



NHSG Key Stage 3 Unit Overview for 7S3: Programming Concepts



Scheme of Learning	Computer Science 7S3 – Programming Concepts IPOSS – basic concepts		 	Spring term
Learning outcomes	<p>By the end of the unit, students should have knowledge and understanding of what an algorithm is, how an algorithm is represented using flowcharts, why sequence matters, the difference between inputs and outputs., what a variable is and how to change the direction of a program using selection.</p> <p>This unit will introduce students to the use of flowcharts for creating control programs. It will develop the student’s computational thinking skills.</p>			
Key questions	Can I create a control program for a complex system that requires the use of inputs, outputs, processes sequences and decisions?			
Knowledge What key concepts are covered? What key skills are developed? What key terminology is learned?	Key concepts <ul style="list-style-type: none">• What is an algorithm?• Flowcharts• Sequence• Inputs• Outputs• Variables• Selection Key Skills <ul style="list-style-type: none">• Building confidence in using a keyboard and mouse (extends from 7S1)• Learning the basics of flowcharts• Developing Computational Thinking• Developing visual interrogation methods• Developing error finding skills		Key terminology <ul style="list-style-type: none">• Algorithm• Flowchart• Output• Input• Variable• Assignment• Selection• Sequence• Actuator• Sensor• Loop	



Ongoing Assessment	<p>In the S3 units, we employ the use of PRIMM, which is short for the five steps of learning to program:</p> <ol style="list-style-type: none"> 1. Predict 2. Run 3. Investigate 4. Modify 5. Make <p>You will discuss a variety of different concepts and skills as a class before attempting some Modify and Make tasks. You are expected to keep notes of the concepts you learn about in the first part of the lesson using your exercise book. You are expected to put copies of your programs for the Modify and Make tasks onto the Teams live document provided to you for that lesson.</p> <p>Some lessons will have an MS forms quiz to check your understanding of what was covered in the lesson. These are not tests and you should use your classwork to help you. Where scores are low, the teacher will either check in with you and your classwork or cover it with the whole class.</p> <p>As Flowol 4 is not freely available online, you will NOT be given work that requires you to use it outside of the lesson. Where you are given homework, you will be expected to draw the symbols and flowchart.</p> <p>If you miss a lesson, please use the drop-in mentor help club on Fridays.</p>																			
Assessment	<p>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).</p> <p>The gradings will be calculated once all results are in. The gradings follow the report ratios:</p> <table> <tr> <th>Percentage of students</th><th>Number of students (out of 210)</th><th>Grading colour</th></tr> <tr> <td>Top 5-10%</td><td>10-21</td><td>Purple</td></tr> <tr> <td>Higher 20-30%</td><td>42-63</td><td>Blue</td></tr> <tr> <td>Middle 45-50%</td><td>94-105</td><td>Green</td></tr> <tr> <td>Lower 8-12%</td><td>16-25</td><td>Yellow</td></tr> <tr> <td>Lowest 3-6%</td><td>6-12</td><td>Orange</td></tr> </table>		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
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	<p>The assessment marks are combined with other unit grades to form each student's Best Fit grade in report seasons.</p>
Sequencing of content	<p>Basics of programming:</p> <ul style="list-style-type: none"> • Flowcharts • PRIMM technique • Outputs • Inputs • Variables • Sequence • Selection – simple then complex • Actuators/motors <p>These lessons build on new functions each time and introduce new concepts and how they are applied in Flowol.</p> <p>These concepts are then built upon in 8S3 and 9S3 but using text-based programming languages and practical programming.</p>
Links to Careers	<p>Software development, particularly in numerical industries including engineering.</p> <p>Robotics, smart device functions.</p>
Support	<ul style="list-style-type: none"> • SharePoint pages (text based, images and videos) • Knowledge organisers or handouts • 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 8 and 9 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. <p>For those who only attain Orange in the end of unit assessment will be given the opportunity to receive peer mentoring for 5 weeks with a focus on going over their weak areas. In the sixth week</p>

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	<p>they will take a shorter 20-minute assessment. Their percentage on this will update their end of unit grade and be taken forward into their report grade.</p> <p>https://projects.raspberrypi.org/en/projects/hello-world/0</p>
Further challenge	<p>Coding Club</p> <p>TuringLabs – Farmbot and SmartCities</p> <p>https://projects.raspberrypi.org/en/projects/astro-pi-mission-zero</p> <p>www.flowgorithm.org</p>