

Kit's Clever Computing: Designing the Perfect Algorithm

Learning objective: To understand that an algorithm is a precise set of instructions to complete a task and to evaluate the importance of logical sequencing.

Use the prompts below to write a clear, logical set of instructions for a specific task. Think like Kit the fox—break your task down into small, manageable steps so that a computer (or a friend!) can follow them perfectly.

An algorithm is like a recipe for a computer; it provides a sequence of clear instructions that must be followed in the exact right order to achieve a successful outcome.

Word bank: sequencing · input · output · logical order · precise · debugging · subsequently · furthermore · consequently · if... then... · algorithm

1. What is the specific task you have chosen to design an algorithm for, and why is it important that the steps are in a precise, logical sequence? (2 marks)

2. List the first three steps of your algorithm. Use 'if... then...' statements to explain what should happen if a mistake occurs during these steps. (3 marks)

3. Explain why 'debugging' is a vital part of the computing process. What might happen if an algorithm has an error in its sequence? (3 marks)

4. Justify your choice of instructions. How would the outcome change if you rearranged the order of two of your steps? (3 marks)

5. Compare and contrast your algorithm with a set of instructions for a simple game. What similarities and differences do you notice regarding the 'input' and 'output'? (4 marks)

6. Reflect on your design: If a computer were to follow your instructions exactly as written, are there any ambiguities that could lead to a 'bug'? How could you make your instructions more explicit? (3 marks)

Extension challenge: Challenge: Imagine your algorithm is being used by a robot. Write a 'What might happen if...' paragraph describing an unexpected scenario (e.g., an obstacle appears) and explain how you would modify your algorithm to handle this new condition.