

Kit's Binary Code Workshop

Learning objective: To understand how computers represent data using binary digits (bits) and to convert denary numbers into 8-bit binary code.

Follow Kit the Fox's instructions to label the computer hardware and complete the binary conversion challenges. Use the binary place value table provided to guide your work.

Draw: Draw a large, friendly-looking computer console in the centre of the page. On the screen, draw a grid representing an 8-bit byte. Inside the grid boxes, draw a mix of 0s and 1s. Around the console, draw Kit the Fox holding a magnifying glass, looking at the circuits inside an open panel. Ensure the style is clear and educational, with labels pointing to the processor, the input keyboard, and the binary display.



Label words: Bit · Byte · Binary · Denary · Processor · Input · Output · Circuit

Steps:

1. Explain why computers use binary code instead of the denary (base-10) system that humans use. How does this relate to electrical circuits?
2. If a light bulb represents a 'bit', describe what happens to the bulb when the binary value is 1 compared to when it is 0.
3. Convert the denary number 13 into an 8-bit binary number. Show your working using the place values:

128, 64, 32, 16, 8, 4, 2, 1.

4. Compare and contrast a 'bit' and a 'byte'. Justify why modern computers require many bytes to store a single high-resolution photograph.

5. What might happen if a computer's processor accidentally flipped a 0 to a 1 in a file? Explain the potential impact on the data.

6. Justify your answer: Is it possible for a computer to function using only 2-bit binary? What are the limitations of such a system?