



### Golden Threads

### Enrichment

### Review and Evaluation

	Topics & Substantive Knowledge	Disciplinary Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Term 1	<p><b>Basic skills</b></p> <p><b>Introduction to Python</b></p> <p>Link to NC unit “Introduction to Python programming” (Y8 Curriculum)</p> <ul style="list-style-type: none"> <li>Write simple Python programs that display messages, assign values to variables, and receive keyboard input</li> <li>Use binary selection (if, else statements) to control the flow of program execution</li> </ul> <p><b>Python Syntax and Structure:</b> Pupils should understand the basic syntax of Python, including how to write and format statements. This includes knowledge of indentation, which is crucial in Python for defining blocks of code.</p> <p><b>Variables and Data Types:</b> Pupils should be familiar with creating and using variables and understand basic data types in Python such as integers, floats (decimal numbers), and strings (text).</p> <p><b>Basic Operators:</b> Understanding how to use arithmetic operators (addition, subtraction, multiplication, division) and assignment operators in Python. This knowledge is foundational for performing calculations and manipulating variables.</p>	<p><b>Logical Reasoning and Structured Thinking:</b> Essential for understanding and applying Python’s syntax. Pupils must be able to logically structure commands and understand the sequential flow of a program. This skill is crucial for writing coherent and effective code.</p> <p><b>Problem-Solving with Algorithms:</b> To effectively use control structures in Python, pupils need problem-solving skills. They should be able to devise algorithms that break down complex problems into simpler, executable steps, and then implement these using appropriate control structures.</p> <p><b>Debugging and Analytical Skills:</b> Debugging is a critical skill in programming. Pupils need to develop an analytical approach to identifying, isolating, and fixing bugs or errors in their code, often requiring a methodical and patient mindset.</p>	<p><b>Name:</b> T1-Y9-Python1-Assessment</p> <p><b>Knowledge fluency:</b> demonstrate understanding of programming keywords</p> <p><b>Python coding skills fluency:</b> questions online quiz with code for pupils to identify errors, fill in missing lines of code based on a given task to code.</p> <p><b>Date:</b> last lesson of the term</p>	<p><b>Misconception:</b> You Must Be Good at Math to Program in Python</p> <p><b>Reality:</b> While certain areas of Python programming (like data science or machine learning) may require strong mathematical skills, many areas of Python programming do not require advanced math. Basic programming, web development, and automation in Python can often be done with minimal mathematical knowledge.</p> <p><b>Misconception:</b> If the Code Works, It’s Correct</p> <p><b>Reality:</b> Just because a Python script runs without errors doesn’t mean it’s the best or most efficient way to solve a problem. Good programming also considers factors like code readability, maintainability, and efficiency. There are often multiple ways to approach a problem, and part of learning to program is understanding how to write code that is not only functional but also well-structured and efficient.</p> <p><b>Misconception:</b> Variables and Lists Serve the Same Purpose</p> <p><b>Reality:</b> While both variables and lists are used to store data in Python, they serve different purposes. A variable stores a single data value, whereas a list is a data structure that can hold multiple values at once, organized in a specific order. Understanding the distinction between these two is crucial for effective data handling in Python.</p>	<p><b>Tier 2 vocabulary</b></p> <p><b>Sequence:</b> The order in which events, actions, or instructions occur. In Python, understanding sequence is crucial for the proper execution of code.</p> <p><b>Interpret:</b> To explain or assign meaning to something. In Python, pupils need to interpret code and error messages to understand how the code behaves or why it fails.</p> <p><b>Tier 3 vocabulary</b></p> <p><b>Variable:</b> A name that is used to denote a value that can change. In Python, variables are used to store data that can be manipulated.</p> <p><b>Function:</b> A block of organized, reusable code that performs a single, related action. Functions enhance the modularity and efficiency of the code.</p>	<p>The Python programming skills unit in Key Stage 3 builds upon foundational computational thinking and basic IT skills.</p> <p>It introduces pupils to structured programming, enhancing their problem-solving abilities and logical reasoning.</p> <p>Post this unit, pupils are well-positioned to delve into more complex programming concepts, data science, or even web development.</p>



