Kit's Coding Quest: Mastering Algorithms

1. An algorithm is a set of instructions used to complete a specific task. (1 mark)

Working: Definition provided in the worksheet instructions.

Accept any response that mentions a set of instructions or steps to complete a task.

2. The bug is the 'Turn Left' instruction. If the shed is straight ahead, the robot should not turn. (2 marks)

Working: The sequence includes a turn that takes the robot off the path to the shed.

1 mark for identifying 'Turn Left' as the error, 1 mark for explaining why (it moves the robot away from the shed).

3. 1. Forward, 2. Forward, 3. Forward, 4. Turn Right. (4 marks)

Working: The prompt asks for 4 instructions to move forward and turn right.

1 mark per correct instruction in the correct sequence.

4. It is important because if the order is wrong, the robot will not reach the destination or complete the task correctly. (4 marks)

Look for: The student must explain that sequence determines the outcome.

Good: Because the robot will get lost.

Better: Because if the order is wrong, the robot will go the wrong way and miss the shed.

Best: The order is important because a program follows a sequence; if the steps are mixed up, the robot will not reach its goal.

What moves an answer up: Moving from 'lost' to 'goal' shows an understanding of the purpose of an algorithm.

5. Sequence: 1. Move forward, 2. Pick up ball, 3. Move backward. To check it, I would run the program and watch the robot to see if it picks up the ball. (4 marks)

Working: Logical sequence followed by a testing method.

2 marks for the correct sequence, 2 marks for a logical testing method (running/observing).

6. 1. Fill the kettle with water. 2. Boil the kettle. 3. Put a tea bag in a mug. 4. Pour the water into the mug. 5. Remove the tea bag. (5 marks)

Working: Logical steps for making tea.

1 mark for each logical step in a clear, sequential order.

7. You should check the code for mistakes, which is called debugging. (5 marks)

Look for: The student should mention checking/reviewing the instructions to find the error.

Good: Look for the mistake.

Better: Check the instructions to see where it went wrong and fix it.

Best: I would debug the program by looking at my instructions to find the mistake and then changing it to make it work.

What moves an answer up: Using the term 'debug' and explaining the process of fixing the error moves the answer to the best level.

What a secure answer looks like

A secure answer shows that the child understands that computers follow instructions exactly as written. They should be able to identify that a 'bug' is simply a mistake in the sequence.

If your child is stuck

Ask the child to act out the robot's movements physically in the room. If they walk into a wall, ask them which instruction was wrong.

Common mistakes to watch for

Children often forget that 'Turn' instructions change the direction for all following steps. They also sometimes struggle to realise that 'debugging' is a normal part of coding, not a sign of failure.