

Nova's Night-time Circuit Challenge

Learning objective: To understand how changing the number of components in a circuit affects the brightness of a bulb or the volume of a buzzer.

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

Nova the owl is setting up a nocturnal lighting system for her stargazing platform. She needs to ensure her observation lamp is bright enough to read her star charts but safe for the forest environment.

Word bank: component · voltage · cell · brightness · resistance · circuit · conductor · insulator

1. Nova has a circuit with one cell and one bulb. If she adds a second cell in the same direction to the circuit, what happens to the brightness of the bulb and why? (2 marks)

2. Max the monkey wants to add a second bulb to Nova's circuit in a series arrangement. Explain how the brightness of the two bulbs will compare to the original single-bulb circuit. (2 marks)

3. If Nova accidentally uses a piece of string instead of a copper wire to connect her circuit, what will happen? Explain your answer using the terms conductor and insulator. (2 marks)

4. Draw a circuit diagram (using standard scientific symbols) that includes a cell, a switch, and a buzzer. Label your components clearly. (3 marks)

5. Max buys a new high-power buzzer that costs £4.50. If he pays with a £10 note, calculate his change. Then, explain why the buzzer might require more voltage than a standard bulb. (2 marks)

Draw: Draw a labelled diagram of a simple series circuit showing one cell, one switch, and two bulbs. Use a pencil to show the path of the current.



Extension challenge: Nova wonders what would happen if she created a parallel circuit instead of a series circuit. Write a short paragraph explaining the main difference in how the bulbs would perform if one was removed.