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

| Computer Science | 8: S3 – Programming Concepts<br>Objects, methods, properties and parameters | Autumn - Spring Term |
|---|---|---|

| | | | |
|---|---|---|---|
| **Learning outcomes** | 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<br>Recap from year 7<br>• Selection<br>• Sequence<br>• Variables<br>• Outs and Inputs<br>• Sensors are a type of input.<br>• Three-part motor (start, delay, stop)<br><br>New for 8S3<br>• Objects<br>• Methods and parameters<br>• Properties<br>• A robot is made up of many objects<br>• These physical objects have methods and properties that can be controlled<br>• A computer will only do exactly what it has been programmed to do | Key Skills<br>• Investigation skills<br>• Confidence in experimentation and failure<br>• Logic<br>• Using block coding and micro python to code the robot to achieve an aim<br>• Adapt and refine code to reach the end goal<br>• Team work<br><br>Key terminology<br>• Object<br>• Method()<br>• Property =<br>• Selection<br>• Graphics Mode<br>• Text/console mode<br>• (Parameter)<br>• Rotation distance, speed | Common misconceptions:<br>• Objects can have any word used as a method or property<br>• Methods and Properties are the same thing<br>• Methods can be used without objects<br>• Methods don't have () at the end<br>• Property changes are relative to the current status of the object<br>• All Methods must have one parameter<br>• Digital co-ordinates start in the bottom left corner |

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

| | |
|---|---|
| **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.<br><br>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.<br><br>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 8. 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 units. The self-evaluation sheets should be used as the basis of what they need to revise.<br><br>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 in Year 7:<br>Input, Output, Process, Variables, sequence, selection, blocks/indents, condition<br><br>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.<br>• Objects and methods – text-based on screen then block-based with robots<br>• Objects and properties – text-based on screen<br>• Methods and parameters – text-based with robots<br><br>Building towards:<br>Definite iteration, indefinite iteration, subroutines |

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

| | |
|---|---|
| **Links to Careers** | Graphics Illustrators (vector images), robotics or RCVs, electrical engineering, space flight control systems |
| **Diversity and Inclusion** | Create flags from different countries as well as Pride flags.<br>Encourages girls into a male-dominated industry though 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. |
| **Additional Support** | SharePoint pages (text based, images and videos)<br>Self-Assessment RAG sheets act as knowledge organisers with key questions for each lesson<br>Small Basic Azure tutorials<br>Paired Programming<br>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<br>Turinglab – please discuss with your teacher<br>Year 9 mentors available one lunchtime a week upon request, or under direction if deemed necessary<br><br>Good ways to revise in this unit:<br>• Practice, lots<br>• Read through the SharePoint pages and make flash cards of key terminology<br>• Get friends/family to test you on definitions<br>• Show your family what you have been working on and explain what the program is doing |
| **Challenge** | Coding club<br>Robotics club<br>Extension tasks – create a data selfie program, codecombat<br>Bebras and The Coding Challenge<br>European Coding Challenge |