KS3 Computing Overview

Year 7 Half Term 1 and part of 2	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Welcome to Computing	Create a memorable and secure password for an account on the school network and important apps. Demonstration on how to use Satchel One Remember the rules of the computing lab	Students will be able to login to the computer system. Students understand the expectations of the classroom	Computing Username Password Network Secure Hazard
	Welcome to your workstation	Organise Folders Find saved work in both students own area and shared area Recognise a respectful email How to attach attachments to an email	Login Create folders for all students Create a respectful email and attach a document.	Email Recipient Network
	Respectful Online Communication	Identify different forms of communication Describe how to communicate online Identify positive and negative interactions online	Be able to communicate respectfully with others online Be able to provide feedback that is both positive and constructive	Online Comments Community
	Presenting to an audience: part 1	Plan an effective Presentation	Explain the effects of cyberbullying	Cyberbullying Presentation Software Copyright

KS3 Computing Overview

		Describe cyberbullying How to use Google's Creative Commons Search		
	Presenting to an audience: part 2	Plan an effective Presentation Describe cyberbullying How to use Google's Creative Commons Search Students understand how to report concerns	Explain the effects of cyberbullying Presentation to the class on cyberbullying	Audience
	Who are you talking to?	Work out who you are talking to online	Identify potential threats from people online	Catfishing
	Hour of code week. Students are given the opportunity to join in the world-wide coding event. Students get the opportunity to start coding in a safe and fun environment with a wide range of block coding activities.			
	Assessment – MS Forms Multiple choice questions with some written questions			

Year 7 Half term 2 & Half Term 3	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Getting to know a Spreadsheet	Identify columns, rows, cells, and cell references in spreadsheet software Understand what formatting techniques are in a spreadsheet	Use columns, rows, cells, and cell references to create 'Pixel Art' Use formatting techniques in a spreadsheet	Data Cell Cell reference Row Column Range Select

KS3 Computing Overview

	Quick Calculation	Identify basic formulas with cell references to perform calculations in a spreadsheet Understand the following mathematical symbols +, -, *, / Understand the use of the autofill tool to replicate cell data	Use the autofill tool to replicate cell data	Drag handle Autofill Formula Cell reference
	Collecting Data	Understand the difference between data and information Understand the difference between primary and secondary data	Explain the difference between data and information Explain the difference between primary and secondary sources of data	Formula Cell reference Autofill Data, Information Source Primary source Secondary source
	Become a Data Master	Understand how to analyse data Understand that Spreadsheets have formulas and how to write them	Create appropriate charts after analysing data Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet	Chart Pie chart Bar chart Series Axis/axes Labels Headers Function Maximum Minimum
	Level up your data skills	Understand how to analyse data	Use a spreadsheet to sort and filter data to be able to analyse data effectively	Header Filter Average Criteria

KS3 Computing Overview

		Understand that Spreadsheets have formulas and how to write them Introduction to Boolean logic. (This links to Computer System unit with AND OR NOT)	Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet	Condition Conditional formatting
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September			

Year 7 Half term 4	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Computer Networks & Hardware	Define what a computer network Define protocol	Explain how data is transmitted between computers across networks Explain the benefits of networking	Network Protocol Mainframe Personal Computer Stand-alone HTTP
	Network Hardware	Name different hardware required to connect to networks	Be able to build a network with the correct hardware	Network Cable Hub Sever Router ISP
	Wired & Wireless Networks	Define wired and wireless networks Define bandwidth.	Discuss specific technology used to create such connections. Discuss why bandwidth is important to networks	Wired Wireless 3G 4G 5G WiFi Bandwidth Bit

KS3 Computing Overview

				Megabit Gigabit Broadband Buffering
	The Internet	Define what the internet is Define the terms: Protocol Packets Addressing	Explain how data travels between computers across the internet	Internet Packet Router IP address, Packet header packet payload Transmission Control Protocol, Internet Protocol
	Internet Services	Define the terms: WWW Internet Connectivity	Explain the difference between the internet, its services, and the World Wide Web Describe how services are provided over the internet Explain the term 'connectivity' as the capacity for connected devices Describe how internet-connected devices can affect me	Internet WWW World Wide Web Internet services Email Voice over internet protocol Internet of things Spam Security Privacy
	The World Wide Web (WWW)	Name the components required for the WWW: servers, browsers, pages, HTTP and HTTPS protocols, etc.	Explain how these components work together to form the WWW	World Wide Web Web browser Web server Web page, Search engine HTTP HTTPS URL Domain name Domain name server

