

Kit's Circuit Challenge: Designing a Bright Idea

Learning objective: To understand the components of a simple series circuit and how to represent them using standard symbols.

Kit the fox is building a new reading lamp for the BookFlik library, but he has mixed up his circuit symbols! Look at the components below. For each item, draw the correct circuit symbol, explain its function, and then solve the 'Greater Depth' design problem.

Word bank: Cell · Battery · Bulb · Switch · Buzzer · Motor · Conductor · Insulator

1. Identify the function of a 'switch' in a circuit. Why is it vital for a battery-powered device to have one? Explain your reasoning. (2 marks)

2. If you were to replace the bulb in Kit's lamp with a buzzer, what change would occur in the output of the circuit? Justify your answer. (2 marks)

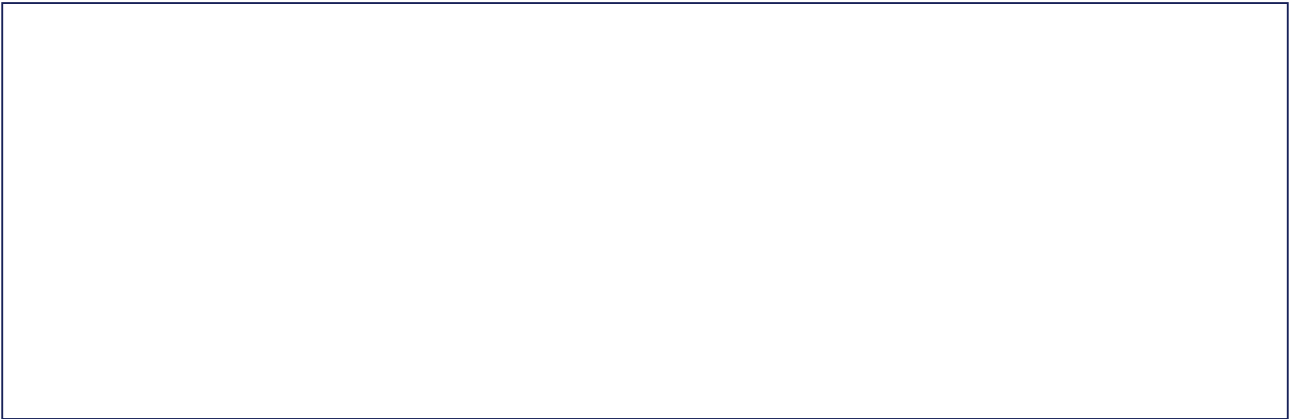
3. Compare and contrast a 'cell' and a 'battery'. Why do we often use these terms differently in science? (2 marks)

4. Kit has a budget of £5.00 to build his lamp. If a bulb costs £1.20 and a battery pack costs £2.50, how much change will he have left? Show your working. (2 marks)

5. What might happen to the brightness of a bulb if you added a second battery to the series circuit? Explain the scientific principle behind this. (2 marks)

6. Design a simple series circuit diagram using symbols that includes two bulbs, one cell, and one switch. Ensure the path is complete. (2 marks)

Draw: Draw a labelled diagram of a simple circuit containing a battery, a switch, and a bulb. Use standard electrical symbols for each component.



Extension challenge: Imagine you are an engineer. Kit wants to create a 'doorbell' circuit for the library entrance. Write a short proposal explaining which components you would choose and why. If the library wanted to add a second doorbell in a different room, explain the challenges of adding a second buzzer to the same circuit.