Computer Science at King's Academy Ringmer

Subject	Knowledge acquired	Skills acquired
YEAR 7		
1 - Google Classroom	Login and set passwords, Access to Google Classroom Access to files using Google Docs and Slides	Students will develop skills to open, access and save work in the schools own digital architecture
2 Malware and security	Understand cloud-based systems and their benefits. Understand threats to data (malware, spam phishing etc). Identify methods to protect from malware Understand social media etiquette.	Students ill develop skills to be able to be secure online. Access and save work in the schools own digital architecture understanding threats that can exist online.
3 Data Representation	Introduces binary numbers and basic manipulation. Ability to add binary numbers, Look up Hex values in binary table, black and white grid based on binary number. Understand code and data is stored as binary	Introduction to binary why it exists. Be able to convert simple 4-digit binary numbers to denary and vice versa.
4 Programming	Developing programs with BBC Microbit Understanding micro devices can be used to collect data (IoT). Use variables, logic statements and sequences. Compile and download binary file, how to construct a program and download it in BBC Micro Bit	Understand the importance of program sequencing. Program outputs in response to inputs. Compilations of files Installing files
5 - Ciphers	Developing computational skills and understanding of secure data learning basic encryption patterns and they applied to transmit data.	Use algorithms to construct a code, understand the purpose of encryption, develop computational thinking skills including pattern matching, algorithms and decomposition.
6 Programming	Using HTML code with notepad++. An introduction to creating web content with HTML tags. Adding different types of text and images. Using Hyperlinks for basic navigation	Developing procedures to add content correctly so it will be displayed in a web browser
7 Staying safe online	What is reasonable usage Reflecting on our self image how we portray ourselves Online bullying awareness and how to report it	Students will develop awareness of their online footprint and what is good online etiquette.
YEAR 8		
1 Safe and confident use of IT systems and how network tracking	Describe an IP address function. Explain how you are tracked with WIFI. Explain how IP addresses and GPS can track your location Understand growth and use of GPS	GPS and network and WIFI tracking, how wifi detects networks and can be used to track people Locations using Ip addresses, GPS locations and history How tracking is used in commercial activities
2.Computational thinking with Python	Be able to edit and run Python files, understand how to input and output data, creation of variables, write conditional statements, decompose a problem into smaller parts	What is an algorithm Decomposition and the purpose of breaking down big problem, Use Flowcharts, understand what is abstraction
3.Data representation	Use of 8 bit & binary numbers. Be able to read and create 8 bit binary numbers Explain how number systems operator, use binary to represent colour images	Understand how binary is used to represent data (e.g. colour, image and sound)
4.Hardware and Software	Understand how the CPU operates. List parts of the CPU. Explain types of hardware used in a PC and the software to run it. What is hardware and software	Different computer platforms Compatibility Computer specification
5.Programming with Small Basic	Ability to write code with set of commands To be able to debug and solve code problemsUse logic statements. Control code with loops Create and use variables. Use algorithm planning tools and techniques. To be able to produce a program and run it independently	Understand the importance of selection and iteration through visual programmingStart to plan how code will be written using flowchart and sequences

6 Using Google Spreadsheets and Data Analysis	Describe reason for using a spreadsheet Ability to use some functions to sum in a spreadsheet Abstract information from data to select pertinent information,How to aggregate data in a spreadsheet	Developing analytical skills Using spreadsheets creating formulas and obtain information
7.Web development skills. HTML and CSS	Describe how HTML and CSS are used on webpages. Use HTML to add content to a webpage Use CSS to style content on a webpage Explain what HTML is and produce a basic webpage	HTML5 and CSS Interpreted languages using trinket tools and exercise as introduction to languages and tags Add and styling new content using HTML
YEAR 9		
1 Validity and Bias	Be able to validate information found online, discern between real and fake news. Use basic SQL to retrieve specific information	Understand how to check for validity and bias Good search engine practice and knowledge of metadata Big data and databases
2 Programming with Python	Developing intermediate Python programming building on skills developed in year 8. Introduction to functions and parameters. Be able to construct a sequence of tasks. Use graphical tools to construct Flowchart, construct a flowchart with correct symbols	Stronger skills with programming and developing concepts of functional based code. Decomposition of problems and use of graphical design techniques. Pattern matching to see how design can transpose into code
3 Introduction to digital images and sounds	Capturing a digital signal as sound , Capturing a digital image , compressing digital data, decompressing digital data. Be able to capture and manipulate a digital image and sound	What digital data looks like Controlling the size and quality of digital data
3 Data representation	Using 8 bit binary numbers,adding 8 bit binary numbers Converting numbers to Hexadecimal, overflow errors How Data representation is used for multimedia and other data, convert numbers for binary to decimal and Hexadecimal	Prior knowledge of binary numbers (Year 7) and how they are represented (Year 9). This prepares students for the GCSE working with 8-bit binary numbers, converting from Hexadecimal to Binary and back as well as Binary Maths.
4 Programming and graphical objects using Small Basic	Developing more complex algorithms and extending language knowledge developed from Y8. Decomposing more difficult problems and using subprograms to solve individual tasks. Developing concepts from functional based programming in Python programming. Using and understanding algorithms and flowcharts. Plan and create a moving graphical image using code	Introduce variables, sequencing, data types, iteration and selection in an industry standard programming language.
5 Hardware and Networks	Introduction into networks. What is in a data: packet How information is routed around the internet Explain how information is moved with IP addresses	Looking into the basic hardware to network information Some topologies Introduction to data packets
6 ICT skills developing graphics	Using specialist programs to develop graphics using photoshop (GNU IMP) or illustrator (Inkscape). Creating logos and images and understanding how they are constructed and can be used in web design	Using skills of abstraction, decomposition to develop images for use in designing logos and web pictures. Developing ICT skills
7 Developing projet skills	Web project - using skills developed to construct images and logos. Developing HTML from Y7 and incorporating CSS skills for more specific page design, Applying these skills to produce a website using either web builder products or HTML and CSS	Introduce variables, sequencing, data types, iteration and selection in an industry standard programming language. Developing understanding of how enterprise solutions can be across multiple technologies.
YEAR 10 / 11 (GCSE course)		
Python Programming	Understand Variables, Data types, Loops, Conditions,Arrays / List, Programming challenges, functional programming	Be able to develop functional based programs and apply and develop code for specific problems
Computational thinking	Abstraction, Decomposition, Algorithms Patterns (re-use)'Flow charts	Introduces key language terms to students for understanding GCSE questions. To prepare students for programming concepts that will have to promote good programming practice. questions relating to content may be examined in GCSE paper

