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	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	**Apply** knowledge and understanding of the key concepts and principles of Computing: Demonstrate safe practices when using the Internet	Students show respect towards each other, their teacher and the wider community. Students exhibit	Rights as a data subject. The value of personal data to companies. Possible consequences of security breaches.	KS2 – The Internet Communication Students have also covered Privacy and security briefly in Y7/8.	KS4 - BTEC Tech Award DIT Component 3: Effective Digital Working Practices	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	We encourage students to read newspapers We encourage students to watch the news Current	Link to careers in cybersecurity. NC link: understand a range of ways to use technology safely, respectfully, responsibly

			Know what precautions to take to maintain safety online Understand the role of encryption in maintaining safety online Know about a range of ciphers	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	wisdom when they know what they have done in a context of where that will lead to, with high levels of engageme nt through a passion for learning and a level of challenge. Students are happy and demonstrat e a hunger for learning and courage to attempt new tasks and complete current ones. Misconcept ions are corrected and challenged at an appropriate level.	The difference between firewalls and anti-virus software. Ethics - e.g. different hat hackers.	KS2 outcome - use technology safely, respectfully and responsibly; recognise acceptable/u nacceptable behaviour; identify a range of ways to report concerns about content and contact	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.		have extended lives. The understandin g of environment al 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 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	affairs are incorporated into lessons Make links to 'real life'	and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.

									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 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.		

| HT3 & 4 | Revision, KS3 Assessments and DIRT

Algorithms | Revision

KS3 Assessments

DIRT

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 confident and responsible use of modern information technologies

Logical reasoning

Computational thinking | 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 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 | 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 reasoning to compare the utility of alternative algorithms for the same problem

Design and develop modular programs that use procedures or functions |

				can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems					environmental impacts is taught through lesson themes.		
HT5	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 of problems **Analyse** problems in computational terms: Analyse the requirements of a program Identify the processes needed to solve a problem	Problem solving Planning 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	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 in Python: sequence* modules will be useful but not essential.	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	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 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) Understand simple Boolean logic (for example, AND, OR and NOT) and

			Plan creative solutions to problems						individuals and will know both what to expect and what is expected of them.		some of its uses in circuits and programming
			Design programs in Python to solve a range of problems								
			Develop confident and responsible use of modern information technologies						Mutual respect for tolerance of those with different faiths and beliefs, and for those without faith is important		
			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.		
HT6	Advanced spreadsheets	- Recap on Basic spreadsheet skills from Y7. - - Understand the structure and use of a range of	**Use** a range of more advanced functions within spreadsheets. **Use** validation within spreadsheets	Progress in computing key topics - application software Progress in computing key topics - data	Basic recap will be needed, e.g. formulas start with =, * is multiply etc. Students may need	KS2 outcome: select, use and combine a variety of software (including internet services) on a range of	In Y9 students will further develop their spreadsheet skills in the Encryption unit. .	Explaining and analysing. Evaluation Alternative solutions	Resilience is taught through the lessons when students are pushed to achieve their best, moving out of their	We encourage students to read newspapers We encourage students to watch the	Link to business and how businesses might use spreadsheets. *Map to NC outcomes

			more advanced functions - 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.	to minimise user error. **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	Analyse problems in computational terms Apply K&U of the key concepts and principles of computing Develop confident and responsible use of modern information technologies	help removing filters once applied. Graphs/charts - titles.	digital devices to design and 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.	This will be built on further at KS4 should they choose IT as an option.		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.	news Current affairs are incorporated into lessons Make links to 'real life'	design, use and evaluate computational 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 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).
			Trial and error Computational thinking - logic - predicting, analysing Mathematical operators Resilience								

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.