Computing – Year 4

Spring 2	Programming A - Repetition in games					
Prior learning	This unit assumes that learners will have some prior experience of programming. The KS1 NCCE units cover floor robots and ScratchJr, and Scratch, and the skill of sequence, is introduced in the Year 3 programming units: Sequencing Sounds and Events and actions in programs.					
Lesson objective	To develop the use of count-controlled loops in a different programming environment	*These lessons can be merged if necessary.* To explain that in programming there are infinite loops and count-controlled loops	To develop a design that includes two or more loops which run at the same time	To modify an infinite loop in a given program	To design a project that includes repetition	To create a project that includes repetition
Key vocabulary	Scratch, programming, sprite, blocks, code, loop, repeat, value	Block, repeat, forever, infinite loop, count-controlled loop, costume	Repetition, forever, infinite loop, count-controlled loop, animate, costume, event block, duplicate	Block, repeat, forever, infinite loop, modify, design	Infinite loop, count-controlled loop, repetition, design, sprite, algorithm	Repetition, design, algorithm, duplicate, debug, refine, evaluate
Creative context	Example jobs and future careers: Digital designers, Animation designers, game developers (https://www.bbc.co.uk/teach/class-clips-video/articles/zdp347h) , software tester, project manager. Links to other subjects: Maths (sequences, counting, timing), Art and DT (designing the game, including backgrounds and sprites), Science (cause and effect reasoning).					
Substantive knowledge	I know that some instructions include steps that are repeated. I know that a loop is used to repeat instructions. I know that a count-controlled loop repeats actions a set number of times.	I know that an infinite loop repeats instructions forever. I know the difference between an infinite loop and a count-controlled loop. I know that programmers choose loops carefully depending on the task.	I know that sprites can have multiple costumes to create animation. I know that loops can run at the same time in a Scratch program. I know that events like the green flag can start multiple actions together.	I know that games are built from repeated actions inside loops. I know that changing values inside a loop affects how a game behaves. I know that code can be reused across different sprites.	I know that games are planned using designs and algorithms. I know that repetition helps actions happen again and again in games. I know that different sprites can behave differently using similar code.	I know that programs must be tested and debugged as they are built. I know that algorithms can be refined during coding. I know that repetition is essential for making games run continuously.
Disciplinary knowledge	I can list an everyday task as a set of instructions including repetition.	I can identify which type of loop is used in a Scratch program.	I can design an animation that uses repetition.	I an identify which parts of a loop can be changed.	I can evaluate how repetition is used in an existing project.	I can follow and refine my algorithm when building a program.

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	I can predict what a short piece of Scratch code will do. I can modify a loop to create a different shape or outcome.	I can explain why a loop repeats forever or stops. I can modify code to change a count-controlled loop into an infinite loop.	I can choose appropriate actions to repeat for each sprite. I can evaluate how effectively repetition is used in my animation.	I can explain the effect of my code changes. I can reuse and adapt existing code for a new sprite.	I can select useful parts of a project to include in my own design. I can develop and explain a game design that includes repetition.	I can debug my code to fix mistakes. I can evaluate the steps I took to create my game.
Recorded learning	Pupils will use a loop in Scratch to repeat instructions and create shape.	Pupils will explain the difference between count-controlled and infinite loops and choose the best one for a task.	Pupils will design and program an animation using loops that run at the same time.	Pupils will change and reuse loops in a Scratch game to make it work the way they want.	Pupils will plan a game in Scratch that uses repetition for actions and events.	Pupils will build, test, and improve their Scratch game, using repetition to make it run smoothly.
Outcome for unit	Over the course of this unit, get the children to save each of their projects (especially the final one) to ensure that there is clear evidence of learning. End of unit evaluation – Please complete the teacher/self-evaluation slide for this unit (the slide is in the folder), by writing their names in the correct boxes.					
Future learning	The progression of the children's programming skills will continue on into the programming units completed in year 5 and 6. In year 6 they will use this knowledge and future knowledge to create their own game in scratch with Variable.					