Long Term Plan KS3 Computing - Year 8

Half term	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Link to subject ethos and driver	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers	SMSC & British Values	Cultural Capital	Career Link
HT1	Programming in Python: Sequence	Understand a range of basic programming constructs in Python Know how to print to the screen, perform calculations, take inputs and store them in suitably named variables	**Develop** working programs in Python to solve specific problems. **Analyse** the requirements of a program **Identify** the processes needed to solve a problem **Design** programs in Python to solve specific problems **Use** Python to confidently write simple programs	Logical reasoning Computational thinking can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems	Syntax and logical errors Students should be encouraged to 'find' errors in their work and test regularly	There is no requirement for students to have used Python before, although prior knowledge of code may be useful. Students will be performing calculations in Python so an understanding of basic arithmetic operators (addition, subtraction, multiplication and division is needed). In Y7 the students will have used scratch	Programming links to the KS4 computing curriculum. NC outcomes: develop and apply their analytic, problem-solving, design, and computational thinking skills develop their capability, creativity and knowledge in computer science, digital media and information technology	Challenge tasks will be built into lessons - refer to MTP, In this unit, students will be encouraged to show additional skills when they develop their code.	Rule of Law is taught through lesson themes as well with school rules also being adhered to and considered at all times. Individual Liberty – It is important to have students understand their freedoms as well as knowing how these fit in with the school ethos. Students will know their rights as individuals and will know both what to	We encourage students to read newspapers We encourage students to watch the news Current affairs are incorporated into lessons Make links to 'real life' examples	Computer programmer NC Link Use two or more programming languages, a 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)

					(block based coding) KS2: use sequence, selection, and repetition in programs; work with variables and various forms of input and output Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems, solve problems by decomposing them into smaller parts				expect and what is expected of them. Mutual respect for tolerance of those with different faiths and beliefs, and for those without faith is important Resilience is taught through the lessons when students are pushed to achieve their best, moving out of their perceived limits at times and getting the deserved rewards as a result.		
HT2	Advanced spreadsheets	- Recap on Basic spreadsheet skills from Y7. - - Understand the structure and use of a range of more advanced functions	**Use** a range of more advanced functions within spreadsheets. **Use** validation within spreadsheets to minimise user error.	Progress in computing key topics - application software Progress in computing key topics - data Analyse problems	Basic recap will be needed, e.g. formulas start with =, * is multiply etc. Students may need help removing filters once	KS2 outcome: select, use and combine a variety of software (including internet services) on a range of digital devices to design and	In Y9 students will further develop their spreadsheet skills in the Encryption unit. . This will be built on further at KS4 should	Explaining and analysing. Evaluation Alternative solutions	Resilience is taught through the lessons when students are pushed to achieve their best, moving out of their perceived limits at times and	We encourage students to read newspapers We encourage students to watch the news Current	Link to business and how businesses might use spreadsheets. *Map to NC outcomes design, use and evaluate computational

Objectives	Skills	Computational terms	Graphs/charts	Programs	IT option	Rewards	Respect	Real life	Abstractions
- Understand how to use validation to create dropdown lists - Know how to sort data and run simple queries - Understand the use of macros to automate processes and know how to record, edit and assign macros.	**Develop** and use macros to automate aspects of spreadsheets. **Identify** the most appropriate functions to use when developing a spreadsheet for a particular purpose. **Design** spreadsheets for a range of purposes making use of a range of more advanced functions. **Use** spreadsheets to handle data in a variety of situations proficiently. **Interpret** data from spreadsheets. Problem solving Manipulating data independently Trial and error Computational	in computational terms Apply K&U of the key concepts and principles of computing Develop confident and responsible use of modern information technologies	applied. Graphs/charts - titles.	create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information In Y7 students will have learnt basic formulas, cell referencing, and the SUM, MIN , MAX, AVERAGE, COUNT and IF Functions. They will also have created charts.	they choose IT as an option.		getting the deserved rewards as a result. Mutual respect for tolerance of those with different levels of understanding and knowledge - peer support.	affairs are incorporated into lessons Make links to 'real life'	abstractions that model the state and behaviour of real-world problems and physical systems 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 Understand simple Boolean logic (for example, AND, OR and NOT) and some of its uses in circuits and programming Use two or more programming

