Computer Studies Mid Term Plans

Contents

National Curriculum

KS3 pupils should be taught to:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems.
- 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.
- 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 how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems.
- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits.
- 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.
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design, and usability.
- 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.

All KS4 pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career.

All KS4 pupils should be taught to:

- develop their capability, creativity and knowledge in computer science, digital media, and information technology.
- develop and apply their analytic, problem-solving, design, and computational thinking skills.
- understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns.

Year 7 Computer Studies

HT 1: Respect

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	•*Using technology safely, respectfully, and responsibly.* •*Recognising acceptable/unacceptable behaviour online.* *Identifying a range of ways to report concerns about content and contact.*
Substantive Knowledge Facts, figures, dates etc	•What is Personal data? •Impact of our digital footprint •The concept of social media platforms, posting, sharing Explaining a 'Computer Virus'
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•*Basic operating system and software skills* •*Presentation skills* Using email
Next Steps …	•Y8 Media Y8 Web Development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	•Identify physical dangers in a computer room. •Identify phishing, smishing and pharming emails. •Evaluate the digital footprint of two candidates for a job. •Research your own digital footprint Create and present a cyber bullying presentation
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	*Presentation skills (drama)*
Real World Connections and Authenticity	•Using the internet responsibly Using social media safely and
Personal Development	•Allows students to work collaboratively. Students learn about online dangers and how to prevent them

HT 2: Networks

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Computer systems and networks in the Key stage 2 computing curriculum
Substantive Knowledge Facts, figures, dates etc	•Define what a computer network is and explain how data is transmitted between computers across networks •Define 'protocol' and provide examples of non-networking protocols •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 •Define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important •Define the Internet •Explain how data travels between computers across the internet •Describe key words such as 'packets', and 'addressing' •Explain the difference between the internet, its services, and the World Wide Web •Describe how services are provided over the internet •List some of these services and the context in which they are used •Explain the term 'connectivity' as the capacity for connected devices ('Internet of Things') to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation) •Describe how internet-connected devices can affect me Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Create virtual networks using network hardware
Next Steps …	*Year 8 Computer Systems*
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	•*Creating your own virtual network* •*Independent research* •*Answering comprehensive questions* *Educational videos about the Internet architecture*
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	•*Analysing the architecture of the internet on world maps (Geography)* •*Investigating the environmental impact of the Internet (Geography)* *Problem Solving (Mathematics)*
Real World Connections and Authenticity	•*Explain the term 'connectivity' as the capacity for connected devices ('internet of things') to collect and share information about me with or without my knowledge (including microphones, cameras and geolocation).* •*Describe the impact of internet-connected devices.* *Investigate how the internet is censored in some countries and not everyone's experience is the same.*
Personal Development	*Analyse how the Internet is censored in different countries across the world.*

HT 3: Media

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Information Technology and digital literacy in the Key stage 2 curriculum
Substantive Knowledge Facts, figures, dates etc	•*Describe the term creative commons* •*Explain the term credible in relation to news sources* *Acknowledge the impact of copyright and the laws that surround it*
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•Select the most appropriate software to use to complete a task •Identify the key features of a word processor •Apply the key features of a word processor to format a document •Select appropriate images for a given context •Apply appropriate formatting techniques •Demonstrate an understanding of licensing issues involving online content by •Applying appropriate Creative Commons licences •Demonstrate the ability to credit the original source of an image •Construct a blog using appropriate software •Create content for a blog based on credible sources •Apply referencing techniques that credit authors appropriately Design the layout of the content to make it suitable for the audience
Next Steps …	•Year 8 Media KS4 ICT – Referencing sources for coursework content
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	•Constructing a blog using appropriate software •Apply referencing techniques that credit authors appropriately •Applying appropriate Creative Commons licences •Select appropriate images for a given context •Select the most appropriate software to use to complete a task •Identify the key features of a word processor Apply the key features of a word processor to format a document
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Writing for a blog post (English)
Real World Connections and Authenticity	•Writing a blog for a real world cause of choice Analysing fake news and credible sources
Personal Development	Students can research a topic *linked to diversity, relationships, beliefs, inclusion, health , protected characteristics and/or fundamental British values.*

HT 4: Programming A

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Programming in the Key stage 2 curriculum
Substantive Knowledge Facts, figures, dates etc	•Define a variable as a name that refers to data being stored by the computer •Recognise that computers follow the control flow of input/process/output •Predict the outcome of a simple sequence that includes variables •Trace the values of variables within a sequence •Define a condition as an expression that will be evaluated as either true or false •Identify that selection uses conditions to control the flow of a sequence •Identify where selection statements can be used in a program •Define iteration as a group of instructions that are repeatedly executed Describe the need for iteration
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•Make a sequence that includes a variable •Modify a program to include selection •Create conditions that use comparison operators (>,<,=) •Create conditions that use logic operators (and/or/not) •Identify where selection statements can be used in a program that include comparison and logical operators •Identify where count-controlled iteration can be used in a program •Implement count-controlled iteration in a program Detect and correct errors in a program (debugging)
Next Steps …	•Year 7 Programming B •Year 8 Programming Year 8 App Development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Independently design and apply programming constructs to solve a problem (subroutine, selection, count-controlled iteration, operators, and variables)
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	▪ utilising their skills in maths (numeracy, arithmetic & algebra) ▪ utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪ All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪ Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

HT 5: Spreadsheets

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Key stage 2 curriculum
Substantive Knowledge Facts, figures, dates etc	•Explain the difference between data and information Explain the difference between primary and secondary sources of data
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•Identify columns, rows, cells, and cell references in spreadsheet software •Use formatting techniques in a spreadsheet •Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /) •Use the autofill tool to replicate cell data •Collect data •Analyse data •Create appropriate charts in a spreadsheet •Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet •Use a spreadsheet to sort and filter data •Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet Use conditional formatting in a spreadsheet
Next Steps …	KS4 ICT Spreadsheet development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	•Navigate spreadsheets via rows and columns •Locate cell references and customise cells •Use autofill •Apply formulae and functions Use conditional formatting
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Cell references, functions and formulae (Mathematics)
Real World Connections and Authenticity	•Data collection and ethics. All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns)
Personal Development	Opportunity to develop students understanding of ethics.

HT 6: Programming B

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	•Programming in the Key stage 2 curriculum Programming A
Substantive Knowledge Facts, figures, dates etc	•Define a subroutine as a group of instructions that will run when called by the main program or other subroutines •Define decomposition as breaking a problem down into smaller, more manageable subproblems •Evaluate which type of iteration is required in a program •Define a list as a collection of related elements that are referred to by a single name Describe the need for lists
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•Identify where condition-controlled iteration can be used in a program •Identify how subroutines can be used for decomposition •Implement condition-controlled iteration in a program •Identify when lists can be used in a program •Use a list •Decompose a larger problem into smaller subproblems Apply appropriate constructs to solve a problem
Next Steps …	•Year 8 Programming Year 8 App Development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Learners are given a scenario to create a translation quiz for a Modern Foreign Languages teacher. The learners will decompose the problem and start to build a Scratch program to meet the requirements. This is a pair programming project that takes place over two lessons; pairs will develop their programs to differing levels. A rubric is to be used for peer- or self-assessment to check progress. Extension activities allow learners to explore more challenging aspects of the solution. In Lesson 12, learners will be given a multiple-choice quiz as a formal final assessment.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	▪ utilising their skills in maths (numeracy, arithmetic & algebra) ▪ utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪ All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪ Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

Year 7 Alternative Learning Provision (ALP)

HT 1 : Respect

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Using technology safely, respectfully and responsibly* *Recognising acceptable/unacceptable behaviour* *Identifying a range of ways to report concerns about content and contact*
Substantive Knowledge Facts, figures, dates etc	•What is Personal data? •Impact of our digital footprint •The concept of social media platforms, posting, sharing Explaining a 'Computer Virus'
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•*Basic operating system and software skills* •*Presentation skills* Using email
Next Steps …	•Y8 Media Y8 Web Development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	•Identify physical dangers in a computer room •Identify phishing, smishing and pharming emails •Evaluate the digital footprint of two candidates for a job •Research your own digital footprint Create and present a cyber bullying presentation
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	•*Presentation skills (drama)* *ICT Skills – used in all subjects*
Real World Connections and Authenticity	•Using the internet responsibly •Using Social media safely and •Using the internet responsibly Using social media safely and
Personal Development	•Allows students to work collaboratively. •Students learn about online dangers and how to prevent them. •Allows students to work collaboratively. Students learn about online dangers and how to prevent them

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
• Colours backgrounds: check, **teach reading ruler.** • Broken down numbered instructions. • Reading age: check • KEY WORD FOCUS	• Sentence starters • Vocab building • **Teach Spelling / grammar check**	• speak like a champion. • Repeat instructions – check understanding. • **I do – We do – you do**	• **Routine – Class Notebook / 10 fast fingers** • MERITS / PRAISE – live ClassCharts • Timed tasks – keep pace	• Be positive. • Praise the work and effort. • Structured movement breaks as part of a task • **Understand triggers.** • Use distraction and offer a way out

HT 2: Networks (KS2 Start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Respect, use of computers and communication KS2 networking

Substantive Knowledge
Facts, figures, dates etc
	• To explain the importance of internet addresses
	  ○ I can recognise that data is transferred using agreed methods.
	  ○ I can explain that internet devices have addresses.
	  ○ I can describe how computers use addresses to access websites.
	• To recognise how data is transferred across the internet.
	  ○ I can identify and explain the main parts of a data packet.
	  ○ I can explain that data is transferred over networks in packets.
	  ○ I can explain that all data transferred over the internet is in packets

