

Kit's Binary Code Workshop

Learning objective: To understand how computers use binary (base-2) to represent data using 1s and 0s.

Follow Kit the Fox's guide to represent letters and numbers as bits. Use the word bank to label your diagram and complete the challenges below.

Draw: Draw a row of 8 lightbulbs across the top of your page. Under each bulb, draw a box. Inside the boxes, write a '1' for a lit bulb and a '0' for an unlit bulb. Below the bulbs, draw Kit the Fox holding a sign that says '8-Bit Byte'. Use a clear, technical style like a diagram in a computer manual.

Label words: Binary · Bit · Byte · Off (0) · On (1) · Circuit

Steps:

1. Kit wants to represent the number 5 in binary. If $4+1=5$, and our place values are 4, 2, and 1, draw the switches for 4 and 1 as 'On' and 2 as 'Off'. Write your answer as a 3-bit binary code.
2. If one byte is made of 8 bits, how many bits would you need to store 4 bytes of data?
3. Why do you think computers use binary instead of our normal number system (0-9)?
4. Label your drawing: Point an arrow to a '1' and label it 'On', and point an arrow to a '0' and label it 'Off'.
5. Complete the sequence: If 001 is 1 and 010 is 2, what is the binary code for 3?