

PROGRAMMING SIMULATIONS – OVERVIEW

Overview

This unit will continue to develop students' understanding of programming whilst introducing them to real world simulations. The unit progresses concepts such as inputs and outputs, events, variables, logical tests and loops.

In this unit, students will learn what simulations are and the benefits of being able to model real world situations in programming. They will learn how to plan and program a simple simulation that demonstrates how real-world processes work.

National Curriculum

The areas of the National Curriculum and the key computing concepts covered in this unit are outlined in the table below:

Knowledge and understanding	Computing concepts
To write and debug programs that accomplish specific goals including controlling or simulating physical systems.	Debugging
To solve problems by decomposing them into smaller parts.	Decomposition
To use sequencing and repetition in programs.	Sequencing, repetition and looping
To work with variables.	Variables
To work with inputs and outputs.	Inputs and outputs
To use logical reasoning to explain how simple algorithms work.	Reasoning and algorithms
To detect and correct errors in algorithms and programs.	Debugging

The Computing Curriculum

Where the knowledge and understanding developed in this unit fits into the computing curriculum is outlined in the table below:

Prior Learning	Future Learning
EYFS Unit: Introduction to programmable robots	Year 6 Unit: Scratch – Programming a computer game
Year 1 Unit: Introduction to algorithms unplugged	Year 6 Unit: Introduction to Python
Year 1 Unit: Programming virtual Beebots	
Year 2 Unit: Debugging Algorithms	
Year 2 Unit: Programming using Scratch Jnr	
Year 3 Unit: Introduction to Scratch	
Year 3 Unit: Programming a quiz in Scratch	
Year 4 Unit: Introduction to micro:bits	
Year 4 Unit: Introduction to HTML	
Year 5 Unit: Advanced micro:bits	

Cross-curricular links and extension activities

This unit provides opportunities for cross-curricular links through the exploration of simulations in real-world processes. Science topics studied previously or being studied currently provide an excellent cross-curricular link to base simulation projects on.

Additional ideas for simulations can be found at the following websites:

[Browse - PhET Simulations](#)

[Solar System Scope - Online Model of Solar System and Night Sky](#)

<https://eyes.nasa.gov/apps/orrery/>

<https://gpm.nasa.gov/education/videos/water-cycle-animation>