PROGRAMMING A – KS1			
Concept	**EYFS**	**YEAR ONE**	**YEAR TWO**
Content (NC with local adaptations)	Make an animal costume for Bee-bot – explore how to use a Bee-bot.	**Moving a robot** Writing short algorithms and programs for floor robots and predicting program outcomes.	**Robot algorithms** Creating and debugging programs and using logical reasoning to make predictions.
Why here?/ Why now?	Introducing that things only move if they are given instructions in a program. This prepares for KS1 programming unit.	To begin learning about algorithms and programming objects building on understanding of Bee-bots introduced in EYFS.	To develop learners' understanding of instructions in sequences, logical reasoning and debugging. This follows on from EYFS and Y1.
Declarative (factual) Knowledge **Children will know that…**	-instructions tell us what to do. -things only move if we give instructions in a program. -instructions must be followed in a specific order. This is called a sequence of commands.	-robots are machines that we can program to do human jobs. -robots in factories make things; in hospital they help make us better. -a Bee-bot is a floor robot that can move when programmed. It has buttons to help us to direct it. -programming means to provide a set of digital instructions in the form of an algorithm tells the floor robot to perform a task/follow a planned route. -a Bee-bot has buttons on the top and each one makes it do something different. -the arrows make the Bee-bot move in different directions. -entering information into a Bee-bot is known as a command.	-programming is when we make a set of instructions for a computer to follow. -robots are a type of machine that follow programs – they follow what we instruct them to do. -an algorithm is a set of instructions for a specific task or for solving a problem. -algorithms can be represented in different forms. -algorithms are precise set of instructions that a computer can turn into a code. A floor robot has a computer inside it. -debugging is a process of finding and fixing errors in algorithms and programs. -commands can be tested and debugged by a trial-and-error approach. -algorithms need to be planned first before they are entered.

		-a Bee-bot can be programmed to move forward, backward, left and right. -if a Bee-bot has been charged and is on, you will know because its eyes light up. -the Go button starts the program. -the X button makes the Bee-bot delete the program and make a new program. -a pictorial algorithm can be represented in a variety of ways.	-recap on declarative knowledge for Bee-bots in Y1 (or similar if using Blue-bots). -when we press the buttons on a floor robot, we are creating a program for it to follow. The program is how the algorithm is run as a code on the robot. -it is important that instructions to the floor robot are clear. If a sequence of instructions is in the wrong order, has any missing or has too many, then it will not end up in the right place at the end.
Procedural Knowledge to perform tasks. **Children will know how to….**	- listen to instructions. - follow a 2-part sequence. - order a simple sentence. - give one simple instruction for a Bee-bot (forward, backward, left, right).	-make sure a Bee-bot is charged before using it. -turn on the Bee-bot using the switch underneath. -plan a sequence of up to 4 commands for a Bee-bot to follow a route, avoiding obstacles. -think carefully about how many times they need to press each button to travel the correct distance they want. -carefully plan routes using squared paper. -enter a programmed route into a Bee-bot to make it move, then press Go. -use knowledge of pictorial codes and apply to new applications. -switch the Bee-bot off again after using it.	-plan a route for a floor robot that will avoid obstacles and get it to the right place. -create a program for a route to be followed. -spot errors in coding and correct them. -give multiple commands to complete an algorithm. -use an appropriate mat for the floor robot to follow a specific route with a start and finish point. -use symbols (e.g., arrows and crosses) to indicate the commands that will be inputted as a program. -find and fix errors in algorithms and programs and debug them.
Vocabulary	Image, object, button, see, beebot, move, forward, backward, on, off, sequence, instructions	Scratch Jr, Bee-Bot, command, sprite, compare, programming, programming area, Block, joining, command, start block, run, program, background, delete, reset, algorithm, predict, effect, change, value, Instructions, appropriate, design.	Instruction, sequence, algorithm, program, order, commands, design, route, mat, debugging.

Digital Safety Links and knowledge **Children will know how to…**	- be careful with technology and handle it safely because it is easily breakable. -Bee-bots should only be used on the floor so they don't fall and break.	-Bee-bots should only be used on the floor, so they don't fall and break. -stand behind the Bee-bot.	-Bee-bots should only be used on the floor, so they don't fall and break. -stand behind the Bee-bot.