	Topics & Substantive Knowledge	Disciplinary Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Term 2	<p><b>Introduction to Python (cont)</b></p> <p><b>Data representation</b></p> <p><a href="#">Link to NC unit "Data Science"</a></p> <p><b>Control Structures:</b> Pupils should know how to use if-else statements for decision-making processes in Python. This involves writing conditions that are evaluated to true or false to control the flow of the program.</p> <p><b>Loops:</b> Knowledge of how to use for and while loops to execute a block of code repeatedly. This includes understanding how to iterate over a range of numbers or through the characters in a string.</p> <p><b>Functions:</b> An introduction to defining and using functions in Python. Pupils should understand how to create a function, pass parameters to it, and return values from it. This is important for writing reusable and organized code.</p>	<p><b>Function-Based Decomposition:</b> Understanding the concept of functions in programming requires the ability to decompose larger problems into smaller, manageable units. Pupils should be able to create modular code using functions, enhancing code reusability and readability.</p>	<p><b>Name:</b> T2-Y9-Python2-Assessment</p> <p><b>Knowledge fluency:</b> demonstrate understanding of programming keywords</p> <p><b>Python coding skills fluency:</b> questions online quiz with code for pupils to identify errors, fill in missing lines of code based on a given task to code.</p> <p><b>Date:</b> lesson before last –of the term</p>	<p><b>Misconception:</b> Functions and Procedures are Interchangeable Terms</p> <p><b>Reality:</b> In Python, the term ‘function’ is more commonly used and refers to a block of code that performs a specific task and can return a result. While ‘procedure’ is a term used in some programming languages with a similar concept, in Python, everything is technically a function, even if it doesn’t return a value (in other languages, these might be called ‘procedures’ or ‘subroutines’).</p>	<p><b>Tier 2 vocabulary</b></p> <p><b>Analyse:</b> To examine something methodically and in detail. In programming, this often involves breaking down code to understand its function and purpose.</p> <p><b>Evaluate:</b> To judge or determine the significance, worth, or quality of something. Evaluating code involves assessing its efficiency, readability, and suitability for solving a given problem.</p> <p><b>Tier 3 vocabulary</b></p> <p><b>Loop:</b> A sequence of instructions that is continually repeated until a certain condition is reached. In Python, common loops include for and while loops.</p> <p><b>List:</b> A built-in Python data structure that is mutable and can contain elements of different data types. Lists are fundamental for managing and organizing data in Python.</p>	<p>Python coding transitions pupils from basic computer literacy to a more profound understanding of coding, thus equipping them with essential skills for the increasingly digital world and preparing them for advanced computer science studies.</p>



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Term 3	<p><b>Web Development</b></p> <p>Link to NC unit “Developing for the Web” (Y8 Curriculum)</p> <ul style="list-style-type: none"> <li>Describe what HTML is</li> <li>Modify HTML tags using inline styling to improve the appearance of web pages</li> <li>Use HTML to structure static web pages</li> <li>Display images within a web page</li> <li>Create hyperlinks to allow users to navigate between multiple web pages</li> <li>Assess the benefits of using CSS to style pages instead of in-line formatting</li> <li>Describe what CSS is</li> <li>Use CSS to style static web pages</li> </ul> <p><b>Basic Structure of HTML:</b> Pupils should understand that HTML (Hypertext Markup Language) is the standard markup language used to create web pages. They should be familiar with the basic structure of an HTML document, including tags, elements, and attributes, and understand how these components work together to structure and display content on a web page.</p> <p><b>Common HTML Tags and Their Purposes:</b> Pupils should be able to identify and use common HTML tags such as &lt;html&gt;, &lt;head&gt;, &lt;title&gt;, &lt;body&gt;, &lt;h1&gt; to &lt;h6&gt; (heading tags), &lt;p&gt; (paragraph), &lt;a&gt; (hyperlinks), &lt;img&gt; (images), and &lt;ul&gt;/&lt;ol&gt; with &lt;li&gt; (unordered/ordered lists). They should understand the specific purpose of each tag and how they are used to create the content and layout of a web page.