

Year 5 Science Assessment: Electrical Circuits

Learning objective: To assess pupils' understanding of simple series circuits, the function of components, and the impact of voltage on brightness and volume.

Read each question carefully. Use the word bank to help you with technical terminology. Ensure your answers are clear and explain your scientific reasoning where requested.

Nova the barn owl is building a light display to help her read her star charts at night, while Max the monkey is helping her calculate the best way to make the bulbs shine brightly. They are experimenting with different numbers of cells and bulbs in their circuits.

Word bank: conductor · insulator · circuit · battery · filament · switch · voltage · component

1. 1. Identify two essential components that must be present in a simple circuit for a bulb to light up. (2 marks) (2 marks)

2. 2. Explain the function of a switch in a circuit. Why is it an important safety feature? (2 marks) (2 marks)

3. 3. Nova adds a second battery to her circuit. Predict what will happen to the brightness of the bulb and justify your answer using the concept of voltage. (3 marks) (3 marks)

4. 4. List two materials that would act as electrical conductors and two materials that would act as electrical insulators if used in a circuit. (2 marks) (2 marks)

5. 5. Compare and contrast a series circuit that has one bulb with a series circuit that has three bulbs. What happens to the brightness of the individual bulbs as you add more to the loop? Explain why. (4 marks) (4 marks)

6. 6. Max is trying to make a buzzer sound louder in his circuit. He has a 1.5V battery and a 9V battery. Which should he choose and why? (2 marks) (2 marks)

7. 7. Extended Writing Task: Imagine you are designing a lighting system for a home. Describe how you would use switches to control different rooms independently. Explain the consequences if the circuit was a simple series loop rather than a parallel one. (5 marks) (5 marks)

8. 8. What might happen if you used a piece of string instead of a copper wire to connect your battery to your bulb? Justify your answer. (3 marks) (3 marks)

Draw: Draw a circuit diagram containing one battery, one switch, and two bulbs connected in a series loop. Ensure you use the correct scientific symbols for each component.

Extension challenge: Total: /25. Research Task: If Nova wants to power her star chart reader using a solar panel instead of a chemical battery, what are the advantages and disadvantages of this renewable energy source compared to a standard battery? Write a brief argument for your chosen method.