Procedural, Experimental and Disciplinary Knowledge
(Skills to develop, experience and practice)
	• To explain how sharing information online can help people to work together.
	  ○ I can recognise how to access shared files stored online.
	  ○ I can send information over the internet in different ways.
	  ○ I can explain that the internet allows different media to be shared.
	• To evaluate different ways of working together online
	  ○ I can identify different ways of working together online.
	  ○ I can recognise that working together on the internet can be public or private.
	  ○ I can explain how the internet enables effective collaboration

Next Steps …	Y8 Networks
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Multiple tasks given throughout the lessons
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	
Real World Connections and Authenticity Personal Development	• I can describe and assess the benefits and the potential risks of sharing information online. • I can assess and justify when it is acceptable to use the work of others. • I can give examples of content that is permitted to be reused

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
• **Broken down numbered instructions.** • Reading age: check • KEY WORD FOCUS	• **Sentence starters** • Vocab building Teach Spelling / grammar check	• **Speak like a champion.** • Repeat instructions – check understanding. • I do – We do – you do	• Routine – Class Notebook / 10 fast fingers • **MERITS / PRAISE – live ClassCharts** • Timed tasks – keep pace	• **Be positive.** • Praise the work and effort. • **Structured movement breaks as part of a task** • Use distraction and offer a way out

HT 3: Media (KS2 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Respect – use of technology to communicate responsibly*
Substantive Knowledge Facts, figures, dates etc	•To review an existing website and consider its structure. • I can explore a website. • I can discuss the different types of media used on websites. • I know that websites are written in HTML. •To consider the ownership and use of images (copyright) • I can say why I should use copyright-free images. • I can find copyright-free images. I can describe what is meant by the term 'fair use'
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	•To plan the features of a web page • I can recognise the common features of a web page. • I can suggest media to include on my page. • I can draw a web page layout that suits my purpose. •To recognise the need to preview pages. • I can add content to my own web page. • I can preview what my web page looks like • I can evaluate what my web page looks like on different devices and suggest/make edits. •To outline the need for a navigation path • I can explain what a navigation path is. • I can describe why navigation paths are useful. • I can make multiple web pages and link them using hyperlinks. •To recognise the implications of linking to content owned by other people. • I can explain the implication of linking to content owned by others. • I can create hyperlinks to link to other people's work. • I can evaluate the user experience of a website
Next Steps …	Y8 Web Development
Summative Assessment	Assessment through task (Rubric) as well as through DART assessment questions
Independent Learning Tasks	Independent work is throughout the unit but also as part of a mini project to test understanding
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	*Writing composition: Identifying the audience for and purpose of the writing, selecting the appropriate form, and using other similar writing as models for their own*
Real World Connections and Authenticity Personal Development	• Online relationships • Managing information online • Copyright and ownership

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
• **Broken down numbered instructions.** • Reading age: check • KEY WORD FOCUS	• **Sentence starters** • Vocab building • Teach Spelling / grammar check	• **Speak like a champion.** • Repeat instructions – check understanding. • I do – We do – you do	• Routine – Class Notebook / 10 fast fingers • **MERITS / PRAISE – live ClassCharts** • Timed tasks – keep pace	• **Be positive.** • Praise the work and effort. • **Structured movement breaks as part of a task** • Use distraction and offer a way out

HT 4: Programming A (KS2 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	KS2 Algorithmic Thinking Spreadsheets
Substantive Knowledge Facts, figures, dates etc	To define a 'variable' as something that is changeable ● I can identify examples of information that is variable ● I can explain that the way a variable changes can be defined ● I can identify that variables can hold numbers or letters To explain why a variable is used in a program ● I can identify a program variable as a placeholder in memory for a single value ● I can explain that a variable has a name and a value ● I can recognise that the value of a variable can be changed
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	To choose how to improve a game by using variables ● I can decide where in a program to change a variable ● I can make use of an event in a program to set a variable ● I can recognise that the value of a variable can be used by a program To design a project that builds on a given example ● I can choose the artwork for my project ● I can create algorithms for my project ● I can explain my design choices To use my design to create a project ● I can create the artwork for my project ● I can choose a name that identifies the role of a variable ● I can test the code that I have written To evaluate my project ● I can identify ways that my game could be improved ● I can use variables to extend my game ● I can share my game with others
Next Steps …	Micro:Bit programming
Summative Assessment	Assessed as part of DC3 DART
Independent Learning Tasks	Creating a project
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Logic Basic math
Real World Connections and Authenticity	• Links to real world programming concepts • Links to games students may be familiar with

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
• **Broken down numbered instructions.** • KEY WORD FOCUS	• Vocab building Teach Spelling / grammar check	• **Speak like a champion.** • Repeat instructions – check understanding. • I do – We do – you do	• Routine – Class Notebook / 10 fast fingers • MERITS / PRAISE – live ClassCharts • **Timed tasks – keep pace**	• Be positive. • **Praise the work and effort.** • Use distraction and offer a way out

HT 5: Spreadsheets (KS2 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	KS2
Substantive Knowledge Facts, figures, dates etc	To explain that formulas can be used to produce calculated data ● I can explain which data types can be used in calculations ● I can construct a formula in a spreadsheet ● I can identify that changing inputs changes outputs To choose suitable ways to present data ● I can produce a chart ● I can use a chart to show the answer to a question ● I can suggest when to use a table or chart
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	To create a data set in a spreadsheet ● I can collect data ● I can suggest how to structure my data ● I can enter data into a spreadsheet To build a data set in a spreadsheet ● I can explain what an item of data is ● I can choose an appropriate format for a cell ● I can apply an appropriate format to a cell To apply formulas to data ● I can calculate data using different operations ● I can create a formula which includes a range of cells ● I can apply a formula to multiple cells by duplicating it To create a spreadsheet to plan an event ● I can use a spreadsheet to answer questions ● I can explain why data should be organised ● I can apply a formula to calculate the data I need to answer questions
Next Steps …	Spreadsheets in Y8
Summative Assessment	Assessed as part of DAR cycle
Independent Learning Tasks	To create a spreadsheet
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Basic math Primary and Secondary data
Real World Connections and Authenticity	• Event planning focus and presenting data to build organisational skills

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
• Broken down numbered instructions. • Reading age: check • **KEY WORD FOCUS**	• Sentence starters • Vocab building Teach Spelling / grammar check	• Speak like a champion. • Repeat instructions – check understanding. • **I do – We do – you do**	• Routine – Class Notebook / 10 fast fingers • MERITS / PRAISE – live ClassCharts • Timed tasks – keep pace	• Be positive. • Praise the work and effort. • Structured movement breaks as part of a task • **Use distraction and offer a way out**

HT 6: Programming B (KS2 start) Micro:Bit

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Programming A
Substantive Knowledge Facts, figures, dates etc	To explain that selection can control the flow of a program ● I can identify examples of conditions in the real world ● I can use a variable in an if, then, else statement to select the flow of a program ● I can determine the flow of a program using selection
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	To create a program to run on a controllable device ● I can apply my knowledge of programming to a new environment ● I can test my program on an emulator ● I can transfer my program to a controllable device To update a variable with a user input ● I can use a condition to change a variable ● I can experiment with different physical inputs ● I can explain that checking a variable doesn't change its value To use an conditional statement to compare a variable to a value ● I can use an operand (e.g. <>=) in an if, then statement ● I can explain the importance of the order of conditions in else, if statements ● I can modify a program to achieve a different outcome To design a project that uses inputs and outputs on a controllable device ● I can decide what variables to include in a project ● I can design the algorithm for my project ● I can design the program flow for my project To develop a program to use inputs and outputs on a controllable device ● I can create a program based on my design ● I can test my program against my design ● I can use a range of approaches to find and fix bugs
Next Steps …	Programming Y8
Summative Assessment	DART assessment cycle
Independent Learning Tasks	Create a series of programs
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Sensors linking to geography and science. Step counter - PE
Real World Connections and Authenticity Personal Development	• Real world applications for programs

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
• **Broken down numbered instructions.** • Reading age: check • KEY WORD FOCUS	• **Sentence starters** • Vocab building Teach Spelling / grammar check	• **Speak like a champion.** • Repeat instructions – check understanding. • I do – We do – you do	• Routine – Class Notebook / 10 fast fingers • **MERITS / PRAISE – live ClassCharts** • Timed tasks – keep pace	• **Be positive.** • Praise the work and effort. • **Structured movement breaks as part of a task** • Use distraction and offer a way out

Year 8 Computer Studies

HT 1: Media

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y7 Media. Images, copyright*
Substantive Knowledge Facts, figures, dates etc	Explain what vector graphics are Provide examples where using vector graphics would be appropriate
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Draw basic shapes (rectangle, ellipse, polygon, star) with different properties (fill and stroke, shape-specific attributes) Manipulate individual objects (select, move, resize, rotate, duplicate, flip, z-order) Manipulate groups of objects (select, group/ungroup, align, distribute) Combine paths by applying operations (union, difference, intersection) Convert objects to paths Draw paths Edit path nodes Combine multiple tools and techniques to create a vector graphic design
Next Steps …	ICT Y10 Design a Logo Task
Summative Assessment	Multi Choice Questions Create an illustration, logo or icon pack
Independent Learning Tasks	Create shapes and complete project
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Union, difference, size
Real World Connections and Authenticity	Create a logo and real-world logos
Personal Development	

