

Progression in Programming

Lower Key Stage 2



	Year 3	Year 4
POS statements Sept 2014	<ul style="list-style-type: none"> Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts Use sequence, selection, and repetition in programs; work with variables and various forms of input and output Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs 	
Children understand concepts 	<ul style="list-style-type: none"> I can break an open ended problem up into smaller parts. I can put programming commands into a sequence to achieve a specific outcome. I keep testing my program and can recognise when I need to debug it. I can use repeat commands. I can describe the algorithm I will need for a simple task. I can detect a problem in an algorithm which could result in unsuccessful programming. 	<ul style="list-style-type: none"> I can use an efficient procedure to simplify a program. I can use a sensor to detect a change which can select an action within my program. I can use logical thinking to solve an open-ended problem by breaking it up into smaller parts. I know that I need to keep testing my program while I am putting it together. I can use a variety of tools to create a program. I can recognise an error in a program and debug it. I recognise that an algorithm will help me to sequence more complex programs. I recognise that using algorithms will also help solve problems in other learning such as Maths, Science and Design and Technology.
Teacher enables progress 	<ul style="list-style-type: none"> Set problem solving tasks for children to develop thinking using both paper and pencil and appropriate software Talk about algorithms to solve difficult problems Talk about the format of instructions and encourage prediction of outcomes Ask questions about what will happen if ... Introduce sensors which can be used to 'trigger' actions such as a floor robot reversing to avoid an obstacle Talk about variables as the numbers which go with logo commands and a procedure as a way to teach the turtle or computer to do something new Model the testing of programs and talk about the need to debug programs Talk about examples of programming in the world around 	
Children build skills 	<ul style="list-style-type: none"> Plan and enter a sequence of instructions on a robot specifying distance and turn to achieve specific outcomes, debug the sequence where necessary Test and improve / debug programmed sequences Begin to type logo commands to achieve outcomes Explore outcomes when giving sequences of instructions in Logo software Use repeat to achieve solutions to tasks Solve open-ended problems with a floor robot and Logo including creating simple regular polygons, making sounds and planning movements such as a dance Create an algorithm to tell a joke or a simple story 	<ul style="list-style-type: none"> Create and edit procedures typing logo commands including pen up, pen down and changing the trail of the turtle Use sensors to 'trigger' an action such as turning the lights on using Probot if it 'goes through a tunnel', or reversing if it touches something Solve open-ended problems with a floor robot, Logo and other software using efficient procedures to create shapes and letters Experience a variety of resources to extend understanding and knowledge of programming Create an algorithm and a program that will use a simple selection command for a game Begin to correct errors (debug) as they program devices and actions on screen, and identify bugs in programs written by others.

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	<ul style="list-style-type: none"> Sequence pre-written lines of programming into order Talk about algorithms planned by others and identify any problems and the expected outcome 	<ul style="list-style-type: none"> Use an algorithm to sequence more complex programming into order Link the use of algorithms to solve problems to work in Maths, Science and Design and Technology
<p>Suggested activities for children to develop process</p> 	<p>TES-iboard Spider web and Mole Maze can be used to develop understanding of the amount of turn required to plan to achieve specific outcomes.</p>	<p>Use NGfL resource to see how sensing change can be used to cause actions to happen.</p>
	<p>Probot or other floor robot is used to explore regular polygons and other shapes. A procedure can be saved to create symmetrical patterns of polygons. Investigate the necessary instructions to include sound in a program. Children debug errors in programming.</p>	<p>Children use if command on Probot or other floor robot to program a response if the robot touches an obstacle or moves into the dark. Can you program it to move when you clap? They test and debug their programming.</p>
	<p>Textease Studio, www.j2e.com/j2code Logo or FSW logo is used to write a name, to create procedures for regular polygons and other shapes such as a house, including the use of repeat command. They test and debug their own and the programs of others. Can you create these trains?</p>	<p>Procedures are used within procedures in logo programs to achieve specific outcomes such as a flower pattern, a fan, the creation of a town or a train as explored in Year 3. Children create a branching story by creating different procedures for branches of the story.</p>
	<p>Scratch, Visual code in www.j2e.com/j2code, or Tynker is used to create an animation of a Knock,Knock joke or a simple story. They identify the algorithm and the programming required. They test and debug the program. Children create a dance routine for a sprite.</p>	<p>Scratch, Visual code in www.j2e.com/j2code, or Tynker is used to create a simple Etch a Sketch game using if commands to program actions using arrow keys on the keyboard. Children look at program instructions to identify outcomes. They create a racing car game where the car must stay on the track. If commands are used to select an action when a colour is touched. Other games are created using sensing of an input to extend the actions within the game. They design their own algorithm for similar games, write and debug the program to achieve desired outcome.</p>
	<p>Daisy the Dinosaur app is used to further develop the use of the repeat instruction. The plan algorithms, create and debug programs.</p>	<p>i-LOGO app or Logo in www.j2e.com/j2code is used to extend confidence in using the correct syntax for LOGO, to view sequences to achieve different purposes. They plan algorithms, create and debug programming sequence to achieve a specified outcome.</p>
	<p>A.L.E.X app and Cargo-Bot are used to meet new challenges. Children are encouraged to talk about the algorithm that will be required to meet the higher levels of challenge.</p>	
	<p>Hopscotch app is used to develop repeat, wait and changes to appearance of objects on screen. Children plan algorithms to achieve specific purposes. They create and debug programs.</p>	<p>Hopscotch app is used to develop repeat, wait and changes to appearance of objects on screen. They use random command and create parallel programs by adding tabs with different sprites. Children plan algorithms to achieve specific purposes. They create and debug programs.</p>
<p>Use Lego WeDo models with Scratch for particular purposes such as using the motor to turn models. The download of Scratch is required for this.</p>		
<p>Schools that haven't invested in Textease Studio or Textease Studio CT could continue using 2Go for Year 3, adding Allow Programming options for children to build confidence and understanding with this resource before moving to FSW logo which is a free download. 2DIY could be purchased to allow children to create games linked to all areas of the curriculum, extending their skills in planning and sequencing to achieve an outcome.</p>		