

## 2022-2023 Year 9 Curriculum and Assessment Plan for Computing

**The curriculum and assessment of pupils at this stage of education has been carefully designed to**

Support all students no matter which pathway they choose to pursue after year 9. The units will cover computer science, information technology and digital literacy and will prepare students who will continue to study computing in year 10 either with the GCSE or BTEC. The curriculum will also support students who will choose neither and will prepare them to continue to use computing both in the outside world and within their other subjects. The curriculum and assessment will build on the previous ones they have studied in year 7 and year 9 allowing them to further expand the knowledge they have developed in the previous curriculums.

<b>Half Term 1:</b>	<b>Subject specific skills being developed:</b>	<b>Half Term 2:</b>	<b>Subject specific skills being developed:</b>	<b>Half Term 3:</b>	<b>Subject specific skills being developed:</b>
<p><b>All pupils will know:</b></p> <p>Computational Thinking (CS)</p> <p><b>All pupils will be assessed by:</b></p> <p>Algorithms and online assessments</p> <p><b>Impact- Why do we teach this?</b></p> <p>This unit will introduce students to the concept of computational thinking explaining how a computer "thinks". They will look at 4 different areas including Decomposition, Abstraction, Pattern Recognition and Algorithms. These fundamentals are some of the building blocks of computer science. Understanding these and their relation to computers will allow students to better understand the workings of a computer and will allow them improve other skills such as programming and data representation.</p> <p>These are units that can benefit all students including those choosing to further study it in year 10 or those that don't. The unit is covered at GCSE so will prepare those students, but it will also teach them how to plan and solve problems effectively and efficiently. Problem solving is a skill that all students can use within school and once they have finished their education.</p>	<ul style="list-style-type: none"> <li>understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem</li> <li>develop and apply their analytic, problem-solving, design, and computational thinking skills</li> </ul>	<p><b>All pupils will know:</b></p> <p>Python Intermediate (CS/DL)</p> <p><b>All pupils will be assessed:</b></p> <p>Online assessments.</p> <p><b>Impact - Why do we teach this?</b></p> <p>At KS3 students should be taught to: Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions. Students' digitally literacy is further developed by enabling them to use, express themselves, and develop their ideas through information technology, which will be progressively built on in subsequent years to reach a level suitable for the future workplace and as active participants in a digital world. Expanding their knowledge and application of data types builds on that basic knowledge and understanding acquired in Year 8 and prepare them for KS4 Computer Science. Students have combined inputs and outputs; they will move onto how this can be done with the use of secondary storage. Storage is a theory topic in KS4 Computer Science and students will carry their coding skills on to the next level to create code for a given scenario, enhancing the skills. The practical use of variables and user inputs is further advanced by students' use of validation and verification. Students build an awareness of incorrect/invalid data and how this could affect the smooth running of their code. Whilst engaging in programming, students will have encountered obstacles in the form of errors. They have learnt about language syntax of Python, and how not adhering to the syntax rules leads to syntax errors. Students should now be identifying logical errors and run-time errors and how to correct them. Their programming skill set, progressively built on over KS3, will give them the building blocks for KS4 Computer Science.</p>	<ul style="list-style-type: none"> <li>develop and apply their analytic, problem-solving, design, and computational thinking skills</li> <li>design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</li> <li>Using a computer language to solve a variety of computational problems</li> <li>design and develop modular programs that use procedures or functions</li> </ul>	<p><b>All pupils will know:</b></p> <p>Data Representation (CS/IT)</p> <p><b>All pupils will be assessed:</b></p> <p>Performing calculations, application of number systems and online assessments.</p> <p><b>Impact - Why do we teach this?</b></p> <p>Data representation teaches students how computers store and execute data. This allow them to gain a clearer picture as to what data is and how a computer manages and manipulates it. All students will use computers in their everyday life, this unit will help them understand how the storage on their devices works.</p> <p>They will look at how to convert denary numbers to binary numbers and be able to perform the conversions themselves using their numeracy skills. This will inform students about the use of binary will expand on their knowledge about the architecture of computers and how they are able to process at the speeds they do. They will also look at digital artefacts, such as images, sound and video files and will learn how computers represent these and are able to compress them.</p> <p>This is a core fundamental of computing and allows students to expand their knowledge of everyday computers. This understanding will then help students to be more confident users of computers.</p>	<ul style="list-style-type: none"> <li>Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]</li> <li>Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits</li> </ul>
	<p><b>Reading Skills needed for this unit:</b></p> <p><b>Key Vocabulary:</b></p> <p>Decomposition, pattern recognition, abstraction, algorithms, pseudocode, flowchart</p>		<p><b>Reading Skills needed for this unit:</b></p> <p><b>Key Vocabulary:</b></p> <p>Sequence, selection, iteration, variable, operator, assignment, integer, string, casting</p>		<p><b>Reading Skills needed for this unit:</b></p> <p><b>Key Vocabulary:</b></p> <p>Binary, denary, number system, pixel, bit, byte, resolution, colour depth, file size, ASCII, Unicode</p>