HT 2: Computer Systems

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Programming – Boolean Logic* *Spreadsheets – Data and Date Types* *Networks – Communicating using binary*
Substantive Knowledge Facts, figures, dates etc	Recall that a general-purpose computing system is a device for executing programs Recall that a program is a sequence of instructions that specify operations that are to be performed on data 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 Recall that all computing systems, regardless of form, have a similar structure ('architecture') Analyse how the hardware components used in computing systems work together in order to execute programs 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 Describe how hardware is built out of increasingly complex logic circuits Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits 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
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Use logic gates to construct logic circuits, and associate these with logical operators and expressions
Next Steps …	Y8 Web Development - Boolean Logic Y8 Representations – Binary, Boolean Logic Y8 App development – Boolean Logic
Summative Assessment	Multi choice Questions
Independent Learning Tasks	Lesson Tasks
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Maths – boolean Logic – Venn Diagrams PSHE – Moral dilemmas in AI
Real World Connections and Authenticity	Link out to AI industry and computer hardware industry
Personal Development	Moral dilemmas around AI

HT 3: Web Development

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y7 Programming* *Y7 Respect* *Y7 Networks* *Y8 Media*
Substantive Knowledge Facts, figures, dates etc	Describe what HTML is Describe what CSS is Assess the benefits of using CSS to style pages instead of in-line formatting Describe what a search engine is Explain how search engines 'crawl' through the World Wide Web and how they select and rank results Analyse how search engines select and rank results when searches are made Discuss the impact of search technologies and the issues that arise by the way they function and the way they are used
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Use HTML to structure static web pages Modify HTML tags using inline styling to improve the appearance of web pages Display images within a web page Apply HTML tags to construct a web page structure from a provided design Use CSS to style static web pages Use search technologies effectively Create hyperlinks to allow users to navigate between multiple web pages Implement navigation to complete a functioning website
Next Steps …	Y8 App Development
Summative Assessment	Multi Choice Questions
Independent Learning Tasks	Creating Websites Searching the web
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	
Real World Connections and Authenticity	Links to real world website development
Personal Development	Ability to critically search the web

HT 4: Representations

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y8 Computer Systems*
Substantive Knowledge Facts, figures, dates etc	List examples of representations Recall that representations are used to store, communicate, and process information Provide examples of how different representations are appropriate for different tasks Recall that characters can be represented as sequences of symbols and list examples of character coding schemes Provide examples of how symbols are carried on physical media Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters Describe how natural numbers are represented as sequences of binary digits Provide examples of the different ways that binary digits are physically represented in digital devices
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Measure the length of a representation as the number of symbols that it contains Measure the size or length of a sequence of bits as the number of binary digits that it contains Convert a decimal number to binary and vice versa Convert between different units and multiples of representation size
Next Steps …	Y9 Representations
Summative Assessment	Multi Choice Questions
Independent Learning Tasks	
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Maths – Decimal and binary number systems
Real World Connections and Authenticity	Real world link to computer scienctists
Personal Development	

#1 Visuals	**#2 Organisational Support**	**#3 Communication**	**#4 Consistency**	**#5 Behaviour Management**

HT 5: App Development

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y7 Programming* *Y8 Web Development*
Substantive Knowledge Facts, figures, dates etc	Decomposition Variables
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Identify when a problem needs to be broken down Implement and customise GUI elements to meet the needs of the user Recognise that events can control the flow of a program Use user input in an event-driven programming environment 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 Use a block-based programming language to include sequencing and selection Use user input in a block-based programming language Use variables in a block-based programming language Reflect and react to user feedback Use a block-based programming language to include sequencing and selection Use user input in a block-based programming language Use variables in a block-based programming language Evaluate the success of the programming project
Next Steps …	Y8 Programming Y9 Programming Y9 Physical computing
Summative Assessment	Multi choice Questions
Independent Learning Tasks	Programming
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Problem Solving
Real World Connections and Authenticity	Connection to App Development on their phones
Personal Development	Problem Solving

HT 6: Python Programming

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Scratch
Substantive Knowledge Facts, figures, dates etc	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 Describe the semantics of assignment statements Describe how iteration (while statements) controls the flow of program execution
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Write simple Python programs that display messages, assign values to variables, and receive keyboard input Locate and correct common syntax errors 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 Generate and use random integers Use multi-branch selection (if, elif, else statements) to control 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 Use Boolean variables as flags
Next Steps …	Y9 Programming Y9 Physical Computing
Summative Assessment	Multi Choice Questions
Independent Learning Tasks	Programming
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Integer data type, Logic, Place Value
Real World Connections and Authenticity	Connection to programming jobs
Personal Development	Problem Solving

Year 8 Alternative Learning Provision (ALP)

HT 1: Media

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y7 Media. Images, copyright*
Substantive Knowledge Facts, figures, dates etc	Explain what vector graphics are Provide examples where using vector graphics would be appropriate
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Draw basic shapes (rectangle, ellipse, polygon, star) with different properties (fill and stroke, shape-specific attributes) Manipulate individual objects (select, move, resize, rotate, duplicate, flip, z-order) Manipulate groups of objects (select, group/ungroup, align, distribute) Combine paths by applying operations (union, difference, intersection) Convert objects to paths Draw paths Edit path nodes Combine multiple tools and techniques to create a vector graphic design
Next Steps …	ICT Y10 Design a Logo Task
Summative Assessment	Multi Choice Questions Create an illustration, logo or icon pack
Independent Learning Tasks	Create shapes and complete project
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Union, difference, size
Real World Connections and Authenticity	Create a logo and real-world logos
Personal Development	

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
Use of visual diagrams and support documents to show tasks	Use of support material in an organised way to allow students to find their own way through their tasks and to know what comes next	• Repeat instructions – check understanding. I do – We do – you do	Routines: Class Notebook, open Inkscape	Praise the work and the effort!

HT 2: Networks (Y7 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Computer systems and networks in the Key stage 2 computing curriculum
Substantive Knowledge Facts, figures, dates etc	• Define what a computer network is and explain how data is transmitted between computers across networks • Define 'protocol' and provide examples of non-networking protocols • 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 • Define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important • Define the Internet • Explain how data travels between computers across the internet • Describe key words such as 'packets', and 'addressing' • Explain the difference between the internet, its services, and the World Wide Web • Describe how services are provided over the internet • List some of these services and the context in which they are used • Explain the term 'connectivity' as the capacity for connected devices ('Internet of Things') to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation) • Describe how internet-connected devices can affect me Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Create virtual networks using network hardware
Next Steps …	*Year 8 Computer Systems*
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	• *Creating your own virtual network* • *Independent research* • *Answering comprehensive questions* *Educational videos about the Internet architecture*
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	• *Analysing the architecture of the internet on world maps (Geography)* • *Investigating the environmental impact of the Internet (Geography)* *Problem Solving (Mathematics)*
Real World Connections and Authenticity	• *Explain the term 'connectivity' as the capacity for connected devices ('internet of things') to collect and share information about me with or without my knowledge (including microphones, cameras and geolocation).* • *Describe the impact of internet-connected devices.* *Investigate how the internet is censored in some countries and not everyone's experience is the same.*
Personal Development	*Analyse how the Internet is censored in different countries across the world.*

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management
Network topics visually represented on class materials	Use of class notebook to allow students to see tasks coming up	• Repeat instructions – check understanding. I do – We do – you do	Routines: Class notebook, starters	Praise the effort! Praise the thinking and contributions • **Structured movement breaks as part of a task**

HT 3: Web Development

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y7 Programming* *Y7 Respect* *Y7 Networks* *Y8 Media*
Substantive Knowledge Facts, figures, dates etc	Describe what HTML is Describe what CSS is Assess the benefits of using CSS to style pages instead of in-line formatting Describe what a search engine is Explain how search engines 'crawl' through the World Wide Web and how they select and rank results Analyse how search engines select and rank results when searches are made Discuss the impact of search technologies and the issues that arise by the way they function and the way they are used
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Use HTML to structure static web pages Modify HTML tags using inline styling to improve the appearance of web pages Display images within a web page Apply HTML tags to construct a web page structure from a provided design Use CSS to style static web pages Use search technologies effectively Create hyperlinks to allow users to navigate between multiple web pages Implement navigation to complete a functioning website
Next Steps …	Y8 App Development
Summative Assessment	Multi Choice Questions
Independent Learning Tasks	Creating Websites Searching the web
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	
Real World Connections and Authenticity	Links to real world website development
Personal Development	Ability to critically search the web

#1 Visuals	**#2 Organisational Support**	**#3 Communication**	**#4 Consistency**	**#5 Behaviour Management**
Use of visual to compare input to effect on the output	Use of Repl to allow students to know where they are supposed to be	I Do – We Do – You do Repeat instructions Parrot back	Routines: Class Notebook, open Repl	

HT 4: Programming A (Y7 start)

hT 4:Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Programming in the Key stage 2 curriculum
Substantive Knowledge Facts, figures, dates etc	• Define a variable as a name that refers to data being stored by the computer • Recognise that computers follow the control flow of input/process/output • Predict the outcome of a simple sequence that includes variables • Trace the values of variables within a sequence • Define a condition as an expression that will be evaluated as either true or false • Identify that selection uses conditions to control the flow of a sequence • Identify where selection statements can be used in a program • Define iteration as a group of instructions that are repeatedly executed Describe the need for iteration
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	• Make a sequence that includes a variable • Modify a program to include selection • Create conditions that use comparison operators (>,<,=) • Create conditions that use logic operators (and/or/not) • Identify where selection statements can be used in a program that include comparison and logical operators • Identify where count-controlled iteration can be used in a program • Implement count-controlled iteration in a program Detect and correct errors in a program (debugging)
Next Steps …	• Year 7 Programming B • Year 8 Programming Year 8 App Development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Independently design and apply programming constructs to solve a problem (subroutine, selection, count-controlled iteration, operators, and variables)
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	▪ utilising their skills in maths (numeracy, arithmetic & algebra) ▪ utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪ All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪ Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

HT 5: Spreadsheets (Y7 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Key stage 2 curriculum
Substantive Knowledge Facts, figures, dates etc	• Explain the difference between data and information Explain the difference between primary and secondary sources of data
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	• Identify columns, rows, cells, and cell references in spreadsheet software • Use formatting techniques in a spreadsheet • Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /) • Use the autofill tool to replicate cell data • Collect data • Analyse data • Create appropriate charts in a spreadsheet • Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet • Use a spreadsheet to sort and filter data • Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet Use conditional formatting in a spreadsheet
Next Steps …	KS4 ICT Spreadsheet development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	• Navigate spreadsheets via rows and columns • Locate cell references and customise cells • Use autofill • Apply formulae and functions Use conditional formatting
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Cell references, functions and formulae (Mathematics)
Real World Connections and Authenticity	• Data collection and ethics. All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns)
Personal Development	Opportunity to develop students understanding of ethics.

