

# Computing Year 9 Long Term Plan

**Rationale (with end points):** 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. Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems. Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability. 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. design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems. Use 2 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 a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns.

Term	Topic	Knowledge	Skills	Reading /wider reading
<b>Autumn term 1</b>	Understanding External Influences	Technology and Business Introduction to PESTLE E-commerce Privacy Issues  Employment & Consumer Law Minimum Wage Recruitment/Discrimination Health and Safety Act  Legislation in Computer Science The Data Protection Act 2018 Computer Misuse Act 1990	Identify issues using a PESTLE analysis.  Application of knowledge and skills  Social and cultural factors in computer science and Businesses  Environmental Issues regarding e-waste  Technological change and social trends	The stock market  <a href="https://www.investopedia.com/articles/investing/082614/how-stock-market-works.asp">https://www.investopedia.com/articles/investing/082614/how-stock-market-works.asp</a>

		<p>Unemployment and Technology Ethical Issues Flexible Working A.I. in workplaces</p> <p>Environmental Issues E-waste Disposal of excess stock</p> <p>Social Factors and Cultural Issues Trends in technology Influences of culture on products/technology</p>		
<p><b>Autumn 2</b></p>	<p>Computer Networking</p>	<p>Understand the advantages and disadvantages of LANs and WANs</p> <p>Understand the need for routers and switches and how they work</p> <p>Understand what the internet actually is</p> <p>Understand how data travels around the internet</p> <p>Understand what a network is</p>	<p>Recognise the differences in the different network topologies: Mesh Vs Star</p> <p>Compare Client-server vs peer-to-peer networks</p> <p>Recognise and label different types of networks.</p> <p>Fill in a table with advantages/disadvantages of the various types of networks. Link scenarios to best network types, providing reasons.</p>	<p>History of the internet</p> <p><a href="https://www.internetsociety.org/internet/history-internet/brief-history-internet/">https://www.internetsociety.org/internet/history-internet/brief-history-internet/</a></p>

		<p>Understand what advantages and disadvantages networking brings</p> <p>Understand the devices needed to produce a computer network</p> <p>Understand the difference between a Local Area Network and a Wide Area Network</p> <p>Understand the need and advantages of network protocols</p> <p>Understand how the various network protocols work</p>	<p>Data in business: How can networks help improve the data flow in a business? Why is this important? What will the effects be?</p>	
<p><b>Spring 1</b></p>	<p>Image Editing</p>	<p>Demonstrate a thorough understanding of the audience and purpose of digital graphics.</p> <p>Be able to create an evidence sheet to show the skills you have used in Photoshop.</p> <p>Understand how to assess strengths, weaknesses and</p>	<p>Be able to identify good points, bad points and improvements of digital graphics.</p> <p>Produce clear and detailed visualisation diagrams for the intended final product.</p> <p>Be able to record and source consistently appropriate sounds from a wide range of</p>	<p>The moral and social implications of image manipulation in the media</p> <p><a href="https://fstoppers.com/social-media/image-manipulation-and-social-media-where-line-559686">https://fstoppers.com/social-media/image-manipulation-and-social-media-where-line-559686</a></p>

		<p>identify improvements of your digital graphic.</p>	<p>sources to create assets for the digital graphics.</p> <p>Decide the best type of planning/design techniques.</p> <p>Identify appropriateness of audience, purpose, layouts and design considerations.</p> <p>Be able to use a variety of tools within Photoshop to create a digital graphic for a purpose.</p>	
<p><b>Spring 2</b></p>	<p>Advanced Python</p>	<p>Recall different data types</p> <p>Make a choice about which loop to use, and why</p> <p>Main terms/definitions in Python. WHILE and FOR loops problems. Choose the best loop (FOR/WHILE) to solve a problem and explain why.</p> <p>Algorithms: Convert flowcharts and pseudocode into Python coding.</p>	<p>Read and understand an existing Python program</p> <p>Use the int(), float() and str() functions to convert data types</p> <p>Write an if-else statement Use a while loop to repeat a section of code</p> <p>Use a for loop to repeat a section of code</p> <p>Be able to store and update values in a list</p>	<p>Computing and space exploration</p> <p><a href="https://www.verdict.co.uk/iss-edge-cloud-open-source-moon-mars/">https://www.verdict.co.uk/iss-edge-cloud-open-source-moon-mars/</a></p>

		<p>Understand why using a list can be more efficient than using single variables</p> <p>Understand what a procedure is</p> <p>Understand why procedures are more effective in programming</p>	<p>Be able to append data to a list</p> <p>Be able to use a for() loop to step through a list</p> <p>Be able to define and call a procedure</p> <p>Be able to use parameters and arguments when creating and using procedures</p>	
<p><b>Summer 1</b></p>	<p>Algorithms</p>	<p>Understand and apply computational thinking methods including abstraction, decomposition and algorithmic thinking</p> <p>Explain what is meant by decomposition and abstraction and use them to solve problems</p> <p>Explain what an algorithm is</p> <p>Understand what pseudocode is and produce algorithms using pseudocode</p>	<p>Explain what an algorithm is</p> <p>Explain what is meant by top-down and bottom-up problem solving</p> <p>Produce algorithms using flow diagrams</p> <p>Create algorithms to solve problems that you have analysed</p> <p>Produce algorithms using pseudocode</p> <p>Create algorithms to solve problems that you have analysed</p>	<p>Algorithms that changed the world</p> <p><a href="https://interestingengineering.com/7-essential-algorithms-that-run-the-world">https://interestingengineering.com/7-essential-algorithms-that-run-the-world</a></p>

		Understand how sorting and searching algorithms work		
<b>Summer 2</b>	System Security	<p>Describe the different strategies criminals use to attack computer networks</p> <p>Students will be able to make recommendations on how to tighten network security through an Acceptable Use Policy and other strategies</p> <p>Python coding: Create a log-in program in Python</p> <p>Networks: LAN vs WAN networks. Which one is more secure and why?</p>	<p>Students will learn how to identify vulnerabilities in a network</p> <p>Fill in table or match-up main network risks with their technical name. How can individuals do to prevent network attacks/risks</p> <p>Students will learn about social engineering techniques and be able to describe the features of Phishing and Shouldering attacks.</p>	<p>Computer forensics as a career</p> <p><a href="https://cybersecurityguide.org/careers/digital-forensics/">https://cybersecurityguide.org/careers/digital-forensics/</a></p>