KS3 Computing Overview

Year 7 Half term 5	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Introduction to algorithms, programming and sequencing	Understand what instructions are in programming and how a computer uses them Understand state the terms: Sequence Subroutines Instructions Execute Algorithms	Be able to distinguish how humans and computers carry out instructions Define a sequence as instructions performed in order, with each executed in turn Predict the outcome of a simple sequence Modify a sequence of instructions	Variables Sequencing, Subroutines Commands Execute Input Process Output Storage Tracing
	Sequence and variables	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 Make a sequence that includes a variable	Expressions Evaluate, Conditions Selection If statements Variables Sequencing Subroutines Success Criteria

KS3 Computing Overview

	Selection	Define the terms: Boolean Condition Selection Identify that selection uses conditions to control the flow of a sequence Identify where selection statements can be used in a program	Modify a program to include selection	Operators Logic Comparison Expressions Evaluate Conditions Selection
	Operators	Identify where selection statements which includes comparison and logical operators that can be used in a program Identify the different comparison and logical operators	Create conditions that use comparison operators (>,<,=) Create conditions that use logic operators (and/or/not)	If statements Variables Sequencing Subroutines
	Count-controlled iteration	Define iteration as the process of repeatedly executing instructions Understand what debugging is 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)	Iteration Count-controlled Condition-controlled Debugging Variables Sequencing Subroutines

KS3 Computing Overview

	Problem-solving	Understand the terms: Sequencing Variables Conditions Selection Iteration	Be able to complete a piece of code	Sequencing Variables Conditions Selection Iteration
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September			

Year 7 Half term 6	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Features of a word processor	Identify the key features of a word processor: Headings Bold, italics, underline Alignment Font colour Font and font size Spellcheck Identify different types of software	Select the most appropriate software to use to complete a task Apply the key features of a word processor to format a document Evaluate formatting techniques to understand why we format documents	Application software Word processor Formatting Fonts Icons
	Licensing appropriate images	Be able to explain what the following terms are or do: Word processor Appropriate Copyright Licensing Creative Commons Text wrapping Cropping Recolouring	Select appropriate images for a given context Apply appropriate formatting techniques Demonstrate an understanding of licensing	Word processor Appropriate Copyright Licensing Creative Commons Text wrapping Cropping Recolouring

KS3 Computing Overview

			issues involving online content by applying appropriate Creative Commons licences Demonstrate the ability to credit the original source of an image Apply to add in Sound and credit the original source	
	The credibility of sources	Define the terms: Credibility Source Audience	Critique digital content for credibility Apply techniques in order to identify whether or not a source is credible	Credibility Source Audience
	Research and plan your blog	Define The terms: Plagiarism Referencing Citation Paraphrase Blog	Apply referencing techniques and understand the concept of plagiarism Evaluate online sources for use in own work	Plagiarism Referencing Citation Paraphrase Blog
	Promoting your cause	Define the term blog	Construct a blog using appropriate software Organise the content of the blog based on credible sources	Blog

KS3 Computing Overview

			Apply referencing techniques that credit authors appropriately Design the layout of the content to make it suitable for the audience	
	Project Completion	Define the term blog	Construct a blog using appropriate software Organise the content of the 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	

Year 8 Half term 1	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	You've got the moves!	Define a subroutine as a group of	Create a subroutine	Sequence Selection Iteration Variables

KS3 Computing Overview

		Define decomposition Identify how subroutines can be used for decomposition		Subroutines
	Fly cat, fly!	Identify where condition-controlled iteration can be used in a program	Implement condition-controlled iteration in a program	Iteration, condition, condition-controlled, repeat until
	Loop the loop!	Understand why iteration is used Understand the different types of iteration	Evaluate which type of iteration is required in a program	Iteration, count-controlled, condition-controlled
	Assessment – MS Forms Multiple choice questions with some written questions			

Year 8 Half term 2	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Treasure those lists!	Define a list Describe the need for lists Identify when lists can be used in a program	Create and use a list	List, variable
	Translate this!	Using knowledge from last year and the lessons this half term create a translation game		Word processor Appropriate Copyright Licensing Creative Commons

