



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

Medium Term Planning – Python Programming & Algorithms

Curriculum Intent	<p align="center">In addition to working further on objectives from Year __, pupils will be taught, following National Curriculum guidelines, the following this term:</p>
Skills/National Curriculum Links	<p>Computing – KS3 Key stage 3 Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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	<p>Operators != == < <= > >= BIDMAS + / * - // %</p>
Literacy	<p>Vocabulary Tier 2: program, code, BIDMAS Vocabulary Tier 3: Integrated development, IDLE, interactive mode, Script mode, variable, string, syntax, assignment statement, augmented assignment operator, data type, integer, float, round, selection, sequence, iteration, module, function, syntax error, logic error, debug, binary search 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 programming is being used in everyday life Careers: Data analysis, software programmers, E-commerce, working in banks etc.. Literacy: literacy slide will provide a definition of the keyword, antonym and synonym</p>
Adaptation	<p>Throughout this topic, quality first teaching will provide differentiation:</p>
QFT/SEND Provision	<p>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.</p>

Implementation Curriculum Delivery

To be able to:
This SOW is currently being adapted and updated to incorporate searching and sorting algorithms.



Learning Outcomes (Knowledge)

Introduction to Python	Strings print function	Know what Python is and some of the applications it is used for Run a simple Python program in Interactive mode using the print function Write, save and run a program in Script mode Understand what a syntax error is
	Variables	Know the rules for variable names Use variables in a program Use + concatenation Use # to make comments Use index []
	Arithmetic	Perform arithmetic using the BIDMAS rule Write a program involving input, calculation and output
	Data Types	Understand the importance of using correct data types: string, integer or float Use the integer, float and round functions
	Selection Celebrity	Use the print() and input() function Create sensible variable names to store a value Use selection
	Selection Quiz ith score system	Use selection statements Learn how to create a quiz Learn how to use a score system
	Selection 8 Ball game with random randint	Use random randint to generate a random number Create a magic 8 ball game Have 20 responses
	iteration for	Create iterative code Use a for loop to repeat a section of code
	iteration while	Use a while loop in a program Use an if statement within a while loop Use a function to generate a random number
	Writing Algorithms	Learn to write algorithms in pseudocode Identify different types of program errors: syntax errors, run-time errors and logic errors and how to fix them

Current learning to be developed in the future within:

This will support pupils to make an informed option choice with the programming elements of the GCSE specification. This is being built upon from learning sequence and iteration in year 7 using Microbits, and sequence using Python, and in year 8 sequence and selection using Python and Edison Robots. In year 9 sequence and selection are revisited and further developed using iteration count-controlled and iteration condition-controlled.

Assessment

- Refer to assessment maps for formative and summative assessment opportunities.

Impact

- Learning will be tested during **Summative Assessment 1 and 2**
- 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 specified marked piece