

Kit's Computing Challenge: Decoding Binary

Learning objective: To explain how computers use binary code to represent data using 1s and 0s.

Use this writing frame to draft your explanation of how binary works. Think about how Kit the fox uses patterns to solve puzzles and apply that logic to computer memory. Aim to use technical vocabulary like 'bits', 'base-2', and 'switches'.

At the heart of every computer, from a simple calculator to a complex supercomputer, lies a hidden language made entirely of ones and zeros called binary.

Word bank: consequently · binary system · on and off states · base-2 · digitally represented · furthermore · electrical currents · in contrast · subsequently

1. Introduction: Describe what binary is and why computers need a specific language to function. Start by saying: 'Computers cannot understand human language, therefore they rely on...' (2 marks)

2. The Logic of Switches: Explain the relationship between electrical currents and binary numbers. Start by saying: 'The binary system operates like a light switch, where 1 represents...' (3 marks)

3. Binary vs. Decimal: Compare our base-10 number system with the computer's base-2 system. Start by saying: 'While humans use the decimal system, computers simplify data into...' (3 marks)

4. Data Representation: Explain why complex information like images or text must be converted into binary code. Start by saying: 'To store a photograph or a document, the computer must translate the information into...' (3 marks)

5. Evaluation: Explain why binary is more efficient for hardware than using a system with more than two digits. Start by saying: 'Using only two states is advantageous because...' (4 marks)

6. Conclusion: Summarise the importance of binary in modern technology. Start by saying: 'In conclusion, binary serves as the fundamental building block of...' (2 marks)

Extension challenge: Justify your answer: If you were designing a new type of computer that could store information in three states (0, 1, and 2) instead of two, what might be the advantages and disadvantages? Explain your reasoning in a short paragraph, considering how this would change the physical hardware.