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

HT 6: Programming B (Y7 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	• Programming in the Key stage 2 curriculum Programming A
Substantive Knowledge Facts, figures, dates etc	• Define a subroutine as a group of instructions that will run when called by the main program or other subroutines • Define decomposition as breaking a problem down into smaller, more manageable subproblems • Evaluate which type of iteration is required in a program • Define a list as a collection of related elements that are referred to by a single name Describe the need for lists
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	• Identify where condition-controlled iteration can be used in a program • Identify how subroutines can be used for decomposition • Implement condition-controlled iteration in a program • Identify when lists can be used in a program • Use a list • Decompose a larger problem into smaller subproblems Apply appropriate constructs to solve a problem
Next Steps …	• Year 8 Programming Year 8 App Development
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Learners are given a scenario to create a translation quiz for a Modern Foreign Languages teacher. The learners will decompose the problem and start to build a Scratch program to meet the requirements. This is a pair programming project that takes place over two lessons; pairs will develop their programs to differing levels. A rubric is to be used for peer- or self-assessment to check progress. Extension activities allow learners to explore more challenging aspects of the solution. In Lesson 12, learners will be given a multiple-choice quiz as a formal final assessment.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	▪ utilising their skills in maths (numeracy, arithmetic & algebra) ▪ utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪ All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪ Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

Year 9 Computer Studies

HT 1: Python Programming

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Various KS2 programming topics, Year 7 Topics 'Programming Essentials' (Scratch) and 'Programming Projects' (Scratch), Year 8 Topics 'Web Development' (HTML), 'App Development' (App Lab) and 'Programming' (Python).
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪Three Programming Constructs (Sequence, Selection, Iteration) ▪Input > Process > Output ▪Variables as a location to store data ▪'If Statements' for decision-making Sub-Routines
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪accurately type commands, compare syntax, debug syntax errors ▪Think computationally: abstract, decompose, recognise patterns & algorithms ▪make predictions Have an appreciation of logic/binary choices
Next Steps …	Pupils engaging with this topic will be equipped to tackle Component 2 of OCR's GCSE Computer Science. This topic may also be a springboard for extra-curricular/hobby programming.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils will frequently be required to predict or attempt a programming solution independently, before any paired or class collaboration. Attempting to solve problems and recall syntax independently develops computational thinking.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪utilising their skills in maths (numeracy, arithmetic & algebra) ▪utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

HT 2: Blender Animation

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Various KS2 programming topics, Year 7 Topics 'Programming Essentials' (Scratch), 'Programming Projects' (Scratch) and 'Image Editing' (Photoshop), Year 8 Topics 'Media' (InkScape).
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪X & Y planes, 3D environments, 3D animation, Panning, Orbiting ▪Mass, volume, perspective ▪Selection & text tools Textures, organic objects, spotlights
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪be able to judge proportion, compare a worked example with their own work ▪follow video tutorials closely, listening to narrated instruction ▪Manipulate 3D shapes in a virtual environment ▪Understand the concept of 'rendering', object mode & edit mode Understand the facets of 3D shapes: 'vertex', 'edge' and 'face'
Next Steps …	Pupils engaging with this topic will be equipped to tackle basic character, object (product) and environment modelling. These skills develop problem-solving/algorithm skills for Component 2 of GCSE Computer Science. This topic may also be a springboard for extra-curricular/hobby animation, modelling, product design, particularly as the Blender software is freeware.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils are encouraged to add to or customise base models, where they must take the learned skills from the video tutorials and apply them independently. Creating new or adapting models without explicit instructions promotes recall and develops problem-solving skills.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪utilising their skills in algebra, volume, mass, X & Y co-ordinates (Maths) ▪utilising their experiences of 3D environments (Design Technology, Engineering ▪Utilising their experiences of perspective & depth (Art & Design) ▪utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪Decision-making Automation / Artificial Intelligence
Personal Development	The 3D Animation, Modelling, Product Prototyping community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

HT 3: Data Science

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Potential KS2 topics, where pupils have gathered data, conducted a survey or poll, Year 7 Topics 'Networks' and 'Spreadsheets' (Excel), Year 8 Topic 'Representations'.
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪the difference between data & information ▪graphs, charts and tables. ▪row and columns formula and functions
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪learn the following terms: visualisations, insight, infographic ▪Learn the following terms: criteria, outlier, trend, correlation ▪Infer from the data, make predictions and offer explanations ▪Utilise the 'Investigative Cycle' determine what data to collect in order to make decisions about a scenario
Next Steps …	Pupils engaging with this topic will be equipped to tackle basic character, object (product) and environment modelling. These skills develop problem-solving/algorithm skills for Component 2 of GCSE Computer Science. This topic may also be a springboard for extra-curricular/hobby animation, modelling, product design, particularly as the Blender software is freeware.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils need to explore and learn how to operate the *DataWrapper, Gap Minder, CODAP* and *MS Forms* websites. Pupils must choose criteria in which to build data visualisations and report their findings.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪drawing on their knowledge of values: height, duration, speed, length, size etc. ▪drawing on their ability to pose questions which could be answered by data. ▪drawing on prior knowledge of data gathering (school surveys for example). ▪utilising their skills in numeracy. ▪utilising their skills in assessing (comparing) and selecting the values. utilising their skills in *Microsoft Excel* (table-building, functions, formulae)
Real World Connections and Authenticity	▪Data collection, Big data, Analytics, GDPR, Consent, Artificial Intelligence ▪Data gathering by weather apps, Formula 1, NHS, banking, Uber, Supermarkets Customer profiling by popular platforms such as YouTube, Netflix
Personal Development	Big data about the environment is valuable in improving a pupil's understanding of global warming, pollution, famine, mortality etc.. Big data about mental health, social, cultural and financial issues is valuable in improving a pupil's understanding of poverty, wealth, unemployment, life expectancy, crime, criminal justice, suicide etc..

HT 4: Representation

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Year 7 Topics 'Spreadsheets' (bitmap simulation), Year 8 Topic 'InkScape' (Colour Picker), 'Representations', and prior interests in sound recording, pixel art editing images.
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪Digital images ▪Binary values (bit, byte) ▪Mixing colours (additive colour) ▪Vibrations, sound waves 'Photoshopping'
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪learn what is meant by a 'bitmap'. ▪learn the relationship between pixels, resolution and image quality/size. ▪learn relationship between bit depth (bits per pixel) and colour depth. ▪understand how primary colours are split between the available bits. ▪learn how to use specific Photoshop tools (magic wand, clone stamp, lasso..) learn audio terms such as: sample rate, sample depth, compression.
Next Steps …	Pupils engaging with this topic will be equipped to tackle the Representations topics within Component 1 of GCSE Computer Science and the vocational EDUCAS Digital Imaging. They will also be able to attempt editing tasks in Photoshop and similar software. This topic may also be a springboard for extra-curricular/hobby/careers interest in photo-retouching, graphic design, sound recording, audio mixing/production and digital illustrating.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils must create their own monochrome and colour bitmaps, they must determine the colour depth of images, create custom colours, manipulate photographs using industry-based methods, compress image files and assess.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪utilising their skills in numeracy (bit depth, calculating file sizes) ▪utilising their prior knowledge from the Year 8 'Representations' unit. ▪utilising their skills in numeracy. ▪utilising their skills in assessing (comparing) and selecting values. utilising their skills in *Microsoft Excel* (cell-shading, entering values etc)
Real World Connections and Authenticity	▪Sectors: web & graphic design, audio editing & production etc.. ▪Physics and the natural world (sound, light, vision, vibration, air waves, colour) ▪Commercial imaging, social media pressures, 'Photoshopping', 'Deep Fakes' Digital media versus analogue media.
Personal Development	A recognition that the images and sounds we consume are constructed by humans and are often motivated by commercial interests or to influence our beliefs.

