Subject: Computing	Year: 3 – Spring 1 – **Programming A – Sequencing Sounds**
National Curriculum objectives • 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; • Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	
To begin this unit, the children should have already learnt: <u>Year 1 & 2</u> Programming is when we make a set of instructions for computers to follow. Robots, such as floor robots like Bee-bots, are one type of machine that can follow programs. We can use algorithms (a set of guidelines to perform a task) to program floor robots along routes and correct 'debug' mistakes in algorithms. *ScratchJr* is a programming application.	**The learning in this unit will prepare the children to learn these things in the future:** <u>Year 4</u> Logo is a text-based programming language, where we can type commands which are then drawn on the screen. Instead of typing in the code to create each individual shape, we can save time by repeating a sequence of instructions. We use the 'repeat' function and create 'infinite' or 'count-controlled' loops. <u>Year 5</u> Microcontrollers control real-life objects (like LEDs and motors) through the construction of programs. Conditions are a means of controlling the flow of actions in a program. The children will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if...then...' structure) and write algorithms and programs that utilise this concept. <u>Year 6</u> A variable is something that is changeable. A variable can be set and changed throughout the running of a program. Programmers will apply the Use-Modify-Create model: learners will experiment with variables in an existing project, then modify them, before they create their own project.
<u>Key Enquiry Question</u> What do the 'blocks' in scratch represent? Can you name the objects in this project? What components are necessary to make a sprite perform a movement? What do you predict will happen if two blocks are joined together? What could be added to your program (music/sounds) to make it more interesting?	**<u>The Big Idea:</u>** *ScratchJr* is a programming environment with three main areas: 1. The Blocks Palette; 2. Code Area; 3. Stage with Sprite. We use <u>algorithms</u> (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

<table>
<tr><th colspan="2">To achieve ARE, pupils will need to be secure in the following knowledge:</th></tr>
<tr><td>By the end of this unit, children will know:
Programmes start because of an input;
What a sequence is;
Programs include a sequence of commands;
The sequence of a program is a process;
The order of commands can affect a programme’s output;
Different sequences can achieve the same output;
Different sequences can achieve the same output.</td><td>Vocabulary:

Programmed; algorithm; button; direction; forward; backward; robot; left; right; route; design; chunking; error; debugging (introduced in KS1).

Scratch; blocks; commands; code; sprite; stage; costume; backdrop; debugging.</td></tr>
<tr><td>By the end of this unit, children will be able to do:
Build a sequence of commands;
Combine commands in a program;
Order commands in a program;
Create a sequence of commands to produce a given outcome.</td><td>Useful Resources:

Online training courses
Raspberry Pi online training courses
Bee-bot floor robots

https://www.youtube.com/watch?v=leBEFaVHllE – Making a sandwich instructions.</td></tr>
</table>

COMPUTING: PROGRAMMING

Y3

KNOWLEDGE ORGANISER

Overview

Sequencing in Scratch

- Programming is when we make a set of instructions for computers to follow.

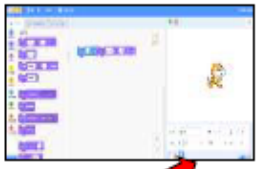
-Scratch is a program that we can use in order to code our own stories and animations.

-We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

The Basics of Scratch

-**What is Scratch?** Scratch is a website/ app that lets us code our own stories, games and animations.

-Scratch helps us to learn how to use programming language, whilst also being creative and using problem-solving skills.



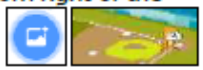
There are three main areas in Scratch:

-The Blocks Palette (on the left) contain all of the different blocks: puzzle piece commands which control the animation.
-Code Area (in the middle) is where the blocks are placed to create a program.
-Stage with Sprite (right) is where the output of the program is presented. The sprite is the character.

Adding/Removing Sprites: This can be done here, at the bottom of the stage. There are many sprites to choose from.

Attributes: There are three attributes of the sprite which we can change to make our animation: Code, Costumes, Sounds.

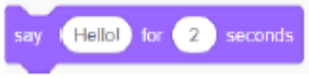
-**Backdrops**: Backdrops can be added by clicking on this icon (bottom right of the screen, below the stage).



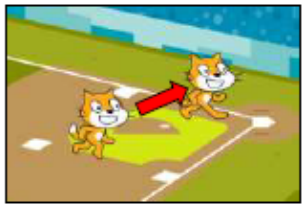
Programming Using Blocks

-Basic Programming: Make sure that the feature of the stage that you want to program (e.g. sprite, background) is selected by clicking on it. Drag the block command that you want onto the code area. Blocks can be deleted by right-clicking on the block and selecting 'delete block.'

-Block Editing: White areas on blocks can be edited. Click on them and type in the preferred value.



-Running the Code: You can run your animation by performing the action stated in the event block (e.g. clicking the event block). If this does not work, you may need to debug your animation (find errors and fix them).



Sequencing and Algorithms

-A **sequence** is a pattern or process in which one thing follows another.

-In Scratch, blocks can stack vertically on top of one another to create sequences.

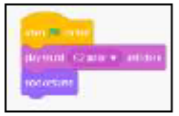
-**Event blocks** are used to start sequences. They are orange and have a curved shape at the top.

-Designing an **algorithm** (set of instructions for performing a task) will help you to program the sequence that you require.

Making Music

-Several sprites, each following connected sound sequences, can create music!

-In order to do this, you will need to **carefully plan your algorithm.**



-If your animation does not work correctly the first time, remember to **debug** it.

Important Vocabulary

Programming	Scratch	Blocks	Commands	Code	Sprite	Stage	Costume	Backdrop	Debugging