P.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
EYFS **Recognise that a range of technology is used in places such as homes and schools** **Select and use technology for particular purposes.**	I can make a floor robot move. I can use simple software to make something happen. I can make choices about the buttons and icons I press, touch or click on.	Provide floor robots, remote control toys and exploratory software for children to use Talk about where technology is used in the school and the world around	Help adults operate equipment around the school and independently operate simple equipment. Use simple software to make things happen. Explore options and make choices with toys, software and websites. Press buttons on a floor robot and talk about the movements. www.poissonrouge.com Explore activities. How do you make things happen? Use building block, Bee bots and floor maps for the children to build their own exploratory activities. Children play with remote control cars and other "push button" toys. Use online games to talk about controlling objects on screen. http://www.priorywoods.middlesbrough.sch.uk/page/?pid=305 http://www.abcya.com/snowman.htm http://www.miniclip.com/games/bubble-trouble/en/#t-sd Use2Go 2Simple Video Infant Toolkit to move from bee to flower to flower or to fly from planet to planet using the appropriate backgrounds. Set the key pad to direction.

P.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
Year 1 **Understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions.** **Create and debug simple programs** **Use logical reasoning to predict the behaviour of simple programs** **Recognise common uses of information technology beyond school.**	I can give instructions to my friend and follow their instructions. I can describe what happens when I press buttons on a robot. I can press the buttons in the correct order to make my robot do what I want. I can describe what actions I will need to do to make something happen and begin to use the word algorithm. I can begin to predict what will happen for a short sequence of instructions. I can begin to use software/apps to create movement and patterns on a screen. I can use the word debug when I correct mistakes when I program.	Provide opportunities for children to give and follow instructions to move about the playground or hall Provide opportunities for children to explore what happens when different buttons are pushed on a floor robot and to predict what will happen when a sequence of buttons are pressed Encourage children to talk about the algorithm that will move a floor robot to a specified position Talk about the buttons that will need to be pressed on a floor robot to execute the algorithm Provide a range of technologies for children to discover outcomes for different inputs Provide opportunities for repeated experiences of programming robots, models and on-screen turtles to achieve particular outcomes	Physically follow and give each other instructions to move around. Explore outcomes when buttons are pressed in sequence on a robot. Begin to identify an algorithm to achieve a specific purpose Execute a program on a floor robot to achieve an algorithm. Begin to predict what will happen for a short sequence of instructions in a program. Begin to use software to create movement and patterns on a screen. Use the word debug to correct any mistakes when programming a floor robot Draw a picture using TES iboard http://www.iboard.co.uk/iwb/Drawing-with-a-Control-Toy-697 (change to the white colour pen to move across the picture) Set an obstacle for Beebots for children to achieve a specific outcome.(link to other curriculum areas) Children will talk about the algorithm that they will need to follow as they plan a sequence of actions to achieve an outcome before programming the robot. They debug any mistakes and look at programs planned by others to predict outcomes. Play TES iboard http://www.iboard.co.uk/iwb/Controlling-Round-a-Route-693 Keep the control set to being one quarter turn. (could use again in Y2 to talk about ½ and ¼ turns)

		Talk about precise instructions and debugging a program	Explore simulations in Bog Day Out including the fishing trawler I Plymouth and the Apple Year in Somerset https://www.bigdayout.swgfl.org.uk/flash/index.htm
		Talk about sequencing activities across the curriculum as examples of algorithms	Guidance https://www.bigdayout.swgfl.org.uk /activityGuidance.pdf
		Talk about where programming is used in the school and the world around	Use 2GO(2Simplw Infant Video Toolkit) to draw a picture. Compare to drawing with a control toy. What's the same? What's different? Set the key pad to turning as soon as the children can use the idea of a quarter turn.
			http://www.snapfiles.com/get/stickfigure.html
			Use to explore making stick figure animation. They can plan a sequence of actions. Set a challenge and talk about the steps necessary to achieve it.
			Use Daisy the Dinosaur app to achieve the outcomes of a variety of challenges. Use Kodable and A.L.E.X. apps to achieve closed outcomes.

