KS3 Curriculum – Computer Science

The Ramsey Academy

	Autumn Term														Spring Term													Summer Term													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 7	**Topic:** E-safety							**Topic:** Scratch programming							**Topic:** Introduction to Web Design											**Topic:** Digital Literacy - Excel							**Topic:** Encryption						**Topic:** EduBlocks		
	Declarative Knowledge: How to be safe online Sending emails Creating strong passwords Identifying phishing emails							**Declarative Knowledge:** Sequence, selection and iteration Variables Loops User input							**Declarative Knowledge:** HTML is used to structure web pages. Web pages contain headings, paragraphs, images and hyperlinks. Good web design uses consistent layouts and navigation. Hyperlinks connect pages and online resources											**Declarative Knowledge:** A spreadsheet is used to organise, store and analyse data. Data is stored in cells identified by row numbers and column letters. Formulas are used to perform calculations automatically. Charts and graphs can be used to present data visually.							**Declarative Knowledge:** Encryption is the process of converting readable data (plaintext) into an unreadable format (ciphertext) to protect information. A key is used to encrypt and decrypt data. Encryption helps keep data secure when it is stored or transmitted over a network. Common examples of encryption include HTTPS websites and encrypted messaging apps						**Declarative Knowledge:** EduBlocks is a block-based programming environment that can generate Python code. Programs in EduBlocks are created using blocks that represent programming commands. Variables are used to store data that can change while a program runs. Selection and iteration are key programming constructs available in EduBlocks.		
	Non-Declarative Knowledge: Use of different software Touch typing							**Non-Declarative Knowledge:** Debugging Testing, evaluation Solving problems							**Non-Declarative Knowledge:** Use VS Code to create and edit web pages. Apply HTML tags correctly to structure content. Test and debug webpages to identify and fix errors. Design and evaluate a website for a target audience.											**Non-Declarative Knowledge:** Conditional formatting. Use basic formulas such as SUM, AVERAGE, MAX and MIN. Sort and filter data to find information quickly. Create and edit charts to present data effectively.							**Non-Declarative Knowledge:** Use a Caesar Cipher to encrypt and decrypt simple messages. Identify when encryption is being used online, such as websites with a padlock icon. Apply an encryption tool to encode a message and share it securely. Test different encryption keys and observe how they affect encrypted data.						**Non-Declarative Knowledge:** Create a program using blocks to control outputs and user interactions. Use variables within an EduBlocks project to store and update information. Build and test a program that uses selection (if statements) and loops. Debug a program by identifying and correcting errors in the block structure or generated code.		
	Assessment: Midpoint assessment: quizzes, discussions Summative assessment: end of unit quiz and creation of an e-safety poster							**Assessment:** Formative/midpoint: reviews of programming logs, questioning Summative: end of unit practical programming project							**Assessment:** Formative/midpoint: HTML quizzes, debugging, teacher observation and peer feedback. Summative: Creation and evaluation of a website meeting a given client brief to create a 'choose your own adventure' story.											**Assessment:** Formative/Midpoint: Spreadsheet skills tasks, formula practice, and knowledge quiz. Summative: Create a spreadsheet that uses formulas, formatting and charts to analyse and present a dataset							**Assessment:** Midpoint: quiz, sending an encoded message and decoding it. Summative: Try to crack and decode a range of cipher texts and explain how they approach these challenges.						**Assessment:** Midpoint: check understanding of key terms, sequence, selection and iteration. Summative: Solve a real world problem and explain how the code works.		
	Curriculum Connection: Networks and security							**Curriculum Connection:** EduBlocks, Python, Web Design							**Curriculum Connection:** Advance web design											**Curriculum Connection:** Data science							**Curriculum Connection:** Python, logic and binary						**Curriculum Connection:** Python		

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Year 8	**Topic:** Web Design							**Topic:** Microbits							**Topic:** Computer Graphics											**Topic:** Data Science				**Topic:** Python					**Topic:** Computer Security				
	Declarative Knowledge: HTML is used to structure the content of a webpage CSS is used to control the appearance and layout of webpages A website consists of multiple linked web pages Hyperlinks allow users to navigate between pages.							**Declarative Knowledge:** A micro:bit is a programmable microcontroller Sensors can detect inputs such as light, temperature, and movement Inputs and outputs are used in physical computing systems Programs control how the micro:bit responds to events							**Declarative Knowledge:** Raster images are made from pixels Vector graphics use mathematical shapes Image resolution affects image quality File formats such as PNG and JPEG have different uses										**Declarative Knowledge:** Data can be collected, stored, and analysed Information is obtained by processing data Charts and graphs help visualise data Data bias can affect conclusions				**Declarative Knowledge:** Python is a high-level programming language Variables store data values Selection uses conditions to make decisions Iteration allows code to repeat					**Declarative Knowledge:** A network is a group of connected devices that share resources and data The internet transfers information using data packets, protocols, and ports Different types of malware include viruses, worms, trojans, ransomware, and spyware Encryption protects data by converting it into a coded format Firewalls and antivirus software help protect systems from cyber threats				
	Non-Declarative Knowledge: Create a webpage using HTML tags Apply CSS styling to text and images Insert hyperlinks between webpages Test and debug a website in a browser							**Non-Declarative Knowledge:** Program a micro:bit using MakeCode Use inputs such as buttons and sensors in code Display messages and animations on the LED matrix Create event-driven programs.							**Non-Declarative Knowledge:** Edit images using graphics software Resize and crop digital images Choose appropriate file formats for different purposes										**Non-Declarative Knowledge:** Collect and organise data in a spreadsheet Create charts and graphs from datasets Analyse trends and patterns Draw conclusions from data				**Non-Declarative Knowledge:** Write Python programs using variables and input/output Create programs with if statements Use loops to repeat instructions Debug syntax and logic errors					**Non-Declarative Knowledge:** Identify devices and components within a computer network Explain the journey of data packets across the internet Recognise and evaluate different forms of malware and their risks Analyse real-world cyber security incidents and recommend preventative measures				
	Assessment: Design and create a multi-page website that includes text, images, links, and CSS styling							**Assessment:** Program a micro:bit device to solve a real-world problem using sensors and outputs							**Assessment:** Produce and edit a graphic for a specified audience and purpose										**Assessment:** Investigate a dataset and present findings using appropriate visualisations				**Assessment:** Develop a Python program that uses variables, selection, and iteration to solve a problem					**Assessment:** Create a cyber security awareness resource demonstrating best practices for staying safe online and explain how networks and the internet operate using key technical terminology				
	Curriculum Connection: Advance web design							**Curriculum Connection:** Python							**Curriculum Connection:** Binary											**Curriculum Connection:** Excel, Python				**Curriculum Connection:** Java Greenfoot					**Curriculum Connection:** e-Safety				