			thinking - logic - predicting, analysing Mathematical operators Resilience								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).
HT3	Algorithms	Understand the concepts of abstraction, decomposition, pattern recognition and algorithms Know how to read and develop flow diagrams	**Use** the principles of abstraction and decomposition to produce algorithms to solve a range of problems **Write** flow diagrams to sequence the steps involved in completing a task **Analyse** different approaches to solving problems **Design** algorithms to solve a range of computational problems	Progress in computing key topics Algorithms Analyse problems in computational terms Data Plan creative solutions to problems Apply K&U of the key concepts and principles of computing Develop	Flowchart shapes Mathematical skills - e.g. patterns	KS2 outcomes: use sequence, selection, and repetition in programs; work with variables and various forms of input and output use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	Links to the KS4/5 IT and Computing curriculums	Challenge work will be built into lessons. Students will attempt more complex tasks and may design more detailed flow diagrams	Resilience is taught through the lessons when students are pushed to achieve their best, moving out of their perceived limits at times and getting the deserved rewards as a result. Mutual respect for tolerance of those with different levels of understanding and knowledge - peer support. From an environment	We encourage students to read newspapers We encourage students to watch the news Current affairs are incorporated into lessons Make links to 'real life'	Roles within computing and mathematics *NC statements Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems Understand several key algorithms that reflect computational thinking (for example, ones for sorting and searching); use logical

				confident and responsible use of modern information technologies Logical reasoning Computational thinking can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems					al standpoint students are encouraged to understand the ways that computer systems and parts can be recycled, reused and have extended lives. The understanding of environmental impacts is taught through lesson themes.		reasoning to compare the utility of alternative algorithms for the same problem Design and develop modular programs that use procedures or functions
HT4	Programming in Python: Selection	Know and understand the key concepts and principles of Computing: Understand how to use selection in Python Understand how to use condition-controlled loops in Python	**Apply** knowledge and understanding of the key concepts and principles of Computing: Develop working programs in Python to solve a range	Problem solving Planning Logical reasoning Computational thinking Can	Boolean operators Spaces in IF statements Code syntax errors	No prior learning is required although familiarity with the terminology and concepts covered by the *Programming in Scratch* and	Programming links to the KS4 computing curriculum. NC outcomes: develop and apply their analytic, problem-solving, design,	Challenge tasks will be built into lessons - refer to MTP, In this unit, students will be encouraged to show additional skills when	Rule of Law is taught through lesson themes as well with school rules also being adhered to and considered at all times.	We encourage students to read newspapers We encourage students to watch the news Current	Computer programmer Use two or more programming languages, a least one of which is textual, to solve a variety of computational

				of problems	analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems		*Programming in Python: sequence* modules will be useful but not essential.	and computational thinking skills	they develop their code.	Individual Liberty – It is important to have students understand their freedoms as well as knowing how these fit in with the school ethos. Students will know their rights as individuals and will know both what to expect and what is expected of them.	affairs are incorporated into lessons	problems.
				Analyse problems in computational terms:				develop their capability, creativity and knowledge in computer science, digital media and information technology			Make links to 'real life' examples	Make appropriate use of data structures (for example, lists, tables or arrays)
				Analyse the requirements of a program								
				Identify the processes needed to solve a problem								Understand simple Boolean logic (for example, AND, OR and NOT) and some of its uses in circuits and programming
				Plan creative solutions to problems								
				Design programs in Python to solve a range of problems						Mutual respect for tolerance of those with different faiths and beliefs, and for those without faith is important		
				Develop confident and responsible use of modern information technologies								
				Use Python confidently to write a wider range of programs.						Resilience is taught through the lessons when students are pushed to achieve their best, moving out of their perceived limits at		