	<p><b>Opportunity for cross-curricular skill development</b></p> <ul style="list-style-type: none"> <li>Numeracy – Algorithms, number systems and units of measure in Computer Science, and network protocols</li> <li>All subject – Problem solving. The ability to be able to plan and work through tasks as effectively as possible.</li> </ul>		<p><b>Opportunity for cross-curricular skill development</b></p> <ul style="list-style-type: none"> <li>All subjects – Print layout formatting, formatting.</li> <li>Maths – Number (</li> <li>English – Writing (considering how their writing reflects the audiences and purposes for which it was intended)</li> <li>D&amp;T – Technical Knowledge</li> </ul>		<p><b>Opportunity for cross-curricular skill development</b></p> <ul style="list-style-type: none"> <li>Numeracy – Algorithms, number systems and units of measure in Computer Science</li> <li>D&amp;T – Technical Knowledge</li> </ul>
<p><b>Half Term 4:</b></p> <p><b>All pupils will know:</b></p> <p>Computer Networks and the Internet (CS/IT)</p> <p><b>All pupils will be assessed:</b></p> <p>Online assessments.</p> <p><b>Impact - Why do we teach this?</b></p> <p>Most people will now spend most of their day connected to a network, whether that be at work, school or home. This unit will introduce the basic concept of what a network is to the students allowing their confidence with the use of networks develop.</p> <p>They will learn about different types of networks and the architecture behind them. They will also discuss the benefits of networks and the drawbacks. This will help them to become safer users online, informing them of the best way they can use them. They will look at the basic structure of the standard network at home.</p> <p>This will introduce to them performance issues and any areas of security risk. This will be recognisable to them and will allow them to become much more confident users. Similar to other units this will not only benefit students hoping to choose it as an option, but also any students who don't as many will regularly interact with networks everyday.</p>	<p><b>Subject specific skills being developed:</b></p> <ul style="list-style-type: none"> <li>evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</li> <li>understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems</li> </ul>	<p><b>Half Term 5:</b></p> <p><b>All pupils will know:</b></p> <p>Computing Today (CS/DL/IT)</p> <p><b>All pupils will be assessed:</b></p> <p>Online assessment</p> <p><b>Impact - Why do we teach this?</b></p> <p>This unit will allow students to create a podcast using sound editing software, giving them the opportunity to explore different applications that they may not have used previously. This will allow for a more practical unit which will expand on their knowledge of IT, digital literacy and using computers.</p> <p>The content of the unit will be focussed on Computing Today. This will look at the ever-changing world of computer science and what current innovations are currently being developed. The content for this will be constantly monitored and updated to ensure it is current.</p> <p>The students will be expected to research some of the most popular current developments within computing, supporting them to become inquisitive and enabling their research skills. This will support students to become more familiar with the world of computing and can see where all the units they have worked through since year 7 are heading towards.</p>	<p><b>Subject specific skills being developed:</b></p> <ul style="list-style-type: none"> <li>evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</li> <li>create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</li> <li>understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.</li> </ul>	<p><b>Half Term 6:</b></p> <p><b>All pupils will know:</b></p> <p>Business Documents (DL) and Advanced E-Safety (CS/IT.DL)</p> <p><b>All pupils will be assessed:</b></p> <p>Creation of various business documents and online assessments.</p> <p><b>Impact- Why do we teach this?</b></p> <p>This unit will focus on students' skills with using more common applications such as word processors and spreadsheets. This will help all students moving into KS4 with writing reports, storing data and creating presentations. It will also help them beyond education by giving them skills that could be used in many working environments.</p> <p>It will help students gain more knowledge and confidence with their IT and digital literacy skills. They will also look at e-safety and will progress what they have learnt from their year 7 and 8 e-safety project. The vast majority of students will continue to use many forms of computers beyond their computing lessons, learning about the importance of staying safe online and being good digital citizens is vital for all of them.</p>	<p><b>Subject specific skills being developed:</b></p> <ul style="list-style-type: none"> <li>undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</li> <li>understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.</li> </ul>

	<p><b>Reading Skills needed for this unit:</b> <b>Key Vocabulary:</b></p> <p>Hub, switch router, IP address, MAC address, topology, LAN, WAN, data packets, fibre optic, Ethernet</p>		<p><b>Reading Skills needed for this unit:</b></p> <p><b>Key Vocabulary:</b></p> <p>Artificial Intelligence, Internet of Things, Smart Cities, Wearable Technology, Cryptocurrency,</p>		<p><b>Reading Skills needed for this unit:</b></p> <p><b>Key Vocabulary:</b></p> <p>Formatting, alignments, font, margins, Column, row, cell, cell reference, absolute cell reference, value, label, function, formulae, Age restrictions, safe, respectful, responsible and secure, online identity, privacy; inappropriate content</p>
	<p><b>Opportunity for cross-curricular skill development</b></p> <ul style="list-style-type: none"> <li>• D&amp;T – Technical Knowledge</li> <li>• Science – Analysis and evaluation</li> </ul>		<p><b>Opportunity for cross-curricular skill development</b></p> <ul style="list-style-type: none"> <li>• D&amp;T – Technical Knowledge</li> <li>• Maths – numeracy and how computers process</li> </ul>		<p><b>Opportunity for cross-curricular skill development</b></p> <ul style="list-style-type: none"> <li>• All subjects – Print layout formatting, formatting.</li> <li>• Maths – Number</li> <li>• English – Writing</li> </ul>
<p><b>Ensuring this curriculum meets the needs of all pupils:</b> this curriculum has been designed to ensure pupils from all starting points will develop the key curriculum skills and knowledge identified. The curriculum design ensures that each unit forms part of the overall learning journey and there are opportunities for revisiting skills and linking together key pieces of knowledge. Whole Academy policies and practices are followed to tailor the delivery of the curriculum for individuals and groups of students. For example SEND students have individual learning profiles that outline needs/strategies to be used, Ongoing formative assessment and clear summative assessment points allow individual staff and departments to identify misconception and adjust curriculum appropriately.</p>					
<p><b>Enrichment opportunities:</b></p> <ul style="list-style-type: none"> <li>• Coding Club</li> <li>• Visits/Trips</li> </ul>					
<p><b>Career opportunities/ links:</b> Software engineer / Software development / Data Analysis / Network Engineer / Cloud Computing / Administration / Data Manager</p>					