SRS –Curriculum Overview – Computing

	Term 1 Key knowledge/skills	Term 2 Key knowledge/skills	Term 3 Key knowledge/skills	Resources & Information for parents/students
Y1	**Online Safety** Identify what personal information is and how to stay safe online. Safe behaviours when using technology at home. The importance of communicating with a trusted adult. **Programming** Using technology to explore how to a physical toy (beebot) or virtual toy can respond to programming.	**Search Engines** using the functions of search engines to find relevant, reliable information and images **Artistic Programmes** During this topic the children will learn and use the artistic features of two different computer programmes when creating pictures of plants.	**Google Earth** The children begin by exploring how to use digital maps to find various regions/landmarks of the world as well as locally.	
Y2	**Online Safety** Understanding digital footrpint. Using search engines Recognising whether a website is age appropriate Rate & review informative websites Kind & unkind behaviour online	**Word Processing** Using the functions of Microsoft Word to create a menu of food choices with text, bullet points, pictures as well as making aesthetic changes to engage the reader **Algorithms** This unit of work will enable the children to learn about algorithms. They will use a programming platform to develop their skills when creating, following and debugging various algorithms.	**Careers: Advertising** The children will explore industry elements linked to advertising and how computing can support this field. They will use a programme to design an advert that persuades its reader.	
Y3	**Developing Skills in Microsoft PowerPoint** Children will be developing their knowledge of websites, their functions and creativity in delivering accurate information, while researching and presenting information about rainforests. Exploring how to research and collect information from the internet Design presentations Evaluate and share presentations.	**Research** Using the functions of the internet and search engines to accurately learn about Roman life to support our writing in English lessons, by creating a bank of information. The concept of safe searching will be explored too.	**Coding** Video games provide the inspiration as the children will discover how to write, design and debug coding using beebots and computer programmes. The learning will focus on algorithms, their purpose and how they can be adapted for input/output purposes.	

Y4	**Online Safety** Understand how to stay safe online from identity theft. Identify the risks and benefits of installing software including apps Understand how to avoid plagiarism Understand the importance of healthy screen time. **Research** Children will be developing their knowledge of reliable websites while researching aspects of life within the Indus Valley.	Animation For computing the children will learn about animation using 2animate and create their own stop motion animation. **Coding** In the second half of spring, children will explore coding, programming and debugging	**Hardware: Keyboards** The children will be exploring desktops computers and its components eventually focusing on keyboards and their functions for programming. The children will develop their keyboard skills including using number pads. **2Calculate** Using software that mimics Excel, the children will focus on how to budget finances using its features. **2LOGO** The learning shifts towards programming, a career of the present and future. The children will learn how to create commands and build procedures.	
Y5	PowerPoint Microsoft PowerPoint will be our focus for this topic, each week the children will build a presentation that includes animation, design elements and factual information about the Shang Dynasty. Eventually the children will present their PowerPoint to an audience.	**Researching Safely** How do I research the Vikings safely and is it a reliable source? Using a 3D modelling software to help me inform others about how a Viking longship was designed for its purpose.	Spreadsheets Children will be developing their knowledge of Microsoft Excel in presenting data in a variety of ways. The will use some of the basic calculation functions to manipulate data sets.	
Y6	**Online Safety** Children will explore what it means to be responsible online, what a digital footprint is and how to use social media responsibly.	**Websites** As part of computing lessons, the children will be developing their knowledge of websites, their functions and creativity in delivering accurate information. **Databases** We will be developing our knowledge of databases, their functions in storing, sorting and presenting data, while researching and presenting information about species found in polar habitats.	**That's Quizzical** In this unit children will develop their ability to create programmes using Purple Mash. The lessons will build up to the children creating a quiz based on their learning of South America.	