SLR 1 Systems architecture and storage	Von Neumann architecture, RAM, CPU, Control unit, LU, Register, Clock, Address bus, Data bus, Control bus,	Introduces key language terms to students for understanding and basic functions performed by the CPU
SLR 2 System software	Operating system, File management, Process management, Peripheral management, User management, Utility software, File repair, Backup, Data compression, Disc defragmentation, Anti-malware	Introduces key language terms to students for understanding how the systems starts up and functions and maintains software.
SLR 3 Data representation – part 1	Base-2 binary, bit pattern, Unsigned integers, Two's complement signed integers, Base-10 denary, Binary shifts, Overflow, Base-16 hexadecimal, Bit, Nibble, Byte, Kibibyte, Mebibyte, Gibibyte, Tebibyte Top 5 Keywords Alternating current, direct current, oscilloscope, earth wire, 3-pin plug	Introduces key language terms to students for understanding how computer based number systems function
SLR 3 Data representation – part 2	7-bit ASCII, Bitmap, Pixel, Resolution, Colour depth, Analogue sound, Amplitude, Sample rate, Bit depth, Sample interval, Data compression, Lossless compression, Lossy compression	Introduces key language terms to students for understanding how data can be represented into digital data in a variety of formats and how they are represented as and binary and hexadecimal
SLR 4 Computer networks, protocols and layers	Network, LAN, WAN, The internet, IP address, Router, Wired network, Wireless network, speed, range, latency, bandwidth, Network speed, Protocols, Ethernet, Wi-Fi,, Application layer, Transport layer, internet layer, Link layer, Network topology, Bus network, Star network, Mesh network	Introduces key language terms to students for understanding a variety of network structures and the protocols that support them
SLR 5 Network and cyber security	Network security, Network vulnerabilities, Penetration testing, Ethical hacking, Access control, Physical security, Firewall, Malware, Viruses, Worms, Trojans, Ransomware, Keyloggers, Social engineering, Cyber security, Encryption, Acceptable use policy, Backup and recovery procedures,	Introduces key language terms to students for understanding a variety of threats to computer systems and methods to avoids them
SLR 6 Ethical, legal and environmental issues	Environmental issues, Ethical issues, Legal issues, Personal data, Privacy issues, Ownership, Consent, Data Protection Act (2018), Computer Misuse Act (1990), Artificial intelligence, Machine learning, Robotics, Accountability, Algorithmic bias, Legal liability, Intellectual property, Copyright, Patents, Trademarks, Licencing	Introduces key language terms to students for understanding some legal and ethical concerns. How to relate them to a variety of cultural, legal, and environmental issues
SLR 7 Basic programming concepts	Subprogram, Flowchart, Pseudocode, Sequence, Selection, Count-controlled repetition, Condition-controlled repetition, Program inputs, Program processes, Program outputs, Variables, Constants, One-dimensional data structures, Two-dimensional data structures, Strings, Records, Arrays,operators	Introduces key language terms to students for understanding and producing efficient and consistent code. Using computational thinking techniques to construct and maintain reusable code
SLR 8 Advanced programming concepts	Initialisation, Assignment, Parameters, Primitive Data type, Integer, Real, Boolean, Char, String manipulation, File handling: Open, Read, Write, Close, Procedure, Function, Parameters, Parameter passing, Return value, Local variable, Global variable	Introduces key language terms to students for understanding and producing functional based programming.. Using computational thinking techniques to construct and maintain reusable code
SLR 9 Robust and secure programming	Syntax error, Logic error, Runtime error, Robust software, Maintainable programs, Indentation, Comments, Meaningful identifiers, White space, Data validation, Length check, Presence check, Range check, Pattern check, Authentication routines	Introduces key language terms to students for understanding techniques that permit good coding practice. Developing skills and rigour that develop programming practices that can be applied consistently for maintainable programs
SLR 10 Algorithms and computational logic	Abstraction, Decomposition, Trace table, Bubble sort, Merge sort, Linear search, Binary search, Algorithm efficiency, Truth table	Introduces key language terms to students for understanding pf Computational thinks and complex search and sort algorithms
SLR 11 Classification of programming languages	Low-level language, High-level language, Interpreter, Compiler, Translator, Machine code	Introduces key language terms to students for understanding how code is compiled and translated to the CPU