

Kit's Binary Brain-Teaser Challenge

Learning objective: To understand that computers use binary (0 and 1) to represent all data, including numbers and text.

Help Kit the fox decode the digital world! Use your knowledge of base-2 to answer these questions. Remember, binary is the language of switches: 0 is 'off' and 1 is 'on'.

Answer Key: 1. A (0 and 1), 2. True, 3. 4, 4. C (8), 5. False, 6. Denary, 7. C (10), 8. True, 9. 1, 10. A (A sequence of eight bits).

Word bank: Binary · Bit · Byte · Base-2 · Denary · Data · Switch · Code

1. 1. What are the only two digits used in binary? A) 0 and 1*, B) 1 and 2, C) 0 and 10, D) 1 and 9 (1 mark)

2. 2. True or False: A computer uses binary because its internal electrical circuits can be either 'on' or 'off'. (1 mark)

3. 3. In the binary sequence 0100, what is the value of the '1' in the 2^2 position? (1 mark)

4. 4. Which of these is the denary (base-10) equivalent of the binary number 1000? A) 2, B) 4, C) 8*, D) 16 (1 mark)

5. 5. True or False: The number 2 exists in binary code. (1 mark)

6. 6. What is the name of the standard number system we use in everyday life (base-10)? (1 mark)

7. 7. What is the binary number 1010 equal to in denary? A) 5, B) 8, C) 10*, D) 12 (1 mark)

8. 8. True or False: A single binary digit is called a 'bit'. (1 mark)

9. 9. If a light switch is 'on', which binary digit represents this? (1 mark)

10. 10. What is a 'byte'? A) A sequence of eight bits*, B) A type of computer bug, C) A binary fraction, D) A computer monitor (1 mark)

Draw: Draw a 'Binary Robot' for Kit. Give the robot a control panel on its chest featuring a pattern of 0s and 1s that spell out your age in binary code.



Extension challenge: Greater Depth Challenges: 1. Explain why computers use binary instead of our standard denary system. 2. Compare and contrast binary with a light switch; why is this a good analogy? 3. Justify why we need eight bits (a byte) to represent larger numbers. 4. What might happen to a file if a single 'bit' is flipped from a 0 to a 1? 5. How many different values can be represented by a 4-bit sequence? Prove your answer. 6. Create a secret binary alphabet where A=00001, B=00010, and C=00011, then write your name in binary.