									times and getting the deserved rewards as a result.		
HT5	Internet safety, cyber protection and encryption	By the end of this module, students should be able to: **Know and understand** the key concepts and principles of Computing: Understand a range of malware and the effects they have Know what precautions to take to maintain safety online Understand the role of encryption in maintaining safety online Know about a range of ciphers	**Apply** knowledge and understanding of the key concepts and principles of Computing: Demonstrate safe practices when using the Internet Use a range of ciphers to encrypt and decrypt text Develop confident and responsible use of modern information technologies Use computer systems safely and confidently	Students show respect towards each other, their teacher and the wider community. Students exhibit wisdom when they know what they have done in a context of where that will lead to, with high levels of engagement through a passion for learning and a level of challenge. Students are happy and demonstrate a hunger for learning and courage to attempt	Rights as a data subject. The value of personal data to companies. Possible consequences of security breaches. The difference between firewalls and anti-virus software. Ethics - e.g. different hat hackers.	KS2 – The Internet Communication Students have also covered Privacy and security briefly in Y7/8. KS2 outcome - use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact	KS4 - BTEC Tech Award DIT Component 3: Effective Digital Working Practices KS4 computing curriculum. *Note - this is also currently taught in Y8, but as the students are using Boost now this is new to both year groups.	Further research and understanding of the laws surrounding privacy and security.	From an environmental standpoint students are encouraged to understand the ways that computer systems and parts can be recycled, reused and have extended lives. The understanding of environmental impacts is taught through lesson themes. Democracy is something students will learn about and will know how to treat others fairly and how to make things work for the whole class as well as the individual. Rule of Law	We encourage students to read newspapers We encourage students to watch the news Current affairs are incorporated into lessons Make links to 'real life'	Link to careers in cybersecurity. NC link: 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.

				new tasks and complete current ones. Misconcept ions are corrected and challenged at an appropriate level.					is taught through lesson themes as well with school rules also being adhered to and considered at all times. Individual Liberty – It is important to have students understand their freedoms as well as knowing how these fit in with the school ethos. Students will know their rights as individuals and will know both what to expect and what is expected of them. Mutual respect for tolerance of those with different faiths and beliefs, and for those without faith		

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HT6	Binary and Computer Logic	**Know** and **understand** the key concepts of computing: Understand binary and why it is used in computing Know how to convert between denary and binary Understand how binary is used to encode text and images Understand the concept of AND, OR and NOT gates and their use in computing programs	**Apply** knowledge and understanding of the key concepts and principles of computing Carry out binary/denary conversions Encode and decode text and images in binary **Analyse** problems in computational terms Identify the output from simple logic circuits	Mathematical skills Logical reasoning Computational thinking Problem solving	Possible confusion over logic gates and truth tables	Students should have a solid grounding in the way place value works in the denary system (units, tens, hundreds, thousands, etc). (KS2 Mathematics) Students should be able to write an algorithm; completing the Algorithms module will prepare them for this	Programming links to the KS4 computing curriculum. NC outcomes: develop and apply their analytic, problem-solving, design, and computational thinking skills develop their capability, creativity and knowledge in computer science, digital media and information	Development of app in lessons 2 and 3 GCSE style questions for other lessons can be used as challenge work.	Rule of Law is taught through lesson themes as well with school rules also being adhered to and considered at all times. Individual Liberty – It is important to have students understand their freedoms as well as knowing how these fit in with the school ethos. Students will	We encourage students to read newspapers We encourage students to watch the news Current affairs are incorporated into lessons Make links to 'real life' examples	Link to careers in maths and computer science NC links - 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).

| | | | Plan creative solutions to problems

Design an app to meet a brief | | | module.

Students should be able to use Scratch; completing the Programming in Scratch module will prepare them for this module. | technology | | know their rights as individuals and will know both what to expect and what is expected of them.

Mutual respect for tolerance of those with different faiths and beliefs, and for those without faith is important

Resilience is taught through the lessons when students are pushed to achieve their best, moving out of their perceived limits at times and getting the deserved rewards as a result. | | 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 |

Skills developed throughout the programme

Cognitive skills
● Non-routine problem solving – expert thinking, metacognition, creativity.
● Systems thinking – decision making and reasoning.
● Critical thinking – definitions of critical thinking are broad and usually involve general cognitive skills such as analysing, synthesising and reasoning skills.
● ICT literacy – access, manage, integrate, evaluate, construct and communicate.

Interpersonal skills
● Communication – active listening, oral communication, written communication, assertive communication and non-verbal communication.
● Relationship-building skills – teamwork, trust, intercultural sensitivity, service orientation, self-presentation, social influence, conflict resolution and negotiation.
● Collaborative problem solving – establishing and maintaining shared understanding, taking appropriate action, establishing and maintaining team organisation.

Intrapersonal skills
● Adaptability – ability and willingness to cope with the uncertain, handling work stress, adapting to different personalities, communication styles and cultures, and physical adaptability to various indoor and outdoor work environments.
● Self-management and self-development – ability to work remotely in virtual teams, work autonomously, be self-motivating and self-monitoring, willing and able to acquire new information and skills related to work.