</p> <p><b>Creating Hyperlinks and Inserting Images:</b> Pupils should know how to create hyperlinks using the &lt;a&gt; tag and how to insert images into a web page using the &lt;img&gt; tag, including understanding the importance of the href attribute for links and the src attribute for images. They should also be aware of the significance of providing alternative text descriptions with images for accessibility purposes.</p> <p><b>Introduction to CSS:</b> Pupils should learn the basics of CSS (Cascading Style Sheets), which is used to control and style the appearance of web pages written in HTML. They should understand how CSS can be used to add styles to HTML elements, such as altering text color, setting fonts, and managing element positioning.</p>	<p><b>Attention to Detail and Syntax Accuracy:</b> HTML requires precision in syntax; a small error can significantly impact the display of a web page. Pupils need a keen eye for detail to write accurate HTML code, including proper tag usage, attribute implementation, and adherence to syntax rules. This meticulous attention to detail ensures that the web pages function and render as intended.</p> <p><b>Problem-Solving and Debugging Skills:</b> The ability to identify and resolve issues in HTML code is key. Pupils must develop problem-solving skills to troubleshoot issues like layout problems, broken links, or incorrect rendering of elements. This also includes understanding how to use browser developer tools to inspect and test HTML code.</p>	<p><b>Name:</b> T3-Y9-WebDev-Assessment3 Content:</p> <p><b>Knowledge fluency:</b> demonstrate understanding of web development basic key terms meaning</p> <p><b>Skills fluency:</b> to be demonstrated by selecting and applying appropriate skills for creating webpages, using html tags, saving webpages, viewing webpages in browser</p> <p><b>Date:</b> last lesson of the term</p>	<p><b>Misconception:</b> HTML Alone is Enough for Creating Modern Websites</p> <p><b>Reality:</b> While HTML is crucial for web development as it provides the basic structure and content of web pages, it is not sufficient on its own to create fully functional and modern websites. HTML needs to be combined with CSS for styling and layout, and often JavaScript for interactivity and dynamic content. Today’s websites typically require a combination of these technologies for a complete, responsive, and interactive user experience.</p> <p><b>Misconception:</b> Learning HTML is Difficult and Requires Advanced Programming Skills</p> <p><b>Reality:</b> HTML is actually one of the most beginner-friendly aspects of web development. It does not require traditional programming skills, such as logic and complex algorithms, that are necessary for other programming languages. HTML is more about understanding and using a markup language to structure content, and many pupils find that they can pick up the basics relatively quickly and start building simple web pages in a short amount of time.</p>	<p>Tier 2 vocabulary</p> <p><b>Structure:</b> In the context of HTML and web development, ‘structure’ refers to the way in which HTML elements are arranged to form the layout and organization of web pages. Understanding the structure is key to effectively organizing content on a webpage.</p> <p><b>Sequence:</b> This refers to the order in which HTML elements are arranged and how they are executed or displayed in a web browser. The sequence is important in HTML to ensure that the webpage content is logical and user-friendly.</p> <p>Tier 3 vocabulary</p> <p><b>Tag:</b> In HTML, a tag is a piece of code that describes the structure of the webpage. Tags are the basic building blocks of HTML and are used to define elements such as headings, paragraphs, links, and other content types.</p> <p><b>Element:</b> In HTML, an element is a fundamental building block used to define the structure and content of web pages. Elements are represented by tags in the HTML code, such as &lt;p&gt; for paragraphs, &lt;a&gt; for hyperlinks, and &lt;div&gt; for divisions or sections.</p> <p><b>Attribute:</b> An attribute in HTML provides additional information about an element, such as setting a link’s destination using the ‘href’ attribute in an anchor tag (&lt;a&gt;). Attributes are used within tags to control the behavior and appearance of elements.</p>	<p>The HTML web development skills unit in Key Stage 3 builds on basic computer literacy and introduces pupils to the fundamentals of web page creation and structure.</p> <p>This foundational knowledge is crucial as it lays the groundwork for more advanced web technologies, such as CSS for styling and JavaScript for interactivity.</p> <p>Following this unit, pupils are ideally positioned to explore these complementary technologies, enhancing their skill set in web design and development.</p> <p>This progression is vital in the IT curriculum, equipping pupils with essential skills for the increasingly digital-oriented future.</p>



