

Nova's Guide to Electrical Circuits

Learning objective: To construct a scientific explanation of how electrical circuits function and the impact of components on brightness and energy flow.

Use this scaffold to build your report on electrical circuits. Refer to your recent practical experiments to support your explanations with evidence. Ensure your scientific vocabulary is precise and your reasoning is logical.

Nova the owl has been observing how electricity flows through a closed loop to power a bulb, noting that every component plays a specific role in the circuit.

Word bank: conduction · insulator · component · voltage · resistance · consequently · furthermore · in contrast · subsequently · hypothesis · demonstrates

1. Introduction: Define what an electrical circuit is and describe the essential components required to create a complete loop. Begin by stating: A simple circuit consists of... (2 marks)

2. The Role of the Cell: Explain the function of the battery (cell) in providing energy. How does the voltage affect the intensity of the light? Start with: The cell acts as the source of... (3 marks)

3. Conductors and Insulators: Compare and contrast materials that allow electricity to pass through them versus those that block it. Use the sentence starter: Materials which allow electrical current to flow are called conductors, whereas... (3 marks)

4. Scientific Reasoning: Explain why the bulb becomes dimmer if you add an extra bulb to a simple series circuit. Start your explanation with: When an additional bulb is introduced, the resistance increases; therefore... (4 marks)

5. Justification: If you were to replace the wire with a piece of string, explain why the circuit would fail to function. Justify your answer using scientific terminology: The circuit would be incomplete because string is an... (3 marks)

6. Critical Analysis: What might happen if the bulb's filament were broken? Explain the consequences for the rest of the circuit: If the filament breaks, the circuit becomes... (3 marks)

Extension challenge: Design an original invention that uses a series circuit. Write a paragraph explaining how you would use a switch to control the energy flow, and evaluate whether your design would be more efficient with one or two cells.