabulary where appropriate.

Nova the owl is preparing her observatory for a night of stargazing. She needs to ensure her equipment is powered correctly. Some of her tools use batteries, while others need to be plugged into the wall. She needs your help to map out her electrical connections to ensure everything works safely.

Word bank: cell · circuit · conductor · insulator · switch · filament · appliance · mains electricity

1. Nova has a small reading lamp that uses a battery. Explain why the lamp will not light up if there is a gap in the circuit. (2 marks)

2. Identify two appliances in your own home that require mains electricity and two that operate using a cell (battery). (2 marks)

3. Compare and contrast a metal paperclip and a plastic straw when used as part of a circuit. Justify which material would allow the bulb to light up. (3 marks)

4. What might happen to the brightness of a bulb if you were to add an extra cell to a simple series circuit? Explain your reasoning. (2 marks)

5. Why is it important for the wires in a circuit to be covered in a plastic coating? Use the word 'insulator' in your answer. (2 marks)

Draw: Draw a scientific diagram of a simple series circuit. Include a cell, a bulb, and a switch. Ensure you use the correct scientific symbols for each component and label your diagram clearly.



Extension challenge: Nova wants to add a second bulb to her circuit. If she connects them in a series, what happens to the brightness of the bulbs compared to the original circuit with only one bulb? Provide a detailed explanation for your prediction and consider how the current travels through the components.