Kit’s Clever Computing Challenge: Mastering Algorithms

Learning objective: To understand, create, and debug simple algorithms, recognising that they are precise, step-by-step instructions for completing a task.

Help Kit the fox solve these computing puzzles! Read each question carefully and circle the correct answer or write your response in the space provided. Remember, algorithms must be clear, logical, and in the right order.

Answer Key: 1. A, 2. True, 3. Debugging, 4. B, 5. False, 6. C, 7. Sequence, 8. True, 9. D, 10. Algorithm. Greater Depth Guidance: Ensure pupils use technical vocabulary in their justifications, focusing on precision and logical order.

Word bank: Algorithm · Debug · Sequence · Input · Output · Logical · Error · Instruction

1. 1. What is an algorithm? A) A type of computer code, B) A precise set of instructions to complete a task*, C) A machine that solves math, D) A digital drawing tool. (1 mark)

2. 2. True or False: If you mix up the steps in an algorithm, the outcome will likely be incorrect. (1 mark)

3. 3. What do we call the process of finding and fixing mistakes in an algorithm? (1 mark)

4. 4. Which of these is the most logical algorithm for making a cup of tea? A) Pour water, boil kettle, add bag. B) Boil kettle, add bag, pour water*. C) Add bag, pour water, boil kettle. D) Pour water, add bag, boil kettle. (1 mark)

5. 5. True or False: An algorithm only works if it is written in a complex programming language. (1 mark)

6. 6. If a robot is programd to walk forward 5 steps and turn left, what is the 'turn left' part? A) The Input, B) The Error, C) The Instruction*, D) The Output. (1 mark)

7. 7. What word describes the specific order in which steps must be carried out? (1 mark)

8. 8. True or False: Algorithms can be used to describe everyday tasks like brushing your teeth. (1 mark)

9. 9. Why must an algorithm be precise? A) To make it look pretty, B) To use more words, C) To impress the computer, D) To ensure the result is always the same*. (1 mark)

10. 10. In computing, what is the term for a set of rules to be followed in calculations or problem-solving operations? (1 mark)

Draw: Draw a flow chart showing the 'algorithm' for Kit the fox to get from his den to the berry bush. Use arrows to show the sequence of his movements.

Extension challenge: Explain why a computer cannot 'guess' what you mean if your algorithm has a missing step. Compare and contrast an algorithm written for a human versus an algorithm written for a computer. Justify why testing an algorithm (debugging) is the most important part of the programming process. What might happen if an algorithm had an infinite loop? Write a short paragraph describing a real-world scenario where a precise algorithm is vital for safety, such as in a hospital or at a traffic junction.