

Kit's Clever Computing: Mastering Algorithms

Learning objective: To understand that algorithms are precise, step-by-step instructions for completing a task and to identify the importance of logical sequencing and debugging.

Read each scenario carefully. Use your logical thinking skills to design, sequence, or correct the algorithms provided. Write your answers clearly in the spaces provided.

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

1. Kit the fox is writing an algorithm to make a jam sandwich. The current steps are: 1. Put jam on the bread. 2. Get two slices of bread. 3. Put the slices together. Explain why this sequence will fail and provide the corrected order of steps. (3 marks)

2. Define the term 'algorithm' in your own words. Why is it essential for an algorithm to be 'precise' when giving instructions to a computer? (2 marks)

3. Max the monkey has written an algorithm to calculate $5 \times 4 + 2$. He wrote: 'Add 2, then multiply by 5.' Justify why this algorithm results in an incorrect answer compared to the correct mathematical order of operations. (3 marks)

4. If you were teaching a robot to brush its teeth, what might happen if the 'sequence' of your algorithm was incorrect? Provide an example of a potential 'error' in this process. (2 marks)

5. Compare and contrast a recipe for baking a cake with a computer algorithm. In what ways are they similar, and how do they differ in terms of how they are interpreted? (3 marks)

6. Imagine you have written a long algorithm to help a friend navigate a maze. The friend reaches a dead end. Explain the process of 'debugging' your algorithm to solve this problem. (2 marks)

Draw: Draw a flow chart showing a simple algorithm for a daily task, such as 'How to get ready for school'. Use clear boxes for each step and arrows to show the sequence.



Extension challenge: Design a 'Greater Depth' challenge: Write an algorithm for a game of 'Rock, Paper, Scissors'. Include a conditional 'If/Then' statement to decide the winner based on the inputs of two players.