KS3 Computing Overview

				Text wrapping Cropping Recolouring
	Get in gear	Understand that a general-purpose computing system is a device for executing programs Understand that a program is a sequence of instructions that specify operations that are to be performed on data	Identify different types of software and their uses	Computer, system, device, program, software, instructions
	Under the Hood	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')	Identify and explain common components	Computer, system, device, program, instructions, data, hardware, processor, memory, storage, communication, input and output, architecture
	Orchestra conductor	Define what an operating system is Recall its role in controlling program execution	Analyse how the hardware components used in computing systems work together in order to execute programs	Program, instructions, data, hardware, processor, memory, storage, communication, input and output, operating system

KS3 Computing Overview

	It's only logical	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 Understand that hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits	Use logic gates to construct logic circuits, and associate these with logical operators and expressions	
	Hour of code week. Students are given the opportunity to join in the world-wide coding event. Students get the opportunity to start coding in a safe and fun environment with a wide range of block coding activities.			

Year 8 Half term 3	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September			
	Across time and space	Describe examples of representations Give examples of how different representations are appropriate for different tasks	Explain that representations are used to store, communicate, and process information Explain different examples of how different representations are	Representations, symbols, storage, communication, processing

KS3 Computing Overview

			appropriate for different tasks	
	Lights and drums	Recall that characters can be represented as sequences of symbols List examples of character coding schemes Provide examples of how symbols are carried on physical media	Measure the length of a representation as the number of symbols that it contains	Representations, symbols, characters, coding (encoding/decoding), coding scheme, representation size or length, physical medium
	Binary Digits	Understand what binary digits (bits) are, in terms of familiar symbols such as digits or letters	Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters Measure the size or length of a sequence of bits as the number of binary digits that it contains	Representation, symbols, binary digits, digital systems
	Numbers in binary	Understand representation of natural numbers in binary	Conversions between binary and decimal representations	Decimal numbers, binary numbers, conversion (between number systems)
	Large quantities	Understand how to convert between different units and multiples of representation size Understand the different ways data is stored	Provide examples of the different ways that binary digits are physically represented in digital devices, including electricity, magnetism, light	Representation size, units, multiples, prefixes

KS3 Computing Overview

Year 8 Half term 4 + 5	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September			
	Getting Started	Navigate the Photopea interface, work with panels and use the History window if needed	Create a new document, set up guides and change the background colour Place images in a document, transform and move them	History window
	Editing Images	Describe the difference between destructive and non-destructive workflow	How to access and use the filter gallery How to use adjustment layers How to retouch images	Destructive, non-destructive, workflow, layers, filters, retouching, blur, sharpen, smudge
	Selection Mask	Describe the importance of a non-destructive workflow when selecting parts of images	Erase parts of an image that you don't want Be able move parts of an image from one file to another	Mask, selection tools, erase
	Project	Students will use the skills they have learnt to follow a client brief, which help will be given for to understand, and create the image required.		

KS3 Computing Overview

Year 8 Half term 6	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	End of Year Assessment End of year assessment cover all content via multiple choice extended writing questions			
	Words are not enough	Understand why images are required on a webpage	Add images to a webpage Apply HTML tags to construct a web page structure from a provided design	|xqaz
	Taking shortcuts	Describe what Cascading Style Sheets (CSS) is Assess the benefits of using CSS to style pages instead of in-line formatting	Use CSS to style static web pages	CSS, style, formatting, head, body, attribute
	Searching the Web	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	Search term, keywords, hyperlink, crawler, spider, index, query, ranking
	Tightening the web	Describe how the choice of search terms affects the information you find	Use search technologies effectively	Image, tag, attribute, directory, render

