Long Term Plan KS3 Computing - Year 9

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	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.	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	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	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.

				Students are happy and demonstrate a hunger for learning and courage to attempt new tasks and complete current ones. Misconceptions are corrected and challenged at an appropriate level.		content and contact			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 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.		
HT2	Advanced spreadsheets	- Recap on Basic spreadsheet skills from Y7. - - Understand the structure and use of a range of more advanced functions - Understand how to use validation to	**Use** a range of more advanced functions within spreadsheets. **Use** validation within spreadsheets to minimise user error. **Develop** and use macros to automate aspects of	Progress in computing key topics - application software Progress in computing key topics - data Analyse problems in computational terms Apply K&U	Basic recap will be needed, e.g. formulas start with =, * is multiply etc. Students may need help removing filters once applied. Graphs/charts - titles.	KS2 outcome: select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and	In Y9 students will further develop their spreadsheet skills in the Encryption unit. . This will be built on further at KS4 should they choose IT as an option.	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 getting the deserved rewards as a result.	We encourage students to read newspapers We encourage students to watch the news Current affairs are incorporated into lessons	Link to business and how businesses might use spreadsheets. *Map to NC outcomes design, use and evaluate computational abstractions that model the state and

			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.	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 thinking - logic - predicting, analysing	of the key concepts and principles of computing Develop confident and responsible use of modern information technologies		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.			Mutual respect for tolerance of those with different levels of understanding and knowledge - peer support.	Make links to 'real life'	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

			Mathematical operators\n\nResilience								which is textual, to solve a variety of computational problems. Make appropriate use of data structures (for example, lists, tables or arrays).
HT3 & 4	Revision\n\nKS3 assessments 1\n\nDIRT\n\nAlgorithms	Revision\n\nKS3 Assessments 1\n\nDIRT\n\nUnderstand the concepts of abstraction, decomposition, pattern recognition and algorithms\n\nKnow how to read and develop flow diagrams	**Use** the principles of abstraction and decomposition to produce algorithms to solve a range of problems\n\n**Write** flow diagrams to sequence the steps involved in completing a task\n\n**Analyse** different approaches to solving problems\n\n**Design** algorithms to solve a range of computational problems	Progress in computing key topics\n\nAlgorithms\n\nAnalyse problems in computational terms\n\nData\n\nPlan creative solutions to problems\n\nApply K&U of the key concepts and principles of computing\n\nDevelop confident and responsible	Flowchart shapes\n\nMathematical skills - e.g. patterns	KS2 outcomes:\n\nuse sequence, selection, and repetition in programs; work with variables and various forms of input and output\n\nuse 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.\n\nStudents 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.\n\nMutual respect for tolerance of those with different levels of understanding and knowledge - peer support.\n\nFrom an environmental standpoint students are	We encourage students to read newspapers\n\nWe encourage students to watch the news\n\nCurrent affairs are incorporated into lessons\n\nMake links to 'real life'	Roles within computing and mathematics\n\n*NC statements\n\nDesign, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems\n\nUnderstand several key algorithms that reflect computational thinking (for example, ones for sorting and searching); use logical reasoning to compare the

				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					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.		utility of alternative algorithms for the same problem Design and develop modular programs that use procedures or functions
HT5	Program ing in Python: Selectio n	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	Problem solving Planning Logical reasoning Computational thinking Can analyse problems in computational terms, and have repeated	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	Programming links to the KS4 computing curriculum. NC outcomes: develop and apply their analytic, problem-solving, design, and computational thinking skills	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	We encourage students to read newspapers We encourage students to watch the news Current affairs are incorporated into lessons	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

| | | | | computational terms:

Analyse the requirements of a program

Identify the processes needed to solve a problem

Plan creative solutions to problems

Design programs in Python to solve a range of problems

Develop confident and responsible use of modern information technologies

Use Python confidently to write a wider range of programs. | practical experience of writing computer programs in order to solve such problems | | not essential. | develop their capability, creativity and knowledge in computer science, digital media and information technology | | 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 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. | Make links to 'real life' examples | structures (for example, lists, tables or arrays)

Understand simple Boolean logic (for example, AND, OR and NOT) and some of its uses in circuits and programming |

| 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

Plan creative solutions to problems

Design an app to meet a brief | Mathematic al skills

Logical reasoning

Computatio nal 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 module.

Students should be able to use Scratch; completing the Programming in Scratch module will prepare them for this module. | Programming links to the KS4 computing curriculum.

NC outcomes: develop and apply their analytic, problem-solvi ng, design, and computationa l thinking skills

develop their capability, creativity and knowledge in computer science, digital media and information technology | 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.

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

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 |

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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.