

Kit's Computing Quest: Designing an Algorithm

Learning objective: To design, write, and debug a precise algorithm for a specific task using logical steps.

Follow the steps below to design a visual algorithm. Use the word bank to label your diagram accurately. Ensure your steps are in the correct sequence.

Draw: Create a flow-chart style diagram on your page. Use clean, geometric shapes: ovals for start/end points, rectangles for processes, and diamonds for decisions. Use bright colours to differentiate between the 'Input' (soil moisture) and the 'Output' (watering action). Ensure your arrows clearly indicate the flow of the algorithm. The style should be technical yet clear, like an engineer's design sketch.



Label words: Algorithm · Input · Output · Decision Node · Process · Loop · Bug · Debug

Steps:

1. Step 1: Draw a 'Start' oval at the top of your page. Draw an arrow leading to a box labelled 'Check soil moisture'. Explain why it is vital for an algorithm to have a clearly defined 'Start' point.
2. Step 2: Draw a diamond shape (a Decision Node). Label it 'Is soil dry?'. If 'Yes', draw an arrow to a box labelled 'Water plants'. If 'No', draw an arrow to 'Wait 1 hour'. Justify why a decision node is necessary in a complex algorithm.
3. Step 3: Draw a line from the 'Wait 1 hour' box back to the 'Check soil moisture' box. What is this circular

movement called in programming, and what is its purpose?

4. Step 4: If the robot waters the plants even when they are already flooded, what has occurred within the algorithm? How would you 'debug' this?

5. Compare and contrast a written recipe for a cake and a computational algorithm. Identify one similarity and one difference.

6. What might happen if the sequence of instructions in an algorithm is reordered? Provide an example using Kit's gardening robot.