HT 5: Cyber Security

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Year 7 Topics 'Online Safety' & 'Networks' and Year 8 Topic 'Computer Systems'.
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪Personal data ▪Social media platforms, posting ▪The idea of a 'Virus' ▪Customer Email, Text Message
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪learn what the three common cyber threats are. ▪learn about the business of selling our data. ▪determine the difference between types of social engineering scams. explore what is meant by the following terms: ethical, permission, authorisation
Next Steps …	Pupils engaging with this topic will be equipped to tackle Component 1 topics: 1.3 Networks & Protocols & 1.4 Network Security of the GCSE Computer Science. This topic may also be a springboard for extra-curricular interest in Problem Solving, Cryptography, Cyber Security, Cyber Crime.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils will read about the Data Protection Act 2018 and how Data Subjects are protected. Pupils will carry out independent research on six types of Malware (Virus, Trojan Horse, Ransomware, Adware, Bot, Worm)
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪utilising any prior experience they have with working collaboratively. ▪utilising any prior experience of gathering information online. utilising any prior experience they have creating and delivering a presentation.
Real World Connections and Authenticity	Pupils will read about the four types of data collected about them on Social Media (personal, content, user behaviour and data about others)
Personal Development	Financial security, online fraud, social engineering scams (phishing, smishing, pharming, blagging) Peer assessment, constructive criticism.

HT 6: Physical Programming

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Potential KS2 block programming topics, Year 7 Topics 'Programming Essentials' (Scratch) and 'Programming Projects' (Scratch), Year 8 Topics 'Web Development' (HTML), 'App Development' (App Lab) and 'Programming' (Python). Tear 9 Topics 'Programming' (Python).
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪'Block Programming' via Scratch ▪'Textual Programming' via Python ▪Command, Input > Process > Output ▪LED's (Light Emitting Diode) Robotic buggies
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪accurately type commands, compare syntax, debug syntax errors ▪Think computationally: abstract, decompose, recognise patterns & algorithms ▪make predictions ▪Have an appreciation of logic/binary choices learn the following terms: accelerometer, magnetometer, illuminance (Lux)
Next Steps …	Pupils engaging with this topic will be equipped to tackle Component 1 of OCR's GCSE Computer Science, developing their computational thinking and debugging skills. This topic may also be a springboard for extra-curricular/hobby programming, maker projects.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils will frequently be required to predict or attempt a programming solution independently, before any paired or class collaboration. Attempting to solve problems and recall syntax independently develops computational thinking.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪utilising their skills in maths (numeracy, arithmetic & algebra) ▪utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪Software development. ▪Understanding of the technology around us. ▪All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

Year 9 Alternative Learning Provision (ALP)

HT 1: Representations (Y8 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	*Y8 Computer Systems*
Substantive Knowledge Facts, figures, dates etc	List examples of representations Recall that representations are used to store, communicate, and process information Provide examples of how different representations are appropriate for different tasks Recall that characters can be represented as sequences of symbols and list examples of character coding schemes Provide examples of how symbols are carried on physical media Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters Describe how natural numbers are represented as sequences of binary digits Provide examples of the different ways that binary digits are physically represented in digital devices
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Measure the length of a representation as the number of symbols that it contains Measure the size or length of a sequence of bits as the number of binary digits that it contains Convert a decimal number to binary and vice versa Convert between different units and multiples of representation size
Next Steps …	Y9 Representations
Summative Assessment	Multi Choice Questions
Independent Learning Tasks	
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Maths – Decimal and binary number systems
Real World Connections and Authenticity	Real world link to computer scientists
Personal Development	

#1 Visuals	**#2 Organisational Support**	**#3 Communication**	**#4 Consistency**	**#5 Behaviour Management**

HT 2: Blender Animation

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Various KS2 programming topics, Year 7 Topics 'Programming Essentials' (Scratch), 'Programming Projects' (Scratch) and 'Image Editing' (Photoshop), Year 8 Topics 'Media' (InkScape).
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪ X & Y planes, 3D environments, 3D animation, Panning, Orbiting ▪ Mass, volume, perspective ▪ Selection & text tools Textures, organic objects, spotlights
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪ be able to judge proportion, compare a worked example with their own work ▪ follow video tutorials closely, listening to narrated instruction ▪ Manipulate 3D shapes in a virtual environment ▪ Understand the concept of 'rendering', object mode & edit mode Understand the facets of 3D shapes: 'vertex', 'edge' and 'face'
Next Steps …	Pupils engaging with this topic will be equipped to tackle basic character, object (product) and environment modelling. These skills develop problem-solving/algorithm skills for Component 2 of GCSE Computer Science. This topic may also be a springboard for extra-curricular/hobby animation, modelling, product design, particularly as the Blender software is freeware.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils are encouraged to add to or customise base models, where they must take the learned skills from the video tutorials and apply them independently. Creating new or adapting models without explicit instructions promotes recall and develops problem-solving skills.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪ utilising their skills in algebra, volume, mass, X & Y co-ordinates (Maths) ▪ utilising their experiences of 3D environments (Design Technology, Engineering ▪ Utilising their experiences of perspective & depth (Art & Design) ▪ utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪ All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪ Decision-making Automation / Artificial Intelligence
Personal Development	The 3D Animation, Modelling, Product Prototyping community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

HT 3: Python Programming (Y8 start)

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Scratch
Substantive Knowledge Facts, figures, dates etc	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 Describe the semantics of assignment statements Describe how iteration (whilestatements) controls the flow of program execution
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Write simple Python programs that display messages, assign values to variables, and receive keyboard input Locate and correct common syntax errors 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, elsestatements) to control the flow of program execution Generate and use random integers Use multi-branch selection (if, elif, elsestatements) to control the flow of program execution Use iteration (whileloops) 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 Use Boolean variables as flags
Next Steps …	Y9 Programming Y9 Physical Computing
Summative Assessment	Multi Choice Questions
Independent Learning Tasks	Programming
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Integer data type, Logic, Place Value
Real World Connections and Authenticity	Connection to programming jobs
Personal Development	Problem Solving

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

HT 4: Representations

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on ... Retrieval opportunities	Year 7 Topics 'Spreadsheets' (bitmap simulation), Year 8 Topic 'InkScape' (Colour Picker), 'Representations', and prior interests in sound recording, pixel art editing images.
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪ Digital images ▪ Binary values (bit, byte) ▪ Mixing colours (additive colour) ▪ Vibrations, sound waves 'Photoshopping'
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪ learn what is meant by a 'bitmap'. ▪ learn the relationship between pixels, resolution and image quality/size. ▪ learn relationship between bit depth (bits per pixel) and colour depth. ▪ understand how primary colours are split between the available bits. ▪ learn how to use specific Photoshop tools (magic wand, clone stamp, lasso..) learn audio terms such as: sample rate, sample depth, compression.
Next Steps ...	Pupils engaging with this topic will be equipped to tackle the Representations topics within Component 1 of GCSE Computer Science and the vocational EDUCAS Digital Imaging. They will also be able to attempt editing tasks in Photoshop and similar software. This topic may also be a springboard for extra-curricular/hobby/careers interest in photo-retouching, graphic design, sound recording, audio mixing/production and digital illustrating.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils must create their own monochrome and colour bitmaps, they must determine the colour depth of images, create custom colours, manipulate photographs using industry-based methods, compress image files and assess.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪ utilising their skills in numeracy (bit depth, calculating file sizes) ▪ utilising their prior knowledge from the Year 8 'Representations' unit. ▪ utilising their skills in numeracy. ▪ utilising their skills in assessing (comparing) and selecting values. utilising their skills in *Microsoft Excel* (cell-shading, entering values etc)
Real World Connections and Authenticity	▪ Sectors: web & graphic design, audio editing & production etc.. ▪ Physics and the natural world (sound, light, vision, vibration, air waves, colour) ▪ Commercial imaging, social media pressures, 'Photoshopping', 'Deep Fakes' Digital media versus analogue media.
Personal Development	A recognition that the images and sounds we consume are constructed by humans and are often motivated by commercial interests or to influence our beliefs.

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

HT 5: Cyber Security

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Year 7 Topics 'Online Safety' & 'Networks' and Year 8 Topic 'Computer Systems'.
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪ Personal data ▪ Social media platforms, posting ▪ The idea of a 'Virus' ▪ Customer Email, Text Message
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪ learn what the three common cyber threats are. ▪ learn about the business of selling our data. ▪ determine the difference between types of social engineering scams. explore what is meant by the following terms: ethical, permission, authorisation
Next Steps …	Pupils engaging with this topic will be equipped to tackle Component 1 topics: 1.3 Networks & Protocols & 1.4 Network Security of the GCSE Computer Science. This topic may also be a springboard for extra-curricular interest in Problem Solving, Cryptography, Cyber Security, Cyber Crime.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils will read about the Data Protection Act 2018 and how Data Subjects are protected. Pupils will carry out independent research on six types of Malware (Virus, Trojan Horse, Ransomware, Adware, Bot, Worm)
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪ utilising any prior experience they have with working collaboratively. ▪ utilising any prior experience of gathering information online. utilising any prior experience they have creating and delivering a presentation.
Real World Connections and Authenticity	Pupils will read about the four types of data collected about them on Social Media (personal, content, user behaviour and data about others)
Personal Development	Financial security, online fraud, social engineering scams (phishing, smishing, pharming, blagging) Peer assessment, constructive criticism.

