Subject: Computing	Year: 1 – Spring 1 – **Programming A – Moving a Robot**
National Curriculum objectives • 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.	
To begin this unit, the children should have already learnt: As this is a Year 1 unit, no prior knowledge is assumed. This unit progresses children's knowledge and understanding of giving and following instructions. It moves from giving instructions to each other to giving instructions to a robot by programming it.	**The learning in this unit will prepare the children to learn these things in the future:** Year 3 *ScratchJr* is a programming environment with three main areas: the Blocks Palette; Code Area; and Stage with Sprite. Year 4 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. Year 5 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. Year 6 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.
Key Enquiry Question Why is it important to give clear instructions? What outcome do you predict your sequence of commands will produce? What do you notice about the outcome when the robots begin from the same position and enact the same command? Are there different ways you could move your floor robot from the start to the finish?	**The Big Idea:** 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. Floor robots have buttons which help us to direct them. We can use algorithms (a set of guidelines to perform a task) to program floor robots along routes.

To achieve ARE, pupils will need to be secure in the following knowledge:	
By the end of this unit, children will know: • Words that can be enacted; • What a given command does; • How to match a command to an outcome; • A programme is a set of commands that a computer can run; • A series of instructions can be issued before they are enacted.	**Vocabulary:** **Programmed; algorithm; button; direction; forward; backward; robot; left; right; route.**
By the end of this unit, children will be able to do: • Enact a given word; • Predict the outcome of a command; • List which commands can be used on a given device; • Run a command on a floor robot; • Choose a command for a given purpose; • Choose a series of words that be enacted as a program; • Choose a series of commands that can be run as a program; • Build a sequence of commands in steps; • Combine commands in a program; • Run a program on a device.	**Useful Resources:** **Teaching Programming to 5- to 11-year-olds** *Bee-bot* floor robots

COMPUTING: PROGRAMMING
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Overview

Moving a Robot

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

- Robots are one type of machine that can follow programs. Floor robots include Bee-bots and Blue-bots.

- Floor robots have buttons which help us to direct them. We can use algorithms (a set of guidelines to perform a task) to program floor robots along routes.

Buttons and Programs

-**Buttons**: Bee-bots have buttons on the top. They each make the Beebot do something different (see picture).

-The arrows move the Bee-bot in different directions.

-The GO button makes the Bee-bot start its program. (on some models, it also pauses the Beebot in-program).

-**Programs**: A program is a series of instructions. We can program the Bee-bot by pressing the direction buttons (in order) that we want it to move in, followed by GO.

-The X button makes the Bee-bot delete the program and make a new program. Switching the Bee-bot off and on again also deletes the program.

Robots and Floor Robots

-**Robots:** Robots are machines that we can program to do human jobs.

-Robots help us to do things, for example to help us clean, mow and learn!

-Robots in factories make things, and in hospitals they help make us better.

-**Bee-bots**: Bee-bots are a type of floor robot.
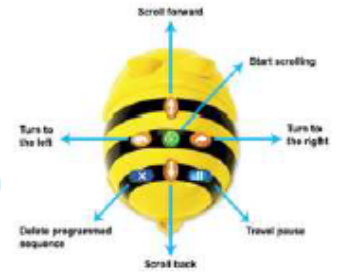-We can programme Bee-bots to move around.

Bee-bots should only be used on the floor, and not tables etc. They can be damaged if they fall from high surfaces. (Other floor robots, e.g. Blue-bot, can also be used).

-**Turning on a Bee-bot:** Before we use a Beebot, we need to make sure it is charged.

To turn it on, using the switch underneath. You can tell that the Bee-bot is on because its eyes light up. Switch it back off again after you have finished using it.
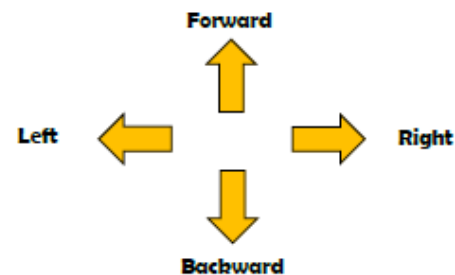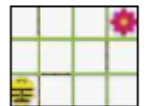
Directions

-In order create clear routes for our Bee-bots, we need to be sure of our directions.

Forward

Left   Right

Backward

Make sure that you stand behind Bee-bot.

Routes and Algorithms

-A route is the course that we travel to get somewhere. We use algorithms (a set of guidelines to complete a task) to program our floor robot to take a route to where we want it to go.

-We should think carefully about how to avoid obstacles. We should also consider how many times we need to press each button to travel the correct distance.

Important Vocabulary

| Programmed | Robot | Algorithm | Button | Direction | Forward | Backward | Left | Right | Route |