KS3 Computing Overview

			Create hyperlinks to allow users to navigate between multiple web pages	

Year 9 Half term 1	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	You and your data	Define data and information Identify what happens to data that is entered online	Explain the difference between data and information Critique online services in relation to data privacy Explain the need for the Data Protection Act	Data, information, cybersecurity, cybercriminals, profiling, user behaviour, privacy policies, data protection, data subject, data portability, malware
	Social engineering	Recognise how human errors pose security risks to data	Implement strategies to minimise the risk of data being compromised through human error	Social engineering, phishing, blagging, shouldering, name generator attack, scam
	Script kiddies	Define hacking in the context of cybersecurity Identify strategies to reduce the chance of a brute force attack being successful	Explain how a DDoS attack can impact the users of online services Explain the need for the Computer Misuse Act (1990)	Cyberthreats, hacking, ethical hacking, penetration testing, brute force attacks, script kiddies, DoS (denial of service), DDoS (distributed denial of service), Computer Misuse Act (1990)
	Rise of the bots	List the common malware threats	Examine how different types of malware cause problems for computer systems	Ransomware, malware, viruses, trojans, worms,

KS3 Computing Overview

		Question how malicious bots can have an impact on societal issues		adware, spyware, bots, botnet
	There's no place like 127.0.0.1 (home)	Compare security threats against their probability and their potential impact to organisations	Explain how networks can be protected from common security threats	Anti-malware, firewall, end-user authentication, folder permissions/privileges, botnet, trojans, biometrics, two-factor authentication (2FA), CAPTCHA
	Under Attack	Identify the most effective methods to prevent cyberattacks	Explain the most effective methods to prevent cyberattacks	Blagging, ransomware, DDoS, brute force, virus, malware, hacking, spyware, adware, firewall, two-factor authentication (2FA), backups, CAPTCHA, Internet Service Provider (ISP), auto-updates

Year 9 Half term 2	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment covers all content via multiple choice extended writing questions			
	Logical Thinking	Be able to ask logical questions solve problems Understand how Boolean operators can be represented in written expressions and Venn diagrams	Use the common Boolean operators: AND, OR, NOT Create a Venn diagram	Logical thinking, logic, Boolean operators, AND, OR, NOT, logic gates, AND gate, OR gate, NOT gate, algorithm, sequence, Venn diagram, truth table, circuit, loop, nested loop, instructions, binary tree, abstraction, network,
	Logic Gates	Understand how logic is used in different situations	Apply, read and	

KS3 Computing Overview

		Know the different gates, AND, OR, NOT	explain the different logic gates	decomposition, pixels, ASCII, nodes, edges, packets, source, destination Logical operators (NOT, AND, OR), logical expressions, truth values (true, false), truth tables, logic gates, logic circuits, hardware components
	Algorithmic thinking 1	Understand what an algorithm is Understand how loops can be used to reduce the amount of code required for a solution Understand how nested loops can be used to improve solutions further Refine algorithms to reduce the number of instructions required	Create a sequence of instructions to achieve a goal Refine algorithms to reduce the number of instructions required	
	Algorithmic thinking 2	Understand Lossy and lossless compression	Explain Lossy and lossless and how the are different Create an algorithm Apply letter frequency to help compression	
	Abstraction	Understand how abstractions are used in everyday life Understand how networks are used to make an abstraction of a maze Understand network (graph) theory terms including: Nodes, Edges	Create abstractions for different purposes	
	Decomposition	Describe the NOT, AND, and OR logical operators, and	Use logic gates to construct logic circuits, and associate	

KS3 Computing Overview

		how they are used to form logical expressions Describe how hardware is built out of increasingly complex logic circuits Understand that hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits	these with logical operators and expressions	

Year 9 Half term 2	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment covers all content via multiple choice extended writing questions			
	Logical Thinking	Be able to ask logical questions to solve problems Understand how Boolean operators can be represented in written expressions and Venn diagrams	Use the common Boolean operators: AND, OR, NOT Create a Venn diagram	Logical thinking, logic, Boolean operators, AND, OR, NOT, logic gates, AND gate, OR gate, NOT gate, algorithm, sequence, Venn diagram, truth table, circuit, loop, nested loop, instructions, binary tree, abstraction, network, decomposition, pixels, ASCII, nodes, edges, packets, source, destination Logical operators (NOT, AND, OR), logical expressions, truth
	Logic Gates	Understand how logic is used in different situations Know the different gates, AND, OR, NOT	Apply, read and explain the different logic gates	

