Kit’s Computing Lab: Decoding Binary

Learning objective: I can explain how computers use binary to store data and convert simple numbers into binary code.

About 15 minutes. Grown-up tip: Remind your child that binary is just like an on/off light switch: 1 is on, 0 is off.

Computers communicate using binary, a base-2 system made of 0s and 1s. Each digit is called a 'bit'. In a byte (8 bits), the values represent powers of two: 128, 64, 32, 16, 8, 4, 2, 1. To convert the number 13 to binary, you find which values add up to 13: 8 + 4 + 1 = 13. Place a '1' in those columns and a '0' in the others: 00001101.

Word bank: Bit · Byte · Binary · Base-2 · Data · Switch · Off · On

1. Explain in your own words why computers use a binary system instead of our normal base-10 counting system. (2 marks)

2. If a binary sequence is 00000101, which two place values are 'switched on' to make this total? (2 marks)

3. Convert the number 20 into an 8-bit binary code. Show your working out clearly. (3 marks)

4. If you have a binary sequence 00001111, what is the denary (base-10) number it represents? (2 marks)

5. Imagine a computer switch is 'on' (1) or 'off' (0). Describe how a series of switches could represent a letter or a colour. (3 marks)

Extension challenge: Challenge: What is the largest number you can represent using an 8-bit binary code (a full byte)? Show your calculation.



I did it! Name: _____ Date: _____

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