

Year 8 Big Picture – Computer Science

<p><i>Autumn 01</i> <i>Weeks 1 – 7 (6 weeks)</i></p>	<p><i>Autumn 02</i> <i>Weeks 8 – 15 (8 weeks)</i></p>	<p><i>Spring 01</i> <i>Weeks 16 -24 (8 weeks)</i></p>
<p>Unit 8.1: Computing Systems</p> <p>The aim is to provide a concise overview of how computing systems operate, conveying the essentials and abstracting away the technical details that might confuse or put off learners.</p> <p>The last lessons cover two interesting contemporary topics: artificial intelligence and open source software. These are linked back to the content of the unit, helping learners to both broaden their knowledge and focus on the topics addressed in the unit.</p>	<p>Unit 8.2: Networks</p> <p>This unit begins by defining a network and addressing the benefits of networking, before covering how data is transmitted across networks and the benefits and drawbacks of using networks. The types of hardware required are explained, as is wired and wireless data transmission. Learners will develop an understanding of the terms ‘internet’ and ‘World Wide Web’. Learners will develop a network diagram and cost a new network infrastructure. The final lesson discusses operating systems and introduced graphical user interfaces (GUI) & Command line interfaces (CLI). Practical exercises are included throughout to help strengthen understanding.</p>	<p>Unit 8.3: Computational Thinking; Algorithms and Flowcharts</p> <p>This unit begins to explore Computational Thinking and applying it to problem solving. Learners identify the four cornerstones and create simple algorithms and complete by creating flowcharts.</p>
<p>Content</p> <ul style="list-style-type: none"> • Explain the difference between a general-purpose computing system and a purpose-built device • Describe the function of the hardware components used in computing systems • Describe how the hardware components used in computing systems work together in order to execute programs • Analyse how the hardware components used in computing systems work together in order to execute programs 	<ul style="list-style-type: none"> • Content • Define what a computer network is and explain the advantages and disadvantages of using a network • List examples of the hardware necessary for connecting devices to networks • Compare wired to wireless connections and list examples of specific technologies currently used to implement such connections 	<p>Content</p> <ul style="list-style-type: none"> • Computational thinking • Decomposition • Pattern recognition • Abstraction • Algorithms • The purpose and use of flowcharts • Flowchart symbols • How to draw a flowchart • How to write an algorithm in preparation for a flowchart

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<ul style="list-style-type: none"> • Define what an operating system is, and recall its role in controlling program execution • Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions • Use logic gates to construct logic circuits, and associate these with logical operators and expressions • Describe how hardware is built out of increasingly complex logic circuits • Provide broad definitions of ‘artificial intelligence’ and ‘machine learning’ Identify examples of artificial intelligence and machine learning in the real world • Describe the steps involved in training machines to perform tasks (gathering data, training, testing) • Describe how machine learning differs from traditional programming • Associate the use of artificial intelligence with moral dilemmas • Explain the implications of sharing program code 	<ul style="list-style-type: none"> • Define what the internet is • Explain how data travels between computers across the internet • Explain the difference between the internet, its services, and the World Wide Web • Describe how services are provided over the internet • Create a network diagram using a range of hardware solutions & pricing to enable re world understanding and context. • Understand what an operating system is and be able to define a Graphical user interface & a Command line interface. 	<ul style="list-style-type: none"> • How to use that algorithm to create a flowchart • Numerous practice flowchart exercises to increase student confidence.
<p>Mini Test – Yr. 8 = Wk. 5/6</p>	<p>Big Test – Yr. 8 = Wk. 14</p>	<p>Mini Test – Yr. 8 = Week</p>
<p><i>Spring 02</i> <i>Weeks ... (Spring 01) – 6 (weeks)</i></p>	<p><i>Summer 01</i> <i>Weeks ... – (7 weeks)</i></p>	<p><i>Summer 02</i> <i>Weeks 33 – 39 (6 weeks)</i></p>
<p>Unit 8.4: Intermediate Python Programming</p> <p>During this unit students will build on the skills and knowledge taught in Year 7.</p>	<p>Unit 8:5: Uisng HTML</p> <p>In this unit, learners will explore the technologies that make up the internet and World Wide Web. Starting with an exploration of the building blocks of the World Wide Web, HTML, and CSS, learners</p>	<p>Unit 8.6: App Development</p> <p><i>CP8.9 Justify their selection of multiple applications/tools when developing digital artefacts for a given audience</i></p> <p>In a world where there’s an app for every possible need, this unit aims to take the learners from designer</p>

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<p>Students will gain an in-depth understanding of how to use variables, data types, and string/ number manipulation.</p> <p>Students will learn about sequencing, selection and iteration and will be introduced to debugging, functions and lists in Python.</p>	<p>will investigate how websites are catalogued and organised for effective retrieval using search engines. They will also consider the hidden network technologies that protect us from the threats that a connected world brings, as well as looking at the impact of these services and technologies.</p> <p>This unit focuses on the following key areas of networks:</p> <ul style="list-style-type: none"> ⊘ Searching ⊘ Threats ⊘ HTML and CSS <p><i>CP8.4 Use at least one additional programming language (that must be textual) to solve problems</i></p>	<p>to project manager to developer in order to create their own mobile app. Using App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in previous units before undertaking their project. Learners will work in pairs to consider the needs of the user; decompose the project into smaller, more manageable parts; use the pair programming approach to develop their app together; and finish off by evaluating the success of the project against the needs of the user.</p>
<p>Content:</p> <ul style="list-style-type: none"> • Describe what algorithms and programs are and how they differ • Recall that a program written in a programming language needs to be translated in order to be executed by a machine • Write simple Python programs that display messages, assign values to variables, and receive keyboard input • Describe the semantics of assignment statements 	<p>Content</p> <ul style="list-style-type: none"> • Describe what HTML is • Use HTML to structure static web pages • Modify HTML tags using inline styling to improve the appearance of web pages • Describe what CSS is • Use CSS to style static web pages • Assess the benefits of using CSS to style pages instead of in-line formatting • Describe what a search engine is 	<p>Content Knowledge</p> <ul style="list-style-type: none"> • Identify when a problem needs to be broken down • Recognise that events can control the flow of a program • Know how to evaluate the success of the programming project <p>Skills</p> <ul style="list-style-type: none"> • Implement and customise GUI elements to meet the needs of the user • Use user input in an event-driven programming environment

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<ul style="list-style-type: none"> • Use simple arithmetic expressions in assignment statements to calculate values • Receive input from the keyboard and convert it to a numerical value • Use relational operators to form logical expressions • Use binary selection (if, else statements) to control the flow of program execution • Use multi-branch selection (if, elif, else statements) to control the flow of program execution • Describe how iteration (while statements) controls the flow of program execution • Use iteration (while loops) to control the flow of program execution • Use variables as counters in iterative programs • Combine iteration and selection to control the flow of program execution 	<ul style="list-style-type: none"> • Explain how search engines 'crawl' through the World Wide Web and how they select and rank results • Create hyperlinks to allow users to navigate between multiple web pages 	<ul style="list-style-type: none"> • Use variables in an event-driven programming environment • Develop a partially complete application to include additional functionality • Identify and fix common coding errors • Pass the value of a variable into an object • Establish user needs when completing a creative project • Apply decomposition to break down a large problem into more manageable steps • Use user input in a block-based programming language • Use a block-based programming language to create a sequence • Use variables in a block-based programming language • Reflect and react to user feedback
<p>Big Test – Yr. 8 = Week</p>	<p>Mini Test – Yr. 8 = Week</p>	<p>Big Test – Yr. 8 = Week</p>