

## Year 5 Computing: Understanding Binary Basics

*Learning objective: To understand how computers use binary digits (bits) to represent data, including numbers and text.*

Read each question carefully. Show your working out for calculation questions. Remember to use British English spelling.

Computers do not understand our alphabet or our number system. Instead, they use a system called binary. A binary system only uses two digits: 0 and 1. Inside a computer, tiny electronic components act like light switches. When a switch is 'on', it represents 1. When a switch is 'off', it represents 0. By using long sequences of these 1s and 0s, computers can store everything from photos to your favourite stories.

*Word bank: Binary · Bit · Denary · Switch · Data · Sequence · Code · On · Off*

**1. Explain what the word 'Binary' means in the context of computing. Why do computers use it instead of the number system we use in maths? (2 marks)**

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**2. If a computer switch is in the 'off' position, what binary digit does it represent? (1 mark)**

**3. Kit the fox is trying to convert the denary number 5 into binary. Using the place values 4, 2, and 1, show how 5 is written in binary. (3 marks)**

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**4. Convert the binary number 1011 into a denary (base 10) number. Show your working out. (3 marks)**

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**5. Why is a 'bit' considered the smallest unit of data in a computer? (3 marks)**

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6. Imagine a computer is storing a simple black and white image. Explain how binary could be used to represent which pixels are black and which pixels are white. (4 marks)

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7. Extended Writing: Max the monkey wants to explain binary to a friend. Write a short explanation describing how a sequence of 0s and 1s can be used to represent a letter of the alphabet. Include why it is important that the computer and the person reading the code agree on the same system (a code). (5 marks)

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8. Convert the binary number 1110 into denary. (4 marks)

**Draw:** Draw a diagram showing a row of four light bulbs. Label them with their binary place values (8, 4, 2, 1). Colour the bulbs 'on' or 'off' to represent the number 13.



*Extension challenge: Total: /25*