KS3 Computing Overview

	Algorithmic thinking 1	Understand what an algorithm is Understand how loops can be used to reduce the amount of code required for a solution Understand how nested loops can be used to improve solutions further Refine algorithms to reduce the number of instructions required	Create a sequence of instructions to achieve a goal Refine algorithms to reduce the number of instructions required	values (true, false), truth tables, logic gates, logic circuits, hardware components
	Algorithmic thinking 2	Understand Lossy and lossless compression	Explain Lossy and lossless and how the are different Create an algorithm Apply letter frequency to help compression	
	Abstraction	Understand how abstractions are used in everyday life Understand how networks are used to make an abstraction of a maze Understand network (graph) theory terms including: Nodes, Edges	Create abstractions for different purposes	

KS3 Computing Overview

	Decomposition	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 Understand that hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits	Use logic gates to construct logic circuits, and associate these with logical operators and expressions	
	Hour of Code	Hour of code week. Students are given the opportunity to join in the world-wide coding event. Students get the opportunity to start coding in a safe and fun environment with a wide range of block coding activities.		

Year 9 Half term 3	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment covers all content via multiple choice extended writing questions			
	Introduction to Databases	Understand what a database is and why it is useful in many different applications Describe what is meant by a flat file database, record, field Describe each of the following different operators such as >=, BETWEEN, AND, OR, NOT and the wildcard * in queries	Enter data into a database in datasheet view Create queries using multiple criteria to answer questions relating to a given flat file database Use different operators such as >=, BETWEEN, AND, OR, NOT and the wildcard * in queries	Flat-file database, relational database, table, column, record, field, query, parameter, criterion, criteria, primary key, linked tables components

KS3 Computing Overview

	Creating a Database Table	Understand the principles of designing a database structure Understand different field types e.g. number and text Define the terms validation and records	Create a database structure Use the correct field types Apply the correct validation to required fields Create a record	
	Queries	Define the term Query Understand how and why data is required to be sorted	Use complex criteria to select records Create a query Sort data of one or more fields	
	Input Forms	Understand what an input form is Understand the term usability and why it is important	Create an input form Sort and navigate around different forms Find, enter, modify and delete records using a form	
	Creating a report	Understand what a report is and the purpose of one	Create a report and be able to edit and design it consistently	

Year 9 Half term 4 + 5	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September			

KS3 Computing Overview

	Getting Started	Navigate the Photopea interface, work with panels and use the History window if needed	Create a new document, set up guides and change the background colour Place images in a document, transform and move them	History window
	Editing Images	Describe the difference between destructive and non-destructive workflow	How to access and use the filter gallery How to use adjustment layers How to retouch images	Destructive, non-destructive, workflow, layers, filters, retouching, blur, sharpen, smudge
	Selection Mask	Describe the importance of a non-destructive workflow when selecting parts of images	Erase parts of an image that you don't want Be able move parts of an image from one file to another	Mask, selection tools, erase
	Project	Students will use the skills they have learnt to follow a client brief, which help will be given for to understand, and create the image required.		

Year 9 Half term 6	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**

KS3 Computing Overview

	What is AI?	Understand the origin and uses of AI Understand how rules are used in AI decision making	Investigate the rules needed to solve problems including: Classification and Navigation of a maze or road	Facial recognition, fingerprint recognition, language processing, neural network, self-driving cars, sensors, embedded, camera, push button, rules, decisions, training data, machine learning, structured data, email, spam, ethics, algorithms, utilitarianism, morals, bias, bits, binary, fuzzy logic, intelligence, IQ, Turing test, Captcha, chatbots, virtual assistants, sentiment analysis, weightings.
	Machine Learning	Understand the difference between facts and rules Describe uses machine learning	Create rules that solve problems of categorising data Discuss strengths and weakness of machine learning	
	Ethics of AI	Understand what ethics is Understand how jobs are affected by AI Understand the term bias and how it can be introduced into AI algorithms	Apply knowledge of bias and ethics to real world scenarios and justify answers	
	Image Recognition	Understand the issues that make facial recognition difficult Understand how images are stored as binary data Describe how patterns in an image can be detected	Carry out facial reignition using given, real world, scenarios Work out an example of storing images as binary	
	Turing Tests and chatbots	Understand how intelligence can be measured in computers and humans Understand what the Turing test is Understand why interpreting patterns is not a useful a skill as 'thinking'	Carry out the Turing Test Interrupt patterns like a computer would and explain how it works	