Seamer and Irton CP School – Computing (H.Griffiths)

Topic – Robot Algorithms	Year 2 Spring 1	Strand – Programming

Prior Learning

Prior Learning	Key Knowledge I need to understand
In **Year 1 – Moving a robot – Spring 1,** learners explored using individual commands, both with other learners and as part of a computer program. They identified what each floor robot command does and used that knowledge to start predicting the outcome of programs. The unit was paced to ensure time was spent on all aspects of programming and built knowledge in a structured manner. Learners were also introduced to the early stages of program design through the introduction of algorithms.	**I need to understand that:** **Programming is when we make a set of instructions for computers to follow.** **Robots are one type of machine that can follow programs - they follow what we instruct them to do.** **We use algorithms (a set of instructions to perform a task) to help robots to do things that we want them to.** **Debugging can help to correct algorithms and programs.** This unit develops pupils' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Pupils will use given commands in different orders to investigate how the order affects the outcome. Pupils will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them.

How I will show what I have learned

To describe a series of instructions as a sequence	- I can follow instructions given by someone else - I can choose a series of words that can be acted out as a sequence - I can give clear instructions
To explain what happens when we change the order of instructions	- I can use the same instructions to create different algorithms - I can use an algorithm to program a sequence on a floor robot - I can show the difference in outcomes between two sequences that consist of the same instructions
To use logical reasoning to predict the outcome of a program	- I can follow a sequence - I can predict the outcome of a sequence - I can compare my prediction to the program outcome
To explain that programming projects can have code and artwork	- I can explain the choices I made for my mat design - I can identify different routes around my mat - I can test my mat to make sure that it is usable
To design an algorithm	- I can explain what my algorithm should achieve - I can create an algorithm to meet my goal - I can use my algorithm to create a program
To create and debug a program that I have written	- I can test and debug each part of the program - I can plan algorithms for different parts of a task - I can put together the different parts of my program

What vocabulary I need to know	What's next
Instruction, sequence, clear, unambiguous, algorithm, program, order, commands, prediction, artwork, design, route, mat, debugging The following Glossary may be useful https://icompute-uk.com/ewExternalFiles/iCompute-Glossary.pdf	In **Year 2 – An Introduction to Quizzes – Summer 2** learners' knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes will be progressed.

Please access resources at Teach Computing Curriculum - https://teachcomputing.org/curriculum

Assessment

National Curriculum Computing links

- 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
- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

Assessment

Formative assessment opportunities will be provided throughout each lesson. The learning objective and success criteria will be introduced at the beginning of each lesson and then reviewed at the end. Learners should assess how well they feel they have met the learning objective using the teacher's chosen method.

Summative assessment completed on ScholarPack on teacher judgement alongside evidence from each session.

Teacher Subject Knowledge

This unit focuses on developing pupils' understanding of computer programming. It highlights that algorithms are a set of clear, precise, and ordered instructions, and that a computer program is the implementation of an algorithm on a digital device. The unit also introduces reading 'code' to predict what a program will do. Pupils will engage in aspects of program design, including outlining the project task and creating algorithms.

When programming, there are four levels that can help describe a project, known as 'levels of abstraction'. Research suggests that this structure can support pupils in understanding how to create a program and how it works:

- Task — what is needed
- Design — what it should do
- Code — how it is done
- Running the code — what it does

Spending time at the task and design levels before engaging in writing code aids pupils in assessing the achievability of their programs and reduces the cognitive load for pupils during programming.