#1 Visuals	**#2 Organisational Support**	**#3 Communication**	**#4 Consistency**	**#5 Behaviour Management**

HT 6: Physical Computing

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on ... Retrieval opportunities	Potential KS2 block programming topics, Year 7 Topics 'Programming Essentials' (Scratch) and 'Programming Projects' (Scratch), Year 8 Topics 'Web Development' (HTML), 'App Development' (App Lab) and 'Programming' (Python). Tear 9 Topics 'Programming' (Python).
Substantive Knowledge Facts, figures, dates etc	Pupils will be aware of: ▪ 'Block Programming' via Scratch ▪ 'Textual Programming' via Python ▪ Command, Input > Process > Output ▪ LED's (Light Emitting Diode) Robotic buggies
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Pupils will need to: ▪ accurately type commands, compare syntax, debug syntax errors ▪ Think computationally: abstract, decompose, recognise patterns & algorithms ▪ make predictions ▪ Have an appreciation of logic/binary choices learn the following terms: accelerometer, magnetometer, illuminance (Lux)
Next Steps ...	Pupils engaging with this topic will be equipped to tackle Component 1 of OCR's GCSE Computer Science, developing their computational thinking and debugging skills. This topic may also be a springboard for extra-curricular/hobby programming, maker projects.
Summative Assessment	Pupils will be assessed on this topic as part of their DC1, DC2 & DC3 formal assessments for Computer Studies.
Independent Learning Tasks	Pupils will frequently be required to predict or attempt a programming solution independently, before any paired or class collaboration. Attempting to solve problems and recall syntax independently develops computational thinking.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Pupils will be at an advantage in this topic: ▪ utilising their skills in maths (numeracy, arithmetic & algebra) ▪ utilising their experiences of problem solving utilising their expertise as an interface user (mobile apps, video games, websites).
Real World Connections and Authenticity	▪ Software development. ▪ Understanding of the technology around us. ▪ All employment sectors (Payroll, Stock management, Data Collection, Validation, Verification, Commerce, Profitability, Tax returns) ▪ Decision-making Automation / Artificial Intelligence
Personal Development	The programming community is a very diverse and inclusive employment sector. Programming (problem solving) is often a collaborative process at all skill levels.

#1 Visuals	#2 Organisational Support	#3 Communication	#4 Consistency	#5 Behaviour Management

OCR GCSE Computer Science J277

1. Computer Systems

1. Systems Architecture

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y8 Computer Systems
Substantive Knowledge Facts, figures, dates etc	**1. Architecture of the CPU -** The purpose of the CPU: The fetch-execute cycle (What actions occur at each stage of the fetch-execute cycle) Common CPU components and their function: ALU (Arithmetic Logic Unit), CU (Control Unit), Cache, Registers (The role/purpose of each component and what it manages, stores, or controls during the fetch-execute cycle) Von Neumann architecture: MAR (Memory Address Register), MDR (Memory Data Register), Program Counter, Accumulator (The purpose of each register, what it stores (data or address), The difference between storing data and an address) **3. Embedded Systems -** The purpose and characteristics of embedded systems (What embedded systems are, Typical characteristics of embedded systems)
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	**2. CPU Performance -** How common characteristics of CPUs affect their performance: clock speed, cache size, number of cores (Understanding of each characteristic as listed) (The effects of changing any of the common characteristics on system performance, either individually or in combination) **3. Embedded Systems -** Give examples of embedded systems (Familiarity with a range of different embedded systems)
Next Steps …	Memory and storage (how CPU works with RAM)
Summative Assessment	End of unit assessment – DART assessment
Independent Learning Tasks	Research and revision document creation.
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Maths – CPU Performance
Real World Connections and Authenticity	Links to gaming industry and hardware jobs (ARM)
Personal Development	

2. Memory & Storage

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y8 Computer Systems Systems Architecture Representation
Substantive Knowledge Facts, figures, dates etc	**1. Primary Storage -** The need for primary storage (Why computers have primary storage, How this usually consists of RAM and ROM), The difference between RAM and ROM (Key characteristics of RAM and ROM), The purpose of ROM in a computer system, The purpose of RAM in a computer system, Virtual memory (Why virtual memory may be needed in a system: How virtual memory works, Transfer of data between RAM and HDD when RAM is filled) **2. Secondary Storage -** The need for secondary storage (Why computers have secondary storage), Common types of storage: Optical, Magnetic, Solid state (Recognise a range of secondary storage devices/media, Differences between each type of storage device/medium). **3. Units -** The units of data storage (Why data must be stored in binary format): Bit, Nibble (4 bits), Byte (8 bits), Kilobyte (1,024 bytes or 1 KB), Megabyte (1,024 KB), Gigabyte (1,024 MB), Terabyte (1,024 GB), Petabyte (1,024 TB) **4. Data Storage - Characters** - The use of binary codes to represent characters. The term 'character set'. The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g. ASCII, Unicode **Images** - How an image is represented as a series of pixels, represented in binary. Metadata. The effect of colour depth and resolution on: The quality of the image, The size of an image file **Sound** - How sound can be sampled and stored in digital form. The effect of sample rate, duration, and bit depth on: The playback quality, The size of a sound file **5. Compression -** The need for compression. Types of compression: Lossy, Lossless
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	**2. Secondary Storage -** Compare advantages/disadvantages for each storage device, be able to apply their knowledge in context within scenarios **3. Units -** Familiarity with data units and moving between each. Data capacity and calculation of data capacity requirements (Calculate capacity of devices. Calculate required capacity for a given set of files. Calculate file sizes of sound, images, and text files: sound file size = sample rate x duration (s) x bit depth, image file size = colour depth x image height (px) x image width (px), text file size = bits per character x number of characters) **4. Data Storage - Numbers** - How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa. How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur. How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa. How to convert binary integers to their hexadecimal equivalents and vice versa. Binary shifts
Next Steps …	File Handling – Programming Bololean Logic
Summative Assessment	End of unit assessment – DART assessment
Independent Learning Tasks	Research and revision document completion
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Maths – Calculation of RAM size Whole unit is based on maths, relating to metre to km conversions and capacity calculations as well as place value. There are also many T3 vocabulary words, mentioned above.
Real World Connections and Authenticity	Buying a computer – why is more RAM better?
Personal Development	Students will aim high and show GRIT to understand all the abstract concepts in this unit. We will link it to industry and home computing

3. Networks and Protocols

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y7 Networks
Substantive Knowledge Facts, figures, dates etc	**1. Networks and Topologies -** Types of network: LAN (Local Area Network), WAN (Wide Area Network). Factors that affect the performance of networks. The different roles of computers in a client-server and a peer-to-peer network. The hardware needed to connect stand-alone computers into a Local Area Network: Wireless access points, Routers, Switches, NIC (Network Interface Controller/Card), Transmission media. The Internet as a worldwide collection of computer networks: DNS (Domain Name Server), Hosting, The Cloud, Web servers and clients. Star and Mesh network topologies. **2. Wired and wireless Networks, protocols, and layers -** Modes of connection: Wired, Ethernet, Wireless. Wi-Fi, Bluetooth. Encryption. IP addressing and MAC addressing. Standards. Common protocols including: TCP/IP (Transmission Control Protocol/Internet Protocol), HTTP (Hyper Text Transfer Protocol), HTTPS (Hyper Text Transfer Protocol Secure), FTP (File Transfer Protocol), POP (Post Office Protocol), IMAP (Internet Message Access Protocol), SMTP (Simple Mail Transfer Protocol), The concept of layers.
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	
Next Steps …	Cyber Security
Summative Assessment	End of unit assessment – DART assessment
Independent Learning Tasks	Networking Tasks, research
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	
Real World Connections and Authenticity	Discussion of real world networks, WWW and Internet
Personal Development	

4. Network Security

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y9 Cyber Security, Networks
Substantive Knowledge Facts, figures, dates etc	**1. Threats to computer systems and networks** Forms of attack: Malware, Social engineering, e.g. phishing, people as the 'weak point', Brute-force attacks, Denial of service attacks, Data interception and theft, The concept of SQL injection **2. Identifying and preventing vulnerabilities** Common prevention methods: Penetration testing, Anti-malware software, Firewalls, User access levels, Passwords, Encryption, Physical security
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	
Next Steps …	System Software, A Level, BTEC
Summative Assessment	End of unit assessment – DART assessment
Independent Learning Tasks	Working through Class Notebook tasks
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Key English vocabulary used to describe key threats
Real World Connections and Authenticity	Real world link to hacking and protection as well as their own lived experience
Personal Development	Learning to protect themselves from online harms

5. System Software

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y8 Computer systems
Substantive Knowledge Facts, figures, dates etc	**1. Operating Systems -** The purpose and functionality of operating systems: User interface, Memory management and multitasking, Peripheral management and drivers, User management, File management **2. Utility Software -** The purpose and functionality of utility software. Utility system software: Encryption software, Defragmentation, Data compression
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	
Next Steps …	Impact of Digital Technology, Programming, A Level and BTEC
Summative Assessment	End of unit assessment – DART assessment
Independent Learning Tasks	Class Notebook tasks
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	
Real World Connections and Authenticity	Connection to personal devices and uses
Personal Development	

6. Impact of Digital Technology

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Respect, Media
Substantive Knowledge Facts, figures, dates etc	Impacts of digital technology on wider society including: Ethical issues, Legal issues, Cultural issues, Environmental issues, Privacy issues. Legislation relevant to Computer Science: The Data Protection Act 2018, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988, Software licences (i.e. open source and proprietary)
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Recommend a type of licence for a given scenario including benefits and drawbacks
Next Steps …	A Level, BTEC
Summative Assessment	End of unit assessment – DART assessment
Independent Learning Tasks	Discussion questioning
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Morals, ethics, environmental issues (geography, science), laws
Real World Connections and Authenticity	Real world scenarios, stories, knowledge to support discussions
Personal Development	Rule of law, cultural differences