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Term 4	<p><b>Cyber Security</b></p> <p>Link to NC unit “Introduction of cybersecurity”</p> <p><b>Understanding of Cyber Security:</b> Pupils should understand the basic concept of cyber security, which involves protecting computers, networks, programs, and data from unauthorized access, attacks, or damage.</p> <p><b>Types of Cyber Threats:</b> Knowledge of common types of cyber threats such as viruses, malware, phishing, and hacking. Pupils should be able to identify the characteristics of these threats and understand how they can impact computer systems and personal information.</p> <p><b>Importance of Password Security:</b> Understanding the importance of creating strong, secure passwords and the risks associated with weak password practices. Pupils should know how to create and manage strong passwords to protect their online accounts.</p> <p><b>Safe Internet Usage Practices:</b> Awareness of safe browsing practices, including the risks of downloading from unknown sources, the importance of staying on reputable websites, and the dangers of sharing personal information online.</p> <p><b>Understanding of Personal Data and Privacy:</b> Knowledge of what constitutes personal data, including the significance of protecting personal and sensitive information online, and understanding privacy settings on various platforms and devices.</p> <p><b>Basic Preventative Measures:</b> Familiarity with basic cybersecurity measures such as antivirus software, firewalls, and keeping software up-to-date. Pupils should understand how these measures help protect against cyber threats.</p>	<p><b>Critical Thinking and Risk Assessment:</b> For understanding cyber security and identifying threats, pupils need critical thinking skills to assess the risk associated with different online behaviors and digital communications. This involves evaluating the security implications of their actions on the internet.</p> <p><b>Analytical Skills for Identifying Threats:</b> To recognize various types of cyber threats, pupils must develop strong analytical skills. This includes the ability to differentiate between normal and suspicious digital activities and discern potential threats from benign software or communications.</p> <p><b>Digital Literacy for Safe Internet Usage:</b> Safe internet usage practices require digital literacy skills. Pupils should be able to navigate the internet responsibly, understand the implications of their online actions, and use digital tools and resources wisely and safely.</p> <p><b>Awareness and Understanding of Privacy Concerns:</b> Understanding personal data and privacy involves awareness and a nuanced understanding of digital footprints. Pupils need to be knowledgeable about how personal information can be collected and used online and the importance of maintaining privacy settings to protect their data.</p>	<p><b>Name:</b> T4-Y9-CyberSecurity-Assessment3 Content:</p> <p><b>Knowledge fluency:</b> demonstrate understanding of cyber security basic key terms meaning</p> <p><b>Skills fluency:</b> questions based on scenarios to assess how pupils apply the knowledge taught</p> <p><b>Date:</b> last lesson of the term</p>	<p><b>Misconception:</b> Cyber Security is Only Concerned with Protecting Against Hackers</p> <p><b>Reality:</b> While protecting against hackers is a significant aspect of cyber security, it encompasses much more. Cyber security also involves safeguarding systems against various types of malware, phishing scams, data breaches, and ensuring the security of personal data. It’s not just about external attacks but also about internal vulnerabilities, user awareness, and safe digital practices.</p> <p><b>Misconception:</b> Strong Antivirus Software is Enough for Complete Protection</p> <p><b>Reality:</b> While antivirus software plays a critical role in protecting computers and networks from malware, relying solely on it for complete cyber security is insufficient. Cyber security is a multi-layered approach that includes using strong, unique passwords, regularly updating software, being aware of phishing tactics, and practicing safe browsing habits. It’s a combination of technological solutions and informed user behaviour.