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Year 9	**Topic:** Logic and Binary							**Topic:** Advance Web Design							**Topic:** Python											**Topic:** Artificial Intelligence and Machine Learning				**Topic:** Java Greenfoot					**Topic:** Podcasting				
	Declarative Knowledge: Computers represent data using binary digits (0 and 1) A byte consists of 8 bits. Denary numbers can be converted to and from binary Logic gates perform operations on binary inputs Common logic gates include AND, OR, NOT, XOR, NAND, and NOR Truth tables show the outputs of logic gates for different inputs.							**Declarative Knowledge:** CSS (Cascading Style Sheets) is used to control the appearance and layout of web pages. JavaScript is a programming language used to add interactivity and dynamic content to websites. External stylesheets allow consistent design across multiple web pages. Responsive web design ensures websites display correctly on different screen sizes and devices.							**Declarative Knowledge:** Variables store data in a program Selection uses conditions to make decisions Iteration is used to repeat instructions Functions are reusable blocks of code Lists allow multiple values to be stored together										**Declarative Knowledge:** Artificial Intelligence (AI) enables computers to perform tasks that normally require human intelligence Machine Learning (ML) allows systems to learn patterns from data without being explicitly programmed AI systems are trained using datasets and algorithms Bias in training data can affect the accuracy and fairness of AI systems AI is used in applications such as recommendation systems, image recognition, and chatbots				**Declarative Knowledge:** Java is an object-oriented programming language Classes are templates used to create objects Objects contain properties and methods Selection and iteration control program flow					**Declarative Knowledge:** Podcasts are digital audio recordings distributed online Effective podcasts require planning, scripting, and audience awareness Audio quality affects listener engagement Copyright laws apply to music and other media used in productions Editing software can be used to improve recordings.				
	Non-Declarative Knowledge: Convert denary numbers into binary. Convert binary numbers into denary. Construct and interpret truth tables. Predict outputs from logic gate circuits. Design simple logic circuits to solve problems.							**Non-Declarative Knowledge:** Students will use a CSS stylesheet to apply consistent formatting and layout across a website. Students will write and test basic JavaScript to add interactivity to web pages. Students will create responsive webpage layouts using CSS properties and techniques. Students will debug and refine HTML, CSS, and JavaScript code to improve functionality and user experience.							**Non-Declarative Knowledge:** Write Python programs using variables and input/output Create programs using selection and iteration Develop and call functions Manipulate data stored in lists Debug syntax and logic errors										**Non-Declarative Knowledge:** Evaluate the accuracy and effectiveness of AI outputs Identify potential bias in AI systems and datasets Compare different uses of AI in real-world scenarios				**Non-Declarative Knowledge:** Create classes and objects in Greenfoot Write methods to control object behaviour Use variables, selection, and iteration in Java Debug and test Java code Develop an interactive game					**Non-Declarative Knowledge:** Plan and script a podcast episode Record clear audio using appropriate equipment Edit audio using specialist software Add music, transitions, and sound effects appropriately Export and publish audio in a suitable format				
	Assessment: Complete binary conversion exercises Create and interpret truth tables. Analyse and design logic gate circuits Explain how binary is used within computer systems							**Assessment:** Midpoint: use of quizzes to check understanding of new terms and keywords. Summative: Students will create a web site for a client which will need to address a real world problem.							**Assessment:** Develop a Python solution to a specified problem Create programs using sequence, selection, and iteration Test and debug code effectively										**Assessment:** Investigate and evaluate a real-world AI application Explain the benefits, limitations, and ethical implications of AI technologies				**Assessment:** Create a Greenfoot project demonstrating object-oriented programming concepts Use classes, methods, and objects effectively Test, debug, and evaluate the completed application.					**Assessment:** Produce a podcast episode for a specified audience and purpose Demonstrate effective recording and editing techniques Evaluate the final product against a set of success criteria.				
	Curriculum Connection: Computer graphics, podcasting							**Curriculum Connection:** Web design							**Curriculum Connection:** Data science, Java Greenfoot											**Curriculum Connection:** Logic and binary				**Curriculum Connection:** Python, Scratch, EduBlocks					**Curriculum Connection:** Computer graphics, binary				