

NHSG Key Stage 3 Unit Overview for 8S3: Programming Concepts



Scheme of Learning	8: S3 – Programming Concepts Objects, methods, properties and parameters		 	Spring Term
End Product i.e. the learning outcome	In this unit, students should gain the ability to identify, understand and use the basics of object orientated programming: objects, methods, properties, parameters, both using a text-based language and using physical computers. They should be able to use the previous knowledge of input, process, output, sequence, and selection. Students will discover how programs can use objects that include their own mini programs and variables. This unit introduces text-based programming alongside block-based programming, while building confidence in prediction and investigation. This unit transfers students’ knowledge and understanding of basic programming concepts and applies them to a different text-based language – Small Basic and micro python			
Key Question	How do I make use of an object’s methods and properties to make efficient programs?			
Knowledge	Key concepts Recap from year 7 • Selection • Sequence • Variables • Outs and Inputs • Sensors are a type of input. • Three-part motor (start, delay, stop) New for 8S3 • Objects • Methods and parameters • Properties • A robot is made up of many objects • These physical objects have methods and properties that can be controlled • A computer will only do exactly what it has been programmed to do	Key Skills • Investigation skills • Confidence in experimentation and failure • Logic • Using block coding and micro python to code the robot to achieve an aim • Adapt and refine code to reach the end goal • Team work	Key terminology • Object • Method() • Property = • Selection • Variable • Graphics Mode • Text/console mode • Motor • (Parameter) • Rotation distance, speed	



Ongoing Assessment i.e. formative

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.

Common misconceptions that students have include:

- Objects can have any word used as a method or property
- Methods and Properties are the same thing
- Methods can be used without objects
- Methods don't have () at the end
- Property changes are relative to the current status of the object
- All Methods must have one parameter
- Digital co-ordinates start in the bottom left corner

The teacher will be monitoring, assessing progress and giving verbal feedback throughout the exercises. Concepts will be assessed using an MS form as a midway test. Teachers will make use of the assessment data from 7S3 to adapt their teaching from the start of the unit. Students are expected to make progress no matter what their starting point is and should be ready to apply what they learnt in the previous programming unit.

Students have access to the resources used via SharePoint/Teams plus Small Basic and Lego Spike Prime online and will be expected to continue with the work for 30 minutes outside of class when using Small Basic, or going over the work covered so far if working with the robots.

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

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End Product Assessment i.e. summative

This unit ends with a 40 -minute paper-based written test in the final lesson. It is a common assessment that the whole year group will be taking. The assessment has different levels of understanding and grasp of the skills. These sections are focused on knowledge (multiple choice questions), Skills and Application (short answer questions) and understanding (long answers with context).

The gradings will be calculated once all results are in. The gradings follow the report ratios:

Percentage of students	Number of students (out of 210)	Grading colour
Top 5-10%	10-21	Purple
Higher 20-30%	42-63	Blue
Middle 45-50%	94-105	Green
Lower 8-12%	16-25	Yellow
Lowest 3-6%	6-12	Orange

The assessment marks are combined with other unit grades to form each student's Best Fit grade in report seasons.

Clear sequencing of content

Previous terminology from S3 unit in Year 7:

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

Links to Careers

Graphics Illustrators (vector images), robotics or RCVs, electrical engineering, space flight control systems

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Diversity and Inclusion	Create flags from different countries as well as Pride flags. Encourages girls into a male-dominated industry through the hands-on experience with Lego robots as well as working together in teams where each role is fulfilled by a female including stereotypical roles such as the coding.
Intervention support	• SharePoint pages (text based, images and videos) • Knowledge organisers or handouts • 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 • Weekly drop-in lunchtime peer mentor help sessions – please ask your teacher for more information. We have a set of Year 10 and 12 mentors who volunteer to help students out. They have either been through the unit previously themselves or have been brought up to date to be able to help explain and demonstrate the unit content.
Challenge	Coding club Robotics club Extension tasks – create a data selfie program, codecombat Turinglab