</p>	<p><b>Tier 2 vocabulary</b></p> <p><b>Authenticate:</b> This term refers to the process of verifying the identity of a user or device. In cyber security, authentication is crucial for ensuring that only authorized individuals can access certain information or systems.</p> <p><b>Encrypt:</b> To encrypt data means to convert it into a code to prevent unauthorized access. Encryption is a key concept in cyber security, used to protect sensitive information by making it unreadable without the proper key or password.</p> <p><b>Tier 3 vocabulary</b></p> <p><b>Phishing:</b> A type of cyber attack that involves tricking individuals into revealing sensitive information (like passwords and credit card numbers) by pretending to be a trusted entity in digital communication. Recognizing and understanding phishing is essential for cyber security awareness.</p> <p><b>Firewall:</b> A network security device that monitors and controls incoming and outgoing network traffic based on predetermined security rules. A firewall acts as a barrier between a trusted network and an untrusted network, such as the internet.</p>	<p>The cyber security skills unit in Key Stage 3 builds upon foundational IT skills, emphasizing the importance of safeguarding digital information and systems.</p> <p>It introduces pupils to essential concepts like data protection, safe internet practices, and threat recognition in an increasingly interconnected world where cyber threats are evolving and becoming more sophisticated.</p>



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<b>Term 5</b>	<p><b>Digital graphics -1</b></p> <ul style="list-style-type: none"> <li>Link to NC unit “Representations – going audiovisual”</li> <li>Define key terms such as ‘pixels’, ‘resolution’, and ‘colour depth’</li> <li>Define ‘compression’, and describe why it is necessary</li> <li>Perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation</li> </ul> <p><b>Understanding Image Formats:</b> Knowledge of various digital image formats (such as JPG, PNG, GIF, TIFF) and their appropriate uses, including the advantages and limitations of each format in different contexts.</p> <p><b>Basic Tools and Functions:</b> Proficiency in using Photopea’s basic tools, such as the selection tools, paintbrush, eraser, and text tool, and understanding their applications in creating and editing graphics.</p> <p><b>Layers and Composition:</b> Understanding the concept of layers in digital graphics, including how to create, modify, and manage layers in Photopea. This includes skills in layer manipulation such as reordering, hiding, and blending layers to compose complex images.</p>	<p><b>Artistic sensibility and creativity:</b> to apply knowledge of different image formats, students need an artistic sensibility to choose the format that best suits their creative intention or project requirements. Creativity is essential in envisioning and designing unique and effective graphics.</p> <p><b>Technical proficiency with graphic software:</b> proficiency in using Photopea’s tools and functions is crucial. Students must develop the technical skill to navigate and utilize the software efficiently, including mastering various tools for creating and editing digital images.</p> <p><b>Organizational skills in digital composition:</b> applying the concept of layers and composition requires good organizational skills. Students need to manage multiple elements within a digital space, understanding how to effectively layer, group, and arrange these elements to create a cohesive final product.</p>	<p><b>Name:</b> T5-Y9-DigGraphic1-Assessment</p> <p><b>Content:</b> 30 questions online quiz about the Tier 3 keywords, concepts, skills learned this term.</p> <p><b>Date:</b> last lesson of the term</p>	<p><b>Misconception:</b> Digital graphic design is easy and requires little effort</p> <p><b>Reality:</b> There’s a common belief that with modern software, creating high-quality digital graphics is easy and requires minimal effort. In truth, effective graphic design requires a good understanding of design principles, creativity, and a considerable amount of practice and refinement. Software tools are just that—tools that still require skill and artistic sense to use effectively.</p> <p><b>Misconception:</b> Graphic design skills are only useful for artists or designers</p> <p><b>Reality:</b> Basic digital graphic skills are increasingly important in a variety of fields, not just traditional art or design careers. Whether it’s creating a presentation, a report, a website, or marketing materials, the ability to design effectively can be a valuable skill in many professional contexts.</p>	<p><b>Tier 2 vocabulary</b></p> <p><b>Contrast:</b> The difference in luminance or colour that makes an object distinguishable from others within the same field of view.