

NHSG Key Stage 3 Unit Overview for 9S3: Programming Concepts



Computer Science	9: S3 – Programming Concepts Iteration and Functions		 	Autumn - Spring Term
Learning outcomes	In this unit, students should gain the ability to identify, understand and use the advanced programming techniques of creating and calling functions, as well as the two types of iteration. They will convert their experience of using objects, methods and properties from block coding and Small Basic into Micro.Python to control a Micro:Bit. They should be able to use the previous knowledge of input, process, output, sequence, and selection. Students will dive deeper into the methods they learnt about last year and find out how to create their own.			
Key Question	How do Smartwatches work and can I create my own?			
Knowledge	Key concepts Recap from Year 8 • Objects • Methods and parameters • Properties • Objects have methods and properties that can be controlled • A computer will only do exactly what it has been programmed to do New to Year 9 • Parts of a program can be made to repeat • Repeats can be for a set number of times • Repeats can be made to continue until a condition is met • A method is a smaller program that is named • A method is an isolated program that can be used in the main program simply by using the name of the method.	Key Skills • Investigation skills • Confidence in experimentation and failure • Logic • Using micro python to code the micro:bit to achieve an aim • Adapt and refine code to reach the end goal • Use of sensors Key terminology • Object • Function/Method()/Subroutine • Property = • Selection • Accelerometer • Temperature Sensor • Indefinite Iteration • Definite Iteration • Definition vs Calling • User Interface (UI)	Common misconceptions: • A function is defined every time you want to use it • A sensor feeds data to the computer even when it is not programmed to	



Ongoing Assessment	In this unit, students continue using the PRIMM method for investigating and predicting what code will do. Students will also work more in pairs to encourage discussion and skills such as error-checking and to reduce cognitive overload. The teacher will be monitoring, assessing progress and giving verbal feedback throughout the exercises. Students are expected to self-evaluate their achievements in the lesson using the provided template of key questions. They will then use homework time to secure a weak area that they have identified. Answers are expected to be in the student's own words and not paraphrased or directly copied from online resources. You will have access the resources used via SharePoint/Teams and will be expected to continue familiarising with the systems each day outside of class. Students are expected to access Computer Science resources via Teams outside of lesson time and this is monitored throughout the year.
Key Assessment	There are two assessment periods for Year 9. These take place at the start of the Spring term, and halfway through the Summer term. Each assessment will check understanding of the units recently covered as well as their sustained understanding of previous units, building upon the Year 7 & 8 units. The self-evaluation sheets should be used as the basis of what they need to revise. These assessments will have the same number of marks across the year group, though there may be some variety in the questions depending on the progress of the individual class. They are written tests on paper and consist of three sections: Knowledge (facts), Application, Explanation. The reports are based on how each student does in comparison with the rest of the year group in these assessments.
Clear sequencing of content	Previous terminology from S3 unit: Input, Output, Process, Variables, sequence, selection, blocks/indents, condition Each of the four key concepts will use a series of tasks to get students investigate, experiment and build understanding. Each concept will make use of the previous concept and incorporate the new concept. • Objects and methods – text-based on screen then block-based with robots • Objects and properties – text-based on screen • Methods and parameters – text-based with robots Building towards: Definite iteration, indefinite iteration, subroutines

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Links to Careers	robotics or RCVs, electrical engineering, space flight control systems, software engineering, product design
Diversity and Inclusion	Encourages girls into a male-dominated industry through the hands-on experience with physical computing. Discussions around disabilities and how wearable technology can improve lifestyles.
Additional Support	SharePoint pages (text based, images and videos) Self-Assessment RAG sheets act as knowledge organisers with key questions for each lesson Small Basic Azure tutorials Paired Programming Step by step tick sheet guides are provided where we determine that the Cognitive load is too high due to working with more than two windows open Turinglab – please discuss with your teacher Year 9 mentors available one lunchtime a week upon request, or under direction if deemed necessary Good ways to revise in this unit: • Practice, lots • Read through the SharePoint pages and make flash cards of key terminology • Get friends/family to test you on definitions • Show your family what you have been working on and explain what the program is doing
Challenge	Coding club Robotics club Extension tasks – create a data selfie program, codecombat Bebras and The Coding Challenge European Coding Challenge