2. Computational Thinking, Algorithms and Programming

1. Algorithms

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	KS3 Programming, App Development, Web Developement
Substantive Knowledge Facts, figures, dates etc	Understand main steps of each algorithm and their prerequisites. Understanding of these principles and how they are used to define and refine problems
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	**1. Computational Thinking -** Principles of computational thinking: Abstraction, Decomposition, Algorithmic thinking **2. Designing, creating, and refining algorithms -** Identify the inputs, processes, and outputs for a problem. Structure diagrams. Create, interpret, correct, complete, and refine algorithms using: Pseudocode, Flowcharts, Reference language/high-level programming language. Identify common errors. Trace tables. **3. Searching and sorting algorithms -** Standard searching algorithms: Binary search, Linear search. Standard sorting algorithms: Bubble sort, Merge sort, Insertion sort. Apply algorithm to dataset.
Next Steps …	Programming Techniques, Robust Programs
Summative Assessment	DART Assessment
Independent Learning Tasks	Class Notebook tasks
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Sorting, searching, problem solving
Real World Connections and Authenticity	Real world problems and solutions
Personal Development	Problem solving

2. Programming Techniques

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Algorithms, KS3 Programming
Substantive Knowledge Facts, figures, dates etc	Understanding of each technique. Recognise the use of ==, !=. <, <=, >, >=, +, -, *, /, MOD, DIV, ^
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	**1. Programming fundamentals** - The use of variables, constants, operators, inputs, outputs and Assignments. The use of the three basic programming constructs used to control the flow of a program: Sequence, Selection, Iteration (count- and condition-controlled loops). The common arithmetic operators. The common Boolean operators AND, OR and NOT. **2.Data Types -** The use of data types: Integer, Real, Boolean, Character and string, Casting **3. Additional techniques -** The use of basic string manipulation. The use of basic file handling operations: Open, Read, Write, Close. The use of records to store data. The use of SQL to search for data. The use of arrays (or equivalent) when solving problems, including both one-dimensional and two-dimensional arrays. How to use sub programs (functions and procedures) to produce structured code. Random number generation
Next Steps …	Robust Programs
Summative Assessment	DART Assessment
Independent Learning Tasks	Many programming challenges
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Maths operators
Real World Connections and Authenticity	Programming job links
Personal Development	

3. Robust Programs

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Programming techniques
Substantive Knowledge Facts, figures, dates etc	**2. Testing -** The purpose of testing. Types of testing: Iterative, Final/terminal.
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	**1. Defensive design -** Defensive design considerations: Anticipating misuse, Authentication. Input validation. Maintainability: Use of sub programs, Naming conventions, Indentation, Commenting **2. Testing -** Identify syntax and logic errors. Selecting and using suitable test data: Normal, Boundary, Invalid, Erroneous, Refining algorithms
Next Steps …	A Level, BTEC
Summative Assessment	Programming Project, DART Assessment
Independent Learning Tasks	Creating their own programs through waterfall methadology
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Testing, evaluating, validation, verification
Real World Connections and Authenticity	Real world programming experience
Personal Development	Understanding the need to test

4. Boolean Logic

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y8 Computer Systems
Substantive Knowledge Facts, figures, dates etc	Knowledge of the truth tables for each logic gate. Recognition of each gate symbol
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Simple logic diagrams using the operators AND, OR and NOT. Truth tables. Combining Boolean operators using AND, OR and NOT. Applying logical operators in truth tables to solve problems. Understanding of how to create, complete or edit logic diagrams and truth tables for given scenarios. Ability to work with more than one gate in a logic diagram
Next Steps …	Programming Techniques
Summative Assessment	DART Assessment
Independent Learning Tasks	Creating/completing Truth tables, logic diagrams and statements
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Core logical operators
Real World Connections and Authenticity	Use of basic words in a structured and clear format
Personal Development	Understanding basic logic

5. IDEs and Languages

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Programming (All years)
Substantive Knowledge Facts, figures, dates etc	**1. Languages -** Characteristics and purpose of different levels of programming language: High-level languages, Low-level languages. The purpose of translators. The characteristics of a compiler and an interpreter. **2. The IDE -** Common tools and facilities available in an Integrated Development Environment (IDE): Editors, Error diagnostics, Run-time environment, Translators
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Practical experience of using a range of these tools within at least one IDE
Next Steps …	A Level, BTEC, Programming Techniques
Summative Assessment	DART Assessment
Independent Learning Tasks	Class Notebook tasks
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	
Real World Connections and Authenticity	Real world programming applications and their benefits
Personal Development	

Eduqas Vocational Award in ICT

Unit 1 – ICT in Society

Chapter 1: How IT can be used to fulfil the needs of organisations and individuals

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	All four coursework units completed in Year 10. (Word processing, spreadsheet development, database development and image manipulation) **Key stage 3 topics:** •Input, output and storage devices •Basic internal components of a computing device •CPU Architecture •Computer Peripherals •System software •Application software •Utility software •IT Services •Online safety Cloud computing and storage
Substantive Knowledge Facts, figures, dates etc	**Learners should know and understand types of:** • computing devices • input devices • output devices • storage devices • basic internal components • ports. **Learners should know and understand:** • system software • applications software • utility software • specialist software • information handling software • open source software • communication software. **Learners should be aware of how each service improves efficiency/productivity for businesses and/or individual users:** • Smart TV • gaming • image capture and manipulation • webcam services • social networking: information needed to create accounts; services available • music and sound including downloading from the Internet and related issues • mobile phones • banking • E-commerce systems • payroll • modern mail handling methods • control processes (feedback) • robotics and bionics • artificial intelligence (AI) and expert systems • online shopping and searching for products on websites • booking online • management information systems • weather forecasting systems • remote storage technologies • online education and blended learning • security systems • accessibility • virtual reality and augmented reality • 3D Printing • wearable technologies • cloud computing

	• disabled accessibility • emerging technologies.
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	
Next Steps …	•*Chapter 2: How data and information is used and transferred* •*A-Level ICT* •*A-Level Computer Science* •*T Level Digital production, design and development* *BTEC Level 3 in ICT*
Summative Assessment	Pupils will be assessed on this topic as part of their mock exams in October and January. There will also be end of chapter assessments.
Independent Learning Tasks	•*Independent research* •*Answering comprehensive questions* •*Mock exam questions* *Educational videos*
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	•*Payroll and e-commerce (Enterprise)* •*3D printing and robotics (Engineering)* •*Image capture and manipulation (Photography)* •*Wearable technologies (Physical education)* *Weather forecasting systems (Geography)*
Real World Connections and Authenticity	•*How IT can be used to fulfil the needs of organisations and individuals* •Automation / Artificial Intelligence in the workplace Links to year 10 coursework scenario
Personal Development	*Opportunities to explore artificial intelligence and explore the ethical constraints. Students will be given the opportunity to express their opinions and respect each others input.*

Chapter 2: How data and information is used and transferred

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	All four coursework units completed in Year 10. (Word processing, spreadsheet development, database development and image manipulation) **Key stage 3 topics:** •Data, information and knowledge •Data loss •Physical security •File storage and properties •Data capture •Computer Networks •Protocols •Network Topologies •Internet, extranet and intranet •Network devices •Malware •External threats •Types of connectivity
Substantive Knowledge Facts, figures, dates etc	**Learners should know and understand:** • that data consists of raw facts and figures • that information is data which has been processed by the computer • that knowledge is derived from information by applying rules to it • the need for good quality data • the potential benefits of encoding data and the reasons for doing it • improvements in speed of access to data and increased storage • advantages and disadvantages of using information and communication technology for storing data • file types • data compression • file properties. **Learners should know and understand:** • data capture methods • methods used for validation and verification and where they are appropriate • possible sources of error which could exist • techniques used to overcome these errors. **Learners should know and understand:** • the differences between local (LAN) and wide area (WAN) networks • the purpose of protocols • computer network operation • network topologies including bus, star and ring • internet/extranet/intranet • devices within a network • how data is transferred over a network • potential threats to data transfer (e.g., packet sniffing) • cloud computing vs in-house servers • emerging technologies **Learners should know and understand:** • connection methods • short range wireless connection (802.11 Bluetooth), near-field communication (NFC) and radio-frequency Identification (RFID) • medium range wireless connection (3G/4G/5G) • long range wireless connection (microwave, satellite) • ethernet, USB, micro USB and USB C • emerging technologies.
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	

Next Steps …	•*Chapter 3: Legal, moral, ethical, cultural and environmental impacts of IT and the need for cybersecurity* •*A-Level ICT* •*A-Level Computer Science* •*T Level Digital production, design and development* *BTEC Level 3 in ICT*
Summative Assessment	Pupils will be assessed on this topic as part of their mock exams in October and January. There will also be end of chapter assessments.
Independent Learning Tasks	•*Independent research* •*Answering comprehensive questions* •*Mock exam questions* *Educational videos*
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	•*Ethics of data collection(PSHCE)* *Geography of the internet (Geography)*
Real World Connections and Authenticity	•*Threats to data* •*Cyber attacks* *Identity theft prevention*
Personal Development	*Opportunities to explore the ethical constraints of data collection. Students will be given the opportunity to express their opinions and respect each others input.*

Chapter 3: Legal, moral, ethical, cultural and environmental impacts of IT and the need for cybersecurity