</p> <p><b>Perspective:</b> The technique used to represent three-dimensional objects on a two-dimensional surface in a way that looks natural and realistic.</p> <p><b>Tier 3 vocabulary</b></p> <p><b>Raster Graphics:</b> Images created with a grid of tiny pixels, where each pixel represents a colour or shade. Examples include JPG and PNG files.</p> <p><b>Vector Graphics:</b> Images created with lines and curves represented by mathematical formulas, allowing for infinite scalability without loss of quality. Examples include SVG and Adobe Illustrator files.</p>	<p>The digital graphics skills unit in Key Stage 3 builds upon fundamental IT skills, such as basic computer proficiency and introductory software usage.</p> <p>It introduces students to essential design principles, software tools, and creative expression through digital mediums.</p> <p>This unit lays the groundwork for advanced topics in digital media, web design, and interactive multimedia, crucial for the modern digital landscape.</p>





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<b>Term 6</b>	<p><b>Digital graphics -2</b></p> <p>Link to NC unit “Representations – going audiovisual”</p> <ul style="list-style-type: none"> <li>Perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation</li> </ul> <p><b>Colour Theory and Application:</b> Fundamental knowledge of colour theory, including RGB and CMYK colour models, and how to apply this knowledge in digital graphics creation, such as adjusting colours, contrasts, and using colour effectively to convey mood or message.</p> <p><b>Graphic Design Principles:</b> Understanding basic graphic design principles such as balance, contrast, alignment, and repetition, and how to apply these principles to create visually appealing and effective digital graphics.</p> <p><b>Image Resolution and Quality:</b> Knowledge of image resolution, including understanding pixels, resolution quality (e.g., DPI - Dots Per Inch), and how these factors affect the quality and size of digital images, especially in different output formats like web versus print.</p>	<p><b>Application of colour theory:</b> To apply colour theory effectively in digital graphics, pupils must understand how colours interact, how they affect perception and mood, and how to use colour to enhance the visual impact of their designs.</p> <p><b>Understanding and application of design principles:</b> Knowledge of graphic design principles needs to be complemented by the ability to apply these principles in practical scenarios. This involves creating layouts and designs that are not only aesthetically pleasing but also communicate effectively and serve the intended purpose.</p> <p><b>Attention to detail in image resolution and quality:</b> When applying knowledge of image resolution and quality, attention to detail is key. Students must be adept at fine-tuning image details to ensure the highest quality output, especially when considering how images will be used across different mediums (e.g., digital, print).</p>	<p><b>Name:</b> T6- Y9- DigGraphic2 -Assessment</p> <p><b>Content:</b> a (scaffolded) project that pupils must complete on their own, through which they demonstrate the fluency and flexibility of their coding skills/ knowledge that they gained</p> <p><b>Date:</b> Hand-in 2 lessons before last –of the term</p>	<p><b>Misconception:</b> More elements make a design better</p> <p><b>Reality:</b> Often, there’s a tendency to overcomplicate designs with multiple fonts, colours, and images. However, in graphic design, simplicity often leads to more powerful and effective communication. Understanding how to use space, colour, and typography effectively is more important than the quantity of elements used.</p>	<p><b>Tier 2 vocabulary</b></p> <p><b>Composition:</b> The arrangement of elements within a work of art or a photograph.</p> <p><b>Aesthetic:</b> Concerned with beauty or the appreciation of beauty, particularly in the arts or visual context.</p> <p><b>Tier 3 vocabulary</b></p> <p><b>Layer Mask:</b> A tool used in digital graphics software to hide or reveal portions of a layer. This allows for complex image editing and compositing.</p> <p><b>Opacity:</b> The degree to which content behind an image or graphic can be seen through it. In digital graphics, adjusting opacity is a common way to blend images and create effects.</p>	<p>Digital graphic unit is pivotal in the curriculum, bridging the gap between foundational IT skills and more specialized digital creativity and technology applications, fostering versatile digital literacy for KS4 readiness.</p>