

Sequencing Level 4 - 5

From level 4, pupils learn to:	To level 5, pupils learn to:
Rationalise a set of instructions by repeating sections	Use precision and accurate syntax when framing instructions
Typically, pupils can:	Typically, pupils can:
Plan and create a sequence of instructions to carry out a simple task, compiling sets of instructions and identifying those that can be repeated and where decisions need to be used, e.g. to move an object in a game along a predetermined path	Group instructions which need repeating as a set, and automate frequently used processes by constructing sub-procedures, e.g. within a set of instructions to warm up a greenhouse
	Typical activity
Activity	Pupils use Logo to create a repetitive design to be used as a logo for an event in the Olympics.
Activities that will result in a step change	Pupils plan their logos and map them out by hand; they identify repeated elements within them. They then write and refine the sequence of instructions needed to draw out these elements, and create the sequence as a sub-procedure. They embed the sub-procedure within their list of instructions.
Key questions (to help make a judgement about appropriateness and understanding)	How does the creation of a sub-procedure make the set of instructions more efficient? What will happen to the logo if you change part of the sub-procedure?
Common misconceptions: pupils sometimes think...	It is easier to list out all repeated instructions. Sub-procedures always start from the same originating point. Sub-procedures cannot be part of a loop.

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From level 4, pupils learn to:	To level 5, pupils learn to:
Plan and implement sets of instructions, predicting outcomes before execution	Test and refine sequences in order to achieve specific outcomes
Typically, pupils can:	Typically, pupils can:
Plan, develop and implement instructions, e.g. devise a set of instructions to control the flow of traffic, with pupils acting the roles of cars at a crossing	Develop, test and refine sequences of instructions to solve problems, e.g. ensure that key presses make an object in a game move in the desired way, and make changes to remedy unforeseen behaviour
	Typical activity
Activity	Pupils create a melody by sequencing recorded phrases and creating sub-procedures using combinations of these phrases.
Activities that will result in a step change	Pupils plan the flow of the melody on paper and annotate this to illustrate how the sub-procedure and any repetitions work. They listen to their output and refine the instructions as necessary to make the music sound as they want it to and to make it more complex.
Key questions (to help make a judgement about appropriateness and understanding)	<p>What changes need to be made to the instructions to make the melody work as intended?</p> <p>What will happen to the melody if you change parts of the sub-procedures?</p> <p>Can you repeat sections that already contain sub-procedures?</p>
Common misconceptions: pupils sometimes think...	<p>Sub-procedures cannot be combined within a single set of instructions.</p> <p>Repetitions are best captured by repeating the sets of instructions.</p> <p>Music does not have the sort of structure that lends itself to sequenced instructions.</p>

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From level 4, pupils learn to:	To level 5, pupils learn to:
(No statement at this level.)	Recognise that sequencing instructions is fundamental to a wide range of ICT applications
	Typically, pupils can:
	Identify how the sequencing of instructions has affected commercial, industrial, public service, domestic and leisure applications, e.g. identify products that use different sets of instructions according to the user's needs
	Typical activity
Activity	Pupils compare the way that traffic light sequences use sequenced instruction with the controls of a washing machine.
Activities that will result in a step change	Pupils create a flow chart for a washing machine using controls to determine temperature, spin cycle, start time, etc. They then compare this with a flow chart they have already created, e.g. for traffic lights, and identify common features (inputs, processes, outputs, decision points and loops).
Key questions (to help make a judgement about appropriateness and understanding)	How are the two flow charts similar and how are they different? What other domestic applications rely on similar sets of instructions? What commercial and industrial applications could be represented in a similar way?
Common misconceptions: pupils sometimes think...	The sequences of instructions they devise have no application beyond school. Flow charts do not apply to applications of ICT at home or in the workplace.