KS3 Computing Overview

Year 7 Half Term 1 and 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

KS3 Computing Overview

	Presenting to an audience: part 1	Plan an effective Presentation	Explain the effects of cyberbullying	Cyberbullying Presentation Software Copyright
		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 3 & 4	**Lesson Name** – Programming using the Micro:Bit	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**

KS3 Computing Overview

	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 - MicroBits	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 - Using IF statements in Micro:Python	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

KS3 Computing Overview

	Count-controlled iteration and condition controlled loops	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
	Problem-solving	Understand the terms: Sequencing Variables Conditions Selection Iteration	Be able to complete a piece of code	Sequencing Variables Conditions Selection Iteration
	Assessment – Micro:Bit project / MS Forms Multiple choice questions with some written questions covering everything from September			

Year 7 Half term 5	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	History of Computing	Understanding the terms: Computer System Machine Binary 1,0	Explain how computers have developed from the 1800s. Explain how computers today have influenced and changed our lives.	Computer systems Binary Machine code High level language Python

KS3 Computing Overview

	Input, Process, Output	Understanding the IPO model. Explain the stages which a computer functions from user input.	Understand how the IPO model works	Input Process Output
	Computer Hardware	Identify the key pieces of computer hardware 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	Computer Hardware Mouse Keyboard Monitor Router / Switch
	Computer Software	Identify different types of software (application and operating)	Select appropriate software for given contexts Demonstrate an understanding of licensing	Applications Proprietary Off the shelf Open source

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	
	Internal hardware	Define the terms: internal Hardware Components	To identify components that are inside a computer system To understand how internal components work together inside a computer system	Internal Hardware CPU Motherboard RAM ROM
	Research and plan your timeline	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

KS3 Computing Overview

	Creating your digital artefact	Define the term artefact	Construct a timeline using appropriate software Organise the content of the timeline based on credible sources	Timeline
			Apply referencing techniques that credit authors appropriately Design the layout of the content to make it suitable for the audience	
	Project Completion	Define the digital artefact	Construct a timeline using appropriate software Organise the content of the timeline based on credible sources Apply referencing techniques that credit authors appropriately Design the layout of the content to make it suitable for the audience	

KS3 Computing Overview

Year 7 Half term 6	**Computer Networks & Hardware**	Define what a computer network is. 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

				Megabit Gigabit Broadband Buffering

KS3 Computing Overview

	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
	Assessment – From all units for Y7. MS Forms Multiple choice questions with some written questions			

KS3 Computing Overview

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
		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**

KS3 Computing Overview

	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 appropriate for different tasks	Representations, symbols, storage, communication, processing
	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

KS3 Computing Overview

	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

Year 8 Half term 3 + 4	**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

KS3 Computing Overview

	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
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September			
	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.			

KS3 Computing Overview

Year 8 Half term 5	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Understanding search engines	Understanding what a search engine is What the function of a search engine is	Explain how search engines 'crawl' through the World Wide Web and how they select and rank results	Search engine Crawlers/Spiders Indexing Keywords
	Searching the web	Understand how to refine searches	How to refine a search using keywords, Boolean operators and advanced search features.	Boolean Advanced search Indexing
	HTML basics	Understand the language of the internet. Understand how web pages are saved as HTML files.	Use HTML tags to begin constructing a simple webpage	Headings Paragraphs Head Body Footer
	Build your own webpage	Build a simple webpage for a celebrity of your choice	Use Research from previous lesson	Headings Paragraphs Head Body Footer

KS3 Computing Overview

	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 website required.

Year 8 Half term 6	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	End of Year Assessment End of year assessment over all content via multiple choice extended writing questions			
	Understanding Audience and Purpose	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	Audience Purpose Project Design
	Developing pre-production documents	Understand the importance of planning a project using pre-production documents.	To plan a project using pre-production documents.	Mood board, Mind map, Visualisation diagram, Wireframe.

KS3 Computing Overview

	Creating visualisation diagrams	Describe what a search engine is	Design a user interface using a visualisation diagram/wireframe. Create a structure diagram.	Visualisation diagram Wireframe Pre-production
	Introduction to App development	Create an app using Apps for good website.	Create a user interface following an assignment brief	App design, User interface
	End of year project. Create an app following an assignment brief.			

Year 9 Half term 1	**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,

KS3 Computing Overview

	Logic Gates	Understand how logic is used in different situations	Apply, read and	instructions, binary tree, abstraction, network,

		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	

KS3 Computing Overview

	Abstraction **Decomposition**	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 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	Create abstractions for different purposes Use logic gates to construct logic circuits, and associate these with logical operators and expressions	

Year 9 Half term 2	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment – MS Forms Multiple choice questions with some written questions covering everything from September / October			

KS3 Computing Overview

	Getting Started (What is an Integrated Development Environment IDE)	Navigate the Thonny interface. Understand how to Use Thonny software Learn how to code, debug and run code.	Create a new Python program PRIMM – Predict, Run, Improve, Model, Make.. Place text in the IDE, Run the code	Integrated Development Environment (IDE) Thonny Python Programming language
	Creating graphics using Python Turtle module.			
	Sequence	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

KS3 Computing Overview

	Selection	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
	Iteration			
	Project	Students will use the skills they have learnt to code a Christmas project using Python Turtle		

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

KS3 Computing Overview

	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	Turing test, Captcha, chatbots, virtual assistants, sentiment analysis, weightings.
	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	

Year 9 Half term 4	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	Assessment covers all content via multiple choice extended writing questions			

KS3 Computing Overview

	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	

	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

KS3 Computing Overview

	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 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	

KS3 Computing Overview

	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 5	**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, enduser 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), autoupdates

Year 9 Half term 6	**Lesson Name**	**Substantive Knowledge**	**Disciplinary Knowledge**	**Tier 3 Vocabulary**
	End of Year Assessment End of year assessment over all content via multiple choice extended writing questions			
	Understanding Audience and Purpose	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	Audience Purpose Project Design

KS3 Computing Overview

	Developing pre-production documents	Understand the importance of planning a project using pre-production documents.	To plan a project using pre-production documents.	Mood board, Mind map, Visualisation diagram, Wireframe.
	Creating visualisation diagrams	Describe what a search engine is	Design a user interface using a visualisation diagram/wireframe. Create a structure diagram.	Visualisation diagram Wireframe Pre-production
	Introduction to App development	Create an app using Apps for good website.	Create a user interface following an assignment brief	App design, User interface
	End of year project. Create an app following an assignment brief.			