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Y7	**Toolkit Office 1:** Ways of working, Word Processing and 2 Lessons on E-Safety **My Computer System:** Hardware & Software, Input, Processing and Output Devices etc.	**Python Programming:** Input, Output, Variables, Operators, Calculations, Data Types **Networks:** Topologies, LAN/WAN, encryption etc.	**Microbit:** Understanding that computers are controlled by code and be able to develop code to tell a computing device what to do. **Toolkit Office 2:** Using the productivity software: Presentations	Python 3: https://www.python.org/downloads/ MicroBit: https://makecode.microbit.org/ BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/zvc9q6f
Y8	**Number Systems:** Binary, Denary & Hex Conversion, ASCii & Pixel Art **Toolkit Office 3:** Using the productivity software: Word processing and DTP	**Python Programming:** Input, Output, Variables, Operators, Calculations, Data Types and If Then Else (and possibly random module/iteration) **Cyber Security:** Hacking, Scams, Malware etc.	**Computer Control – Flowol:** Sequencing and basic algorithms (step-by-step) taught here in readiness for programming **Graphics Design:** Gathering and manipulating assets to create digital artefacts	Python 3: https://www.python.org/downloads/ BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/zvc9q6f
Y9	**Programming Concepts – Scratch:** Programming. IPO, variables, if/then/else, loops etc, but taught in Scratch so that it's visual and easier to grasp the concepts. **Spreadsheet Modelling:** Formulae, charts, modelling, what if etc.	**Programming Basics – Python:** Input, Output, Variables, Operators, Calculations, Data Types and If Then Else (and possibly random module/iteration) **Database Development:** Designing and building databases. Queries, forms, reports, etc.	**Computational Thinking & Logic:** Logic Gates, Number Systems & Image/Audio/Characters **Issues & Impact:** in the digital world	Scratch: https://scratch.mit.edu/scratch_1.4 Python 3: https://www.python.org/downloads/ BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/zvc9q6f
Y10	Programming Constructs Binary, Denary & Hexadecimal Data Representation Programming with Flowchart & Pseudocode Algorithms	Programming Recap Truth tables Computer Hardware & Software Programming Languages	Computational Thinking Algorithms Programming with Validation	GCSE Pearson Edexcel Computer Science Python 3: https://www.python.org/downloads/ ClearRevise Edexcel GCSE Computer Science 1CP2, Illustrated revision and practice ISBN: 978-1-910523-28-5 Python Challenge! PM Heathcote ISBN:978-1-910523-35-3 REVISE Pearson Edexcel GCSE (9-1) Computer Science Revision Guide REVISE Pearson Edexcel GCSE (9-1) Computer Science Revision Workbook BBC Bitesize: https://www.bbc.co.uk/bitesize/examspecs/zdgy7nb
Y11	Advanced Programming with software production flow etc. Networks Issues & Impact Trace Tables	Revision	N/A	

| Y12 | **Networks:** Characteristics of networks, protocols and standards, Internet structure
Network security and threats, encryption, Network hardware, pagerank, Client-server and peer to peer
Databases: Relational and flat file databases, data capturing methods, normalisations, SQL, referential integrity, Transaction processing, ACID record locking and redundancy
Web Technologies: HTML/CSS 1.3.4 Web Tech, client side etc.
Compression, Encryption and Hashing: Lossy vs. Lossless compression, run length encoding and dictionary coding, Symmetric and asymmetric encryption, Uses of hashing
Data Types: Data types, binary, Sign and magnitude and two's complement, binary addition and subtraction, hexadecimal, normalisation of floating-point numbers Floating point arithmetic, Bitwise manipulation and masks, ASCII and UNICODE
Programming Techniques: Practical programming (in Python) interweaved with practical algorithm solving
Some of the Computational Thinking (abstractly/ahead/etc.) discussed here
Second programming language to be learned independently
Constructs, Recursion, Global/Local Variables, Modularity & IDE, Practical Algorithms | **Structure & Function of Processor:** ALU, Control Unit, Registers and Buses, Fetch-Decode-Execute Cycle, Factors affecting the performance of the CPU Pipelining, Von Neumann, Harvard and contemporary processor architecture
Types of Processors: CISC Vs RISC processors. GPUs, Multicore and Parallel systems
I/O & Storage: Input, output and storage devices, Magnetic, flash and optical storage devices, RAM and ROM, Virtual storage
Data Structure: Arrays, lists, tuples and records. Im/mutable, Static / Dynamic
Linked Lists, Stacks & Queues, Stacks & Queues
Trees, Binary Trees & Graphs
Algorithms: Linear, Binary & Hashing search, Bubble, Insertion, Merge and Quick Sorts, Djikstra and A-Star | **Systems Software:** Operating systems, Memory Management, Interrupts, Scheduling, Distributed, embedded, multi-tasking, multi-user and Real Time operating systems, BIOS, Device drivers and Virtual machines
Applications Generation: Applications, Utilities, Open source vs. closed source, Translators: Interpreters, compilers and assemblers, Stages of compilation, Linkers and loaders and use of libraries
Programming Languages
Computing Legislations: The Data Protection Act 2018, The Computer Misuse Act 1990, The Copyright Design and Patents Act 1988, The Regulation of Investigatory Powers Act 2000.
Python Codes: Analysing python codes for linear, binary, insertion, bubble, merge, quicksort algorithms
OOP with Computational Thinking: Classes, objects, methods, attributes, inheritance, encapsulation and polymorphism
Project Skills: Preparing for the Year 13 final project | OCR A Level Computer Science
Isaac Computer Science:
https://isaaccomputerscience.org/topics/a_level?examBoard=all&stage=all#ocr
Python 3: https://www.python.org/downloads/
CodeAcademy: https://www.codecademy.com/catalog

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		Revision	N/A	
Y13	NEA: **Project** **Moral & Ethical Issues:** Computers in the workforce, Automated decision making, Artificial intelligence, Environmental effects, censorship and the Internet, Monitor behaviour **Boolean Algebra:** Boolean Expressions, Karnaugh Maps, De Morgan's Law etc. **Computational Thinking:** Abstractly, Ahead, Procedurally, Logically & Concurrently **Computational methods:** Using the methods. Backtracking, data mining, heuristics, performance modelling, pipelining, visualisation to solve problems **Algorithm Efficiency:** Efficiency of different algorithms, Big O notation (constant, linear, polynomial, exponential and logarithmic complexity) **Programming Techniques:** Programming recap of the topics needed			