P.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
Year 2 **Understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions.** **Create and debug simple programs** **Use logical reasoning to predict the behaviour of simple programs** **Recognise common uses of information technology beyond school.**	I can give instructions to my friend (using forward, backward and turn) and physically follow their instructions to move in a shape I can tell you the order I need to do things to make something happen and talk about this as an algorithm. I can program a robot or software to do a particular task. I can look at my friend's program and tell you what will happen. I can use programming software to make objects move. I can watch a program execute and spot where it goes wrong so that I can debug it.	Provide opportunities for children to give and follow instructions to move about the playground or hall Provide opportunities for children to explore what happens when different buttons are pushed on a floor robot and to predict what will happen when a sequence of buttons are pressed Encourage children to talk about the algorithm that will move a floor robot to a specified position Talk about the buttons that will need to be pressed on a floor robot to execute the algorithm Provide a range of technologies for children to discover outcomes for different inputs Provide opportunities for repeated experiences of programming robots, models and on-screen turtles to achieve particular outcomes	Physically follow and give each other forward, backward and turn(right angle) instructions. Express an algorithm to achieve an outcome. Plan and enter a sequence of instructions to achieve an algorithm, with the robot specifying distance and turn and drawing a trail. Predict what will happen and test results. Explore outcomes when giving instructions in a simple Logo program. Talk about similarities and differences between a floor robot and logo on screen. Write or draw their name/topic words using http://www.iboard.co.uk/iwb/Drawing-with-a-Control-Toy-697 Children talk about an algorithm to move a Probot to create a rectangle or a square. They plan the program that will be required. They test the program to identify any bugs. They suggest solutions to sort out problems. Watch a Logo program execute using 'allow programming' in 2Go, debug any problems Children talk about each other's programs and predict the outcomes.

		Talk about precise instructions and debugging a program Talk about sequencing activities across the curriculum as examples of algorithms Talk about where programming is used in the school and the world around	Play TES iboard cheese sniffer game with a friend. http://www.iboard.co.uk/iwb/Cheese-Sniffer-657 You have five moves each turn. Play in a pair against another to encourage talk about the 'most efficient' set of moves to get to the next cheese. Use Train Routes activity in SWGfL area of Big Day Out to find different routes to travel. (Train Routes in Swindon) Plan a the best sequence of steps to get your canal boat up and down the lock in the lest number of steps (Canal Lock in Wiltshire) Use 2Go (2Simple Infant Video Toolkit) online tools to plan specific routes using the town and racing track backgrounds. Talk about the algorithm required and plan the program to execute it. Set the key pad to turning 900. Set children challenges to create programs for oblongs and squares or to create a letter. Talk about each other's programs and predict outcomes.

P.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
Year 3 **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**	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.	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	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 using Scratch Sequence pre-written lines of programming into order Talk about algorithms planned by others and identify any problems and the expected outcome Use TES-iboard Spider web and Mole Maze to develop understanding of the amount of turn required to plan to achieve specific outcomes http://www.iboard.co.uk/iwb/Spider-Web-665 http://www.iboard.co.uk/iwb/Mole-Maze-663

| | | | Use Probot or other floor robots 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. |
			Textease Studio 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.
			Scratch 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.
			Use Daisy the Dinosaur app to further develop the use of the repeat instruction. They plan algorithms, create and debug programs.
			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.
			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.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
Year 4 **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**	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.	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	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 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 Identify bugs in programs Use the if command on Probot to program a response if it touches an obstacle or moves into the dark. Program it to move in response to a clap. Test and debug their programming. https://hwb.wales.gov.uk/Find%20it/Pages/Home.aspx To see how sensing change can be used to cause

			actions to happen. Use procedures within procedures in Logo to achieve a specific outcome 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 http://www.inklestudios.com/inklewriter/ by creating different procedures for the story. http://www.simonhaughton.co.uk/2012/06/scratch-lesson-1-programming-an-etch-a-sketch-game.html Create a simple etch a sketch game using if command to program actions using arrow keys on the keyboard. Create a racing car game where the car must stay on the track. http://www.teach-ict.com/programming/scratch/scratch_home.htm If commands are used to select an action when a colour is touched. Other games to be 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 games to achieve the desired outcome. i-LOGO app is used to extend confidence in using syntax for LOGO, to view sequences to achieve different purposes. They plan algorithms, create and debug programming sequences to achieve a specified outcome. 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 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. They plan algorithms to achieve specific purposes. They plan and debug programs.

P.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
Year 5 **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**	I can decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program for a device or onscreen activity. I can use a variable to increase programming possibilities. I can change an input to a program to achieve a different output. I can use 'if' and 'then' commands to select an action. I can refine a procedure using repeat commands to improve a program. I can talk about how a computer model can provide information about a physical system. I can use logical reasoning to detect and debug mistakes in a program. I use logical thinking, imagination and creativity to extend a program.	Set problem solving tasks for children where they are expected to write procedures to achieve outcomes Model the writing of an algorithm to achieve a specific outcome Model the detecting and correcting errors in a program and link this to the original algorithm Set tasks for children to use sensing equipment to control actions of a device Provide opportunities for children to simulate controlling effects of a physical system Talk about a variable as a container or box to store a number that needs to be used in a program Talk about the uses of programming in the world around and its impact on society, including that of gaming	Explore procedures using repeat to achieve solutions to problems with Logo and a floor robot Talk about procedures as parts of a program Refine procedures to improve efficiency Use a variable to replace the length of side and the angle of a regular shape Explore instructions to control software or hardware with an input and using if... then... commands Explore a computer model to control a physical system Change inputs on a model to achieve different outputs Refine and extend a program Identify difficulties and articulate a solution for errors in a program Group commands as a procedure to achieve a specific outcome within a program Write down the steps required (an algorithm) to achieve the outcome that is wanted and refer to this when programming Use procedures, including those using an if command, with a floor robot Probot to plan an efficient route around a 'road system'. Lights must be turned on when the robot goes through a tunnel. Textease Turtle or other logo program such as FSW logo or i-LOGO app is used to develop procedures to create specific

