Year 9 Summer Term
'An ambitious curriculum that meets the needs of all'

Medium Term Planning – Computational Thinking and Data Representation

Curriculum Intent	In addition to working further on objectives from Year __, pupils will be taught, following National Curriculum guidelines, the following this term:
Skills/National Curriculum Links	Computing – KS3 Key stage 3 Pupils should be taught to: • 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 • 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 • 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] • understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems • 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 • 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 • create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability • understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognize inappropriate content, contact and conduct and know how to report concerns.
Numeracy	Logic gates, hexadecimal, binary, denary, integer, operators AND, NOT, OR
Literacy	**Vocabulary Tier 2:** Instructions, manageable, expression, diagrams, destination **Vocabulary Tier 3:** Logical thinking, logic, Boolean operators, AND, OR, NOT, logic gates, AND gate, OR gate, NOT gate, algorithm, sequence, Venn diagram, truth table, circuit, loop, nested loop, binary tree, abstraction, network, abstraction, decomposition, pixels, ASCII, nodes, edges, packets, source **Reading:** Presentations, worksheets, and homework **Writing:** complete worksheets and skill task **Oracy:** learn how to pronounce difficult or new keywords **SMSC:** Understand identity theft, how the online world can be fun but dangerous if not used sensibly **PSHE:** Understand how the economy is impacted by cyber crime **Careers:** Cyber security **Literacy:** literacy slide will provide a definition of the keyword, antonym and synonym
Adaptation **QFT/SEND Provision**	Throughout this topic, quality first teaching will provide differentiation: **By product:** Learning will produce work on a variety of different levels, a mix of individual, think pair share, designing original maters, Q&A with teacher, teacher marking and self-marking. **By resource:** presentations, worksheets with extension tasks **By Intervention:** by providing different levels of supervision/support, seating plan, use of TA **By Progressive Questioning:** exploring pupils' understanding through interactive dialogue. **By Grouping:** according to prior attainment, gender, social preference, preferred learning style. **By Task:** Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range. **By Offering Optional Activities:** In class or as homework, to extend learning. This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.

Implementation Curriculum Delivery	To be able to:		
Learning Outcomes (Knowledge)	Computational Thinking	Logic thinking	Be able to ask logical questions to solve problems using images Know the common Boolean operators: AND OR NOT Understand how Boolean operators can be represented in written expressions.
		Logic gates	Understand how logic is used in different situations Know different logic gates including: AND gates OR gates NOT gates Be able to complete truth tables for logic gates and circuits with up to three inputs
		Algorithm thinking 1	Understand what an algorithm is Create a sequence of instructions to achieve a goal Understand how loops can be used to reduce the amount of code required for a solution Understand how nested loops can be used to improve solutions further Be able to refine algorithms to reduce the number of instructions required
		Algorithm thinking 2	Understand the difference between lossy and lossless compression Be able to use an algorithm to communicate data Understand how the algorithm can be improved Use a binary tree to further improve the algorithm Understand why compression is needed for video transmission and photo storage
		Abstraction	Understand how abstractions are used in everyday life Be able to create abstractions for different purposes Understand how networks are used to make an abstraction of a maze Understand network (graph) theory terms including: Nodes Edges
		Decomposition	Understand how decomposition can be used to break down problems into more manageable components Be able to break down a large Computing problem into its parts and understand: how images are converted to binary using pixels how text is converted to binary using ASCII how data is broken up into packets how data is sent through a network
Current learning to be developed in the future within:	This will support pupils to write programs in Python in year 9 and links back to year 7 data representation when learning about binary, denary and adding binary numbers, in year 8 this was recapped and added to with hexadecimal and this is being developed in year 9 with logic gates.		
Assessment	• Refer to assessment maps for formative and summative assessment opportunities.		
Impact	• Learning will be tested during **<u>Summative Assessment 1</u>** • Assessment results will indicate pupils emerging, developing, securing or mastering. • Data review documentation will indicate if pupils are underachieving, meeting or exceeding MEG grade.		

- In line with the departmental marking policy, quality written feedback will be provided for the s
  marked piece