Year 8 Big Picture – Computer Science

Autumn 01 Weeks 1 – 7 (6 weeks)	Autumn 02 Weeks 8 – 15 (8 weeks)	Spring 01 Weeks 16 -24 (8 weeks)
Unit 8.1: Computing Systems 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. 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.	**Unit 8:2: Networks** 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.	**Unit 8.6: App Development** *CP8.9 Justify their selection of multiple applications/tools when developing digital artefacts for a given audience* In a world where there's an app for every possible need, this unit aims to take the learners from designer 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.
Content • 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	• **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	**Content** **Knowledge** • 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

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		Skills
• Describe how the hardware components used in computing systems work together in order to execute programs	• Compare wired to wireless connections and list examples of specific technologies currently used to implement such connections	• Implement and customise GUI elements to meet the needs of the user
• Analyse how the hardware components used in computing systems work together in order to execute programs		• Use user input in an event-driven programming environment
• Define what an operating system is, and recall its role in controlling program execution	• Define what the internet is	• Use variables in an event-driven programming environment
• Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions	• Explain how data travels between computers across the internet	• Develop a partially complete application to include additional functionality
• Use logic gates to construct logic circuits, and associate these with logical operators and expressions	• Explain the difference between the internet, its services, and the World Wide Web	• Identify and fix common coding errors
• Describe how hardware is built out of increasingly complex logic circuits	• Describe how services are provided over the internet	• Pass the value of a variable into an object
• Provide broad definitions of 'artificial intelligence' and 'machine learning' Identify examples of artificial intelligence and machine learning in the real world	• Create a network diagram using a range of hardware solutions & pricing to enable re world understanding and context.	• Establish user needs when completing a creative project
• Describe the steps involved in training machines to perform tasks (gathering data, training, testing)	• Understand what an operating system is and be able to define a Graphical user interface & a Command line interface.	• Apply decomposition to break down a large problem into more manageable steps
• Describe how machine learning differs from traditional programming		• Use user input in a block-based programming language
• Associate the use of artificial intelligence with moral dilemmas		• Use a block-based programming language to create a sequence
• Explain the implications of sharing program code		• Use variables in a block-based programming language
		• Reflect and react to user feedback
Mini Test – Yr. 8 = Wk. 5/6	**Big Test – Yr. 8 = Wk. 14**	**Mini Test – Yr. 8 = Week .....**
Spring 02 *Weeks … (Spring 01) – 6 (weeks)*	*Summer 01* *Weeks … – …. (7 weeks)*	*Summer 02* *Weeks 33 – 39 (6 weeks)*

Unit 8.4: Intermediate Python Programming	Unit 8.3: Computational Thinking; Algorithms and Flowcharts	Unit 8.6
During this unit students will build on the skills and knowledge taught in Year 7. Students will gain an in-depth understanding of how to use variables, data types, and string/ number manipulation. Students will learn about sequencing, selection and iteration and will be introduced to debugging, functions and lists in Python.	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.	**Planning Interactive Media Products** In this unit, learners will first develop pre-production skills used in the digital media industries. They will learn the importance of understanding the client's requirements, planning, developing timeframes and deadlines, and the techniques involved in these processes
Content: - 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 - Use simple arithmetic expressions in assignment statements to calculate values - Receive input from the keyboard and convert it to a numerical value	Content Content - 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 - How to use that algorithm to create a flowchart - Numerous practice flowchart exercises to increase student confidence.	Content **KNOWLEDGE** - Describe the term 'pre-production' - Compare planning tools available for pre-production - Name associated file formats for types of digital graphics - Identify the resources required for creating digital graphics - Recognise the legislation regarding use of digital graphics - Discuss the features and properties of websites SKILLS - Create pre-production planning materials

• 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		• Plan a multi-page website • Plan a digital media artefact from a selected client brief • Evaluate design decisions for media artefacts
Big Test – Yr. 8 = Week …..	Mini Test – Yr. 8 = Week …..	Big Test – Yr. 8 = Week …..