Mastering the Code: A Computing Challenge

Learning objective: I can design, write, and debug programs to accomplish specific goals.

About 45 minutes. Grown-up tip: Ask your child to explain how they would give instructions to a robot to make a cup of tea.

Read each question carefully. For programming code questions, you may use pseudo-code or block-based logic. Example: 'If button pressed, then move forward 10 steps.'

Kit the fox is helping Amira and Mo design a computer program for a robot that navigates a maze in the school library. The robot needs to move through the aisles, avoid bumping into the oak bookshelves, and stop when it reaches the reading corner.

Word bank: algorithm · debug · variable · loop · conditional · input · output

1. Define an 'algorithm' in your own words. Why is the order of instructions important in a computer program? (2 marks)

2. The robot needs to move forward until it hits a wall. Write a simple conditional statement (an 'If... then...' statement) that Kit could use for this. (3 marks)

3. What is meant by the term 'debugging'? Describe one step you would take if your program failed to make the robot turn left. (4 marks)

4. The robot needs to travel around the perimeter of a square garden four times. Explain how you would use a 'loop' to make the code more efficient instead of writing the same instructions repeatedly. (5 marks)

5. Amira wants the robot to flash a light (output) only when a sensor (input) detects a hedgehog in the garden. Draw a simple flowchart or write a list of steps to show this process. (6 marks)

6. Explain why a variable might be useful for the robot to keep track of how many books it has collected. (5 marks)

Draw: A friendly, clever-looking fox wearing a small pair of glasses, sitting at a desk with a laptop, looking at a digital diagram of a small robot on the screen.

Extension challenge: Design a program for a 'Smart Home' system. If the temperature drops below 15°C, the heating turns on. If it rises above 22°C, the window opens. Write the logic for this. Total: /25

I did it! Name: _____ Date: _____

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