PROGRAMMING A – KS2				
Concept	**YEAR THREE**	**YEAR FOUR**	**YEAR FIVE**	**YEAR SIX**
Content (NC with local adaptations)	**Sequencing Sounds** Creating sequences in a block-based programming language to make music.	**Repetition in shapes** Manipulating digital images and reflecting on the impact of changes and whether the required purpose is fulfilled.	**Selection in physical computing** Exploring conditions and selection using programmable microcontroller.	**Variables in games** Introduction of 'variables' in Scratch
Why here?/ Why now?	Continuing the use of computers to make media and introduces linking their programming skills developed in KS1 to create this.	To extend pupils understanding of programming by learning about repetition and loops.	To combine the elements previously taught in Y3 and Y4 and progress to add more age-appropriate content.	Pupils continue to develop programming skills by experimenting with variables in an existing project, then modifying them, before they create their own projects.
Declarative (factual) Knowledge **Children will know that…**	-programming is making a set of instructions for computers to follow. -Scratch is a website/app program that we can use in order to code our own stories, music, animations and games. -Scratch helps us to use programming language, whilst also being creative and using problem-solving skills. -the Block Palette contains different blocks which control animations.	-programming is making a set of instructions for computers to follow. -FMS Logo is a text-based program that we can use in order to create shapes and patterns. -patterns are things that repeat in a logical way. In everyday life, patterns are everywhere! -an algorithm needs to be a clear set of sequenced instructions. -instead of typing in the code to create each individual shape, we can save time by repeating	-an algorithm is a set of instructions followed in order to solve a problem. -an algorithm can be displayed in different ways. -different colours in a code have different purposes. -commands can be represented in different shapes and colours.	-computer or online games and programs have been built using codes and algorithms. -algorithms are planned, modelled, trialled and debugged, in order to create accurate command sequences that enable variables to be enacted in games. -variables are used to change elements in a program and/or increase the level of challenge. -scores can be added to online games. -hacking is gaining unauthorised access into a program.

	-the Code Area (in the middle) is where the blocks are placed to create a program. -Stage with Sprite is where the output of the program is presented. -the sprite is the character. -attributes are what the sprite looks like, acts and sounds like. -Each coloured block represents a different command: -motion blocks make the sprite move; sound blocks (pink) make sound, looks blocks change appearance. -the repetition block simplifies the algorithm. -algorithms can be shortened to be more efficient.	the sequence of instructions using the 'repeat' function. -to make sjhapes, they need to know the angles of corners for different shapes. -a loop is a code that repeats a block of instructions until a goal is met. -loops can replace a duplicate code. -an algorithm can be improved by debugging it.		-games can be hacked by changing the algorithms.
Procedural Knowledge to perform tasks. **Children will know how to….**	-use and explain the colours of the Scratch coding blocks. -change the attributes of the sprite (code, costumes, sounds). -trial the program first to check for errors that need debugging. -use the 'repeat block' to simplify sequences by	-plan, model and test an algorithm in order to create accurate and imaginative shapes and patterns. -use basic commands: FD – forwards (followed by a space and number of steps) BK – backwards (as above)	-create an algorithm for a specific purpose. -include loops. -detect and solve errors in their program.	-use knowledge gained in Years 1-5 to create an algorithm for deigning a game. -use Scratch to select variables (dark orange circle) from the menu on the left: -choose or make a variable. Select events (light orange circle) from the menu on the left:

	selecting code and then the 'control' blocks (orange). Use the repeat block by placing it around the command blocks that they want to repeat. Type into the white box the number of times something is to be repeated. -add a backdrop. -use Scratch to make music.	LT – left turn (followed by a space and then the degrees to turn, e.g., LT 90). RT – right turn (as above) CS – clears pen marks on screen and gets the turtle back to the centre PU – stops turtle from leaving a pen trail PD – makes turtle leave a pen trail again. -use a repeat command for a set number of times to repeat the code added in brackets e.g., repeat 4 [FD 100 LT 90]. -edit and improve algorithms. -use loops (repetition) within code to avoid repeating commands. -use the repeat function with shapes to help make spirals. -identify an error within an algorithm and correct it.		-choose what needs to happen for the variable to change (e.g., when the space key is pressed). Select variables again and choose what will happen when an event happens (e.g., change score by 1 to add a point or change score by -1 to deduct a point. Higher challenges: Add callouts by selecting 'Looks' from the menu on the left. Add it to the variable program. Edit the text to change the callout. Add motion by selecting 'Motion' and choosing from the available motion commands to get the sprite to change position. Add comments by right clicking on the block that they want to comment on. This is a good way of showing they understand what their code is doing, -code multi-step programs to follow a simple, logical sequence. -identify an error within an algorithm and correct it. -identify features in a code in order to sabotage someone else's game.
Vocabulary	Scratch, programming, blocks, commands, code, sprite, costume, stage, backdrop, programming	Code snippet, program, turtle, commands, algorithm, design, logo, debug, pattern, count controlled loop, algorithm,	Microcontroller, Crumble controller, components, LED, sparkle, crocodile clips, connect, battery box, program,	Project, modify, variable, define, letter-string, algorithm, artwork, role, code, task, design, events,

	blocks, motion, turn, glide, sequence, task, design, code, run the code, sequence, order, note, chord, algorithm, bug, debug.	value, repeat, repetition, count-controlled loop, trace, value, repeat, count controlled loop, decompose, procedure	repetition, infinite loop, count controlled loop, condition, input, output devices, selection, action, task, design.	callouts, motion, trial and error, sabotage.
Digital Safety Links and knowledge Children will know how to…	-demonstrate good conduct when using online platforms for communication. -respond to inappropriate content online by speaking to a trusted adult.	-demonstrate good conduct when using online platforms for communication.	-demonstrate good conduct when using online platforms for communication. - stay safe when playing a game online. -use appropriate words when creating and playing a game online. -respond to inappropriate comments or images online.	- stay safe when playing a game online. -use appropriate words when creating and playing a game online. -respond to inappropriate comments or images online.