| | | | | effects on screen extending their repertoire of commands. They plan algorithms that require inputs and make use of variables to create a program. They create a procedure to draw any regular polygon using number_of_sides and length. They experiment with mathematical sequences of addition, subtraction, multiplication and division. [h](#)

Use Scratch to develop games to meet specific challenges such as a tennis game (a version is available without the variables to support learners who need an additional step before adding variables). A score is added to the game. A picoboard is used with Scratch (download) to trigger actions based on the sensing of different variables such as sound. Different planning sheets are available to support the creation of new games.

Use Flowol 4 or Go Control to program a sequence of actions for a Zebra Crossing, a light house, lights and a foundation for the Town Hall during the day and the night, and bridge lights. These can be linked to models where these are available.

Use the Espresso Computer Modelling module to manage water at home and then the supply from a reservoir. http://southwestwater.org.uk/t2_comp_model/index.html

Kodu is introduced to plan and create games for their peers. Increasingly complex games should be created

Hopscotch app is used to develop skills, knowledge and understanding of programming as described for Scratch above. A.L.E.X app and Cargo-Bot are used to develop problem solving skills. |
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P.O.S Programming	Concepts for children to understand	Teacher delivered	Activities
Year 6 **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**	I can deconstruct a problem into smaller steps, recognising similarities to solutions used before. I can explain and program each of the steps in my algorithm (for a device or onscreen activity). I can evaluate the effectiveness and efficiency of my algorithm while I continually test the programming of that algorithm. I can recognise when I need to use a variable to achieve a required output. I can use a variable and operators to stop a program. I can use different inputs (including sensors) to control a device or onscreen action and predict what will happen. I can link errors in a program to a problem in the algorithm on which it is based.	Set problem solving tasks for children where they are expected to write procedures to achieve outcomes Model the writing of an algorithm to achieve a specific outcome Model the detecting and correcting errors in a program and link this to the original algorithm Set tasks for children to use sensing equipment to control actions of a device Provide opportunities for children to simulate controlling effects of a physical system Talk about a variable as a container or box to store a number that needs to be used in a program Talk about the uses of programming in the world around and its impact on society, including that of gaming	Record in some detail the steps (the algorithm) that are required to achieve an outcome and refer to this when programming Predict the outputs for the steps in an algorithm I Increase confidence in the process to plan, program, test and review a program Write a program which follows an algorithm to solve a problem for a floor robot or other model Write a program which follows an algorithm to achieve a planned outcome for appropriate programming software Control on screen mimics and physical devices using one or more input and predict the outputs Understand how sensors can be used to measure input in order to activate a procedure or sequence and talk about applications in society Create variables to provide a score or trigger an action in a game Link errors in a program to problems in the original algorithm Use Lego EV3 Robots for children to program models to successfully navigate courses including the use of input devices to avoid obstacles. Use logo to create a square shaped spiral, a star. Create a procedure to calculate the area of a rectangle, the area of a circle. Use print and readword to create function machines for mathematical calculations such as the area of different

			quadrilaterals. The Blockly maze provides a useful assessment of children's understanding of both logo and planning and using an algorithm. Other Blockly resources can be used to develop logical thinking. https://blockly-games.appspot.com/maze Children create a Times Tables game making use of a variable. They adapt it to create a quiz where the correct answer must be linked to a question. The use of a picoboard is developed for children to use different controls for their games. Children use what they learn from examples of games to create their own. Children create their own blocks which are procedures to achieve specific outcomes. Use Go Control to program a sequence of actions for crossroads, pelican crossing, and the train level crossing. These can be linked to models where available. Use the Espresso Computer Modelling module to manage water at home and then the supply from a reservoir. http://southwestwater.org.uk/t2_comp_model/index.html Scratch can be used to plan and create games for their peers. Increasingly complex games should be created Hopscotch app is used to develop skills, knowledge and understanding of programming as described for Scratch above. A.L.E.X app and Cargo-Bot are used to develop problem solving skills.