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	All four coursework units completed in Year 10. (Word processing, spreadsheet development, database development and image manipulation) Key stage 3 topics: • GDPR • Computer Misuse Act • Communications Act • Copyright Designs and Patents Act • Health and Safety Legislation • E-Waste Digital Footprint
Substantive Knowledge Facts, figures, dates etc	**Learners should know and understand:** • accidental damage • unintended disclosure by incorrectly assigned access levels • malicious software including viruses, worms, Trojan Horses, spyware, ransomware, DDoS and key logging • hacking (e.g., white, black and grey hat) • social engineering • emerging threats. **Learners should know and understand:** • financial implications • moral and legal implications (including competitor advantage, breaking of GDPR/DPA, open to blackmail) • data manipulation • loss of service • loss of intellectual property • loss of reputation. **Learners should know and understand:** • logical protection including access levels, authentication, firewalls, anti-malware applications, password protection and encryption • physical protection including locks, biometrics, location of hardware, backup systems and security staff • security policies including disaster recovery, staff responsibilities, acceptable use policy and staff training • emerging technologies. **Learners should know and understand:** • privacy and security • cookies and data collection by multinational companies • monitoring of individuals • impact of data loss or damage. **Learners should know:** • General data protection regulation (GDPR) 2018 • Data protection act (DPA) 1998 • Computer misuse act 1990 • Communications act 2003 • Regulation of investigatory powers act 2016 • Copyright, designs and patents act 1988 • Health and safety legislation. **Learners should be aware of:** • employment patterns • retraining • changes in working practices (e.g., collaboration, hot desking) • teleworking • homeworking • videoconferencing • effect on transport • effect on traditional media • drones • green IT and non-green IT • e-waste • rare earth element mining

	• global production lines • the digital divide – local and global • social media including cyberbullying and Fake News • net neutrality • addiction • mental health • emerging technologies. **Learners should know and understand the potential effects of:** • digital footprint – passive and active • posts on social media • online identity • identity theft • the risks of inappropriate images.
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	
Next Steps ...	•*A-Level ICT* •*A-Level Computer Science* •*T Level Digital production, design and development* *BTEC Level 3 in ICT*
Summative Assessment	Pupils will be assessed on this topic as part of their mock exams in October and January. There will also be end of chapter assessments.
Independent Learning Tasks	•*Independent research* •*Answering comprehensive questions* •*Mock exam questions* *Educational videos*
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	•*E-Waste(Geography)* •*Rare element mining (Geography)* •*Digital divide (PSHCE)* *Copyright Designs and Patents Act (Business)*
Real World Connections and Authenticity	•*Legal implications in the workplace* •*Environmental impacts of technology* •*Cybersecurity* •*Mental health* •*Addiction* •*E-Waste* •*Green IT* *Rare Element mining*
Personal Development	Students can research a topic *linked to diversity, relationships, beliefs, inclusion, health , protected characteristics and/or fundamental British values.*

Unit 2 – ICT in Context

Task 1: Planning, creating, modifying, and using databases

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y7 Spreadsheets, Y8 Computer Systems, Image Task
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Learners should be able to: • analyse requirements to a specified client brief • identify success criteria • identify the different entities within a specified client brief • design a database structure including tables, relationships, forms, queries, reports, fields, primary and foreign keys, data types, field properties, validation rules minimising data redundancy • give detailed justification for field types used • justify their choice of validation rules applied to field types. Learners should be able to: • create and add tables • add fields • create a primary key • assign appropriate data types • apply effective validation rules and error messages • link tables using key fields and relationships • import data from a given CSV file • add, edit and delete records • check and test data to ensure it is error-free • check and test the database to ensure it functions correctly. Learners should be able to: • create select queries, using a query builder including single table/single criteria; multiple tables/multiple criteria; wildcard; parameter, calculations • produce reports from queries, with at least one report showing customisation for fitness of purpose. Learners should be able to: • create effective data entry forms that simplify data entry and navigation, include relevant fields and accept data and validation • enhance layout of the form to include an image for business purposes • add features and controls that make the system user friendly and allow the user to navigate records, forms, queries and reports easily, visual basic (VB) and/or macro. • provide a test plan and select a range of test data including valid, extreme and erroneous data • give detailed reasons for all testing methods • give evidence for the testing carried out to test plan including evidence of test pass/fail • evaluate the testing successes and failures and identify improvements
Next Steps …	Spreadsheet
Summative Assessment	Coursework unit
Independent Learning Tasks	Create a database
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Data/Information. Primary/Secondary sources
Real World Connections and Authenticity	Real world business scenario
Personal Development	Understanding of a running business and it's requirements

Task 2: Planning, creating, modifying, and using spreadsheets

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y7 Spreadsheets, Databases, programming
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Learners should be able to: • analyse requirements to a specified client brief • identify success criteria • design a spreadsheet structure including worksheets, navigation, formulae, tools and techniques to be applied. Learners should be able to: • import data from a CSV file and generate content of their own • enhance layout and format of the spreadsheet including font style; font size; enhanced grids/borders; titles; colours; merged cells; cell alignment; text wrap; headers or footers; forms; worksheet tab • facilitate data entry through use of form controls, e.g., buttons, check box, drop-down lists, combo boxes, spinners, scroll bar • define a print area in order to present a customer-friendly output • create a navigation menu in order to customise and simplify the client's use of the workbook. Learners should be able to use: • data formatting, (e.g., currency, %, decimal places) • conditional formatting • use of date/time function • facilitate data entry through use of validation form controls, e.g., drop-down lists, combo boxes, spinners, scroll bar • validation checks, e.g., range, type, presence, format • validation messages. Learners should be able to use: • formula with single operator (+, -, *,/) • brackets to prioritise calculation • simple function SUM, AVERAGE, MAX, MIN, RAND, COUNT, COUNTA, COUNTIF, INT/ MOD • relative and absolute referencing • complex functions e.g., IF, nested IF, IF(OR), IF(AND), SUMIF, AVERAGEIF, VLOOKUP, COUNTIF, goal seek, pivot tables • macros to link native function. Learners should be able to: • use sorting on single items • use sorting on multiple items • use filters • create a chart/graph with appropriate title legend axis labels and formatting. Learners should be able to use: • 'what if' investigations to change data • 'what if' investigations to change formula. Learners should be able to: • provide a test plan and select a range of test data including valid, extreme and erroneous data • use a test table, based on the success criteria • give detailed reasons for all testing methods • give evidence for the testing carried out • evaluate the testing successes and failures and identify improvements • suggest how to implement these improvements
Next Steps …	Automated Document, BTEC, A Level
Summative Assessment	Coursework Unit
Independent Learning Tasks	Create a spreadsheet
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"*	

"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it." *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Data/information, invoicing
Real World Connections and Authenticity	Invoicing business scenario
Personal Development	Finance knowledge

Task 3: Planning, creating, and modifying an automated document

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y7 Media, Spreadsheets
Substantive Knowledge Facts, figures, dates etc	
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Learners should be able to: • analyse requirements to a specified client brief • identify success criteria • design a standard document including location of place holders, formatting and features to be used. Learners should be able to: • create a standard document • create a source document • create appropriately divided fields • create appropriate data within the fields • create a link between the data source and standard document. Learners should be able to: • insert appropriate fields: address line; subject; salutation/ valediction; personalised content within document • check accuracy: spelling; grammar; proofread • add appropriate formatting and features: letterhead; watermark; autodate; alignment; set line spacing; justification; indexing; automatic fields; bullets; appropriate layout. Learners should be able to: • complete the merge and check accuracy • check formatting following insertion of merged data • output merged documents • evaluate the document and identify improvements
Next Steps …	BTEC, A Level
Summative Assessment	Coursework Unit
Independent Learning Tasks	Create an automated document
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Writing to an audience, Marketing
Real World Connections and Authenticity	Marketing links to real world scenario
Personal Development	Ethical discussion of the need to message customers in this way.

Task 4: Planning, creating, manipulating, and storing images

Core Curriculum *"The core is like a residue – the things that stay, the things that can be captured as proposition. Often, such things need to be committed to memory."* Christine Counsell	
Builds on … Retrieval opportunities	Y8 Media
Substantive Knowledge Facts, figures, dates etc	
Procedural, Experimental and Disciplinary Knowledge (Skills to develop, experience and practice)	Learners should be able to: • analyse requirements to a specified brief • identify success criteria • plan design (sketches and layouts) with annotations • identify and select image source self-taken (camera/scanner) images from 3rd party: images from internet or another secondary source • identify key qualities of image (e.g., size, format) and limitations to editing • identify any copyright or intellectual property rights and reference source. Learners should be able to: • compare file types (png, tiff, jpeg) and fitness for purpose (size, resolution, scalability) • select software according to image type (vector/raster) • select image properties (RGB/CMYK) and canvas size based on output requirements • import image/create image using tools/create hybrid image • use standard and advanced tools to create and modify image Standard: Select marquees, lassos, cut, copy, crop, move, group, rotate, distort, enlarge/shrink, magic wand, bring to front/send to back, brushes/pencil, adjust line thickness/style, simple lines, shapes, curves (freehand and auto), fill, add text, edit text Advanced: Blur, blend, smudge, sharpen, colour mode, brightness, contrast, layers, merge layers, masking/mask layer, change alpha, cloning, background eraser, airbrush, gradient. Learners should be able to: • store image(s) using version control • store images using appropriate file type (vector or raster) • output final version in optimised format • test the file types electronically and digitally for fitness for purpose • evaluate final product against success criteria, identifying possible improvements
Next Steps …	Database, Spreadsheet, automated letter
Summative Assessment	Coursework Unit
Independent Learning Tasks	Create a business logo
Curriculum Hinterland *"This provides essential context and relevance to support the overall narrative of our core curriculum"* *"If, in certain subjects, for the purposes of teaching, we reduce the curriculum to just the core, we may make it harder to teach, and at worst, we kill it."* *(Edited Quote) Christine Counsell*	
Interdisciplinary Knowledge	Image creation, copyright
Real World Connections and Authenticity	An investigation and discussion of what a real world logo looks like and why
Personal Development	Online safety: Copyright issues