Nova’s Night-time Circuit Challenge

Learning objective: To understand the components of a simple circuit and identify common conductors and insulators.

Read the passage carefully, then answer the questions below. Think like a scientist and justify your reasoning.

Nova the barn owl loves stargazing, but the forest is very dark at night. To help her read her star charts, she decided to build a simple circuit. Nova gathered her materials: a small battery, a light bulb, and copper wires. She carefully connected the wires from the battery to the bulb. Suddenly, the filament inside the glass glowed brightly! Nova knew that electricity flows in a complete loop, which we call a circuit. If there is a break in the path, the electricity cannot flow, and the bulb stays dark. Nova tested different materials to see if they would work as switches. She found that metal paperclips allowed the electricity to travel through, acting as conductors. However, when she tried using a wooden twig or a piece of plastic, the light would not turn on. These materials are insulators, which block the flow of electricity. By understanding how to complete a circuit, Nova can now light up her workspace and continue exploring the wonders of the night sky with ease.

Word bank: circuit · conductor · insulator · filament · battery · component · electricity

1. Identify two materials mentioned in the passage that act as insulators. (2 marks)

2. What are the three main components Nova used to build her circuit? (2 marks)

3. Why did the light bulb stay dark when Nova used a wooden twig in her circuit? (2 marks)

4. Based on the text, what would happen to the light if the wire was disconnected from the battery? (2 marks)

5. Do you think Nova should use a metal spoon as a switch for her light? Justify your answer using your knowledge of conductors. (2 marks)

Draw: Draw a diagram of Nova's simple circuit. Label the battery, the light bulb, the wires, and show where you would place a switch to turn the light on and off.

Extension challenge: Explain why it is important that the wires in our homes are covered in plastic insulation. What might happen if the plastic covering was damaged? Justify your answer with scientific reasoning.