

SJBC Curriculum Termly Plan: Y7 Computer Science

Term	Topic(s) and links to other subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	<p>Clear messaging in digital media</p> <p>Online relationships</p> <p>Online bullying</p> <p>Privacy and security</p>	<p>Students will combine the use of digital tools and online collaboration to produce media.</p> <p>The core knowledge and key facts of this topic are:</p> <ul style="list-style-type: none"> • Choose search terms relating to a particular issue • Identify key features of a good poster • Use tools to copy an image into another application • Choose and download a suitable image • Create a poster using a desktop publishing application • Plan a poster to clearly convey a message • Choose how to combine text and graphics in a slide • Modify a logo using a graphic editing program • Use digital tools to provide feedback on design choices • Modify a logo so that it fits in with the planned slide styles • Plan a consistent layout for a set of slides • Create a styled set of slides based on a plan • Evaluate content against a rubric • Search for and add a suitable image • Search for suitable text for slides • Evaluate your work against a rubric • Explain your work to others through a presentation • Plan how to deliver a presentation 	<p>Search Engine</p> <p>Search Term</p> <p>Keyword</p> <p>Download</p> <p>Desktop Publishing (DTP)</p> <p>Layout</p> <p>Typography</p> <p>Contrast</p> <p>Consistency</p> <p>Slide Deck</p> <p>Graphic Editing Program</p> <p>Logo</p> <p>Presentation</p>	<p>Rubric/</p> <p>End of topic test (30 mins)</p>	<p>Core resources: Key Stage 3</p> <p>Enrichment and extension resources:</p>
Autumn 2	<p>Networks from semaphores to the Internet</p>	<p>Recognising networking hardware and explaining how networking components are used for communication.</p> <p>The core knowledge and key facts of this topic are:</p> <ul style="list-style-type: none"> • Define 'protocol' and provide examples of non-networking protocols 	<p>Computer Network</p> <p>Transmission</p> <p>Wired Connection</p> <p>Wireless Connection</p> <p>Router</p> <p>Switch</p>	<p>End of topic test (30 mins)</p>	<p>Core resources: Key Stage 3</p>

		<ul style="list-style-type: none"> • Define what a computer network is and explain how data is transmitted between computers across networks • 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 what the internet is • Describe key words such as 'protocols', 'packets', and 'addressing' • Explain how data travels between computers across the internet • Describe how internet-connected devices can affect me • Describe how services are provided over the internet • Explain the difference between the internet, its services, and the World Wide Web • 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) • List some of these services and the context in which they are used • Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together 	Modem Bandwidth Latency Internet World Wide Web (WWW) Data Packet Addressing IP Address DNS (Domain Name System) Browser Server Client HTTP HTTPS Digital Service Streaming Firewall Encryption Connectivity Internet of Things (IoT) Geolocation Protocol		Enrichment and extension resources:
Spring 1	Understanding AI, Legal Issues & E-Safety	Students will be generating AI Media and analysing how to construct prompts effectively. This will lead to conversations about the legality of AI and issues of student's personal safety online.	Artificial Intelligence Copyright Data Privacy Intellectual Property Creative Commons	End of topic test (30 mins)	

		<ul style="list-style-type: none"> Identify important terms like artificial intelligence, copyright, data privacy. Describe why it's important to know the rules about using and downloading content from AI tools. Show how to use AI safely and legally. Spot possible risks or mistakes in examples where AI is used incorrectly and Creative commons. Assess the safety and legality of AI generated content in case studies. Design a short guide or infographic on How to Stay Safe and Legal When Using AI. Recognize and apply school policies and UK laws. 	Fair Use Plagiarism Attribution Terms of Service Bias Misinformation Consent Digital Footprint Safe Search Source Reliability Algorithm Deepfake UK Data Protection Act Age-Appropriate Use School Acceptable Use Policy		
Spring 2	Modelling data using spreadsheets	<p>Students will be sorting and filtering data and using formulas and functions in spreadsheet software.</p> <ul style="list-style-type: none"> 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 Explain the difference between data and information Explain the difference between primary and secondary sources of 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 	Spreadsheet Column Row Cell Cell Reference Formula Function Autofill Formatting Conditional Formatting SUM AVERAGE MAX MIN COUNTA COUNTIF IF Data Information Primary Data Secondary Data Analyse Chart	End of topic test (30 mins)	Key Stage 3

			Sort Filter		
Summer 1	Programming essentials in Scratch	<p>Students will learn to apply programming constructs of sequence, selection and iteration in Scratch.</p> <ul style="list-style-type: none"> • Compare how humans and computers understand instructions (understand and carry out) • Define a sequence as instructions performed in order, with each executed in turn • Modify a sequence • Predict the outcome of a simple sequence • Define a variable as a name that refers to data being stored by the computer • Make a sequence that includes a variable • Predict the outcome of a simple sequence that includes variables • Recognise that computers follow the control flow of input/process/output • 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 • 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 • Define iteration as a group of instructions that are repeatedly executed • Describe the need for iteration • Detect and correct errors in a program (debugging) 	Algorithm Sequence Variable Input Output Process Selection Condition Comparison Operators Logical Operators Iteration Count-controlled iteration Loop Subroutine Debugging Trace Program Predict Modify Design	End of topic test (30 mins)	Key Stage 3

		<ul style="list-style-type: none"> Identify where count-controlled iteration can be used in a program Implement count-controlled iteration in a program Independently design and apply programming constructs to solve a problem (subroutine, selection, count controlled iteration, operators, and variables) 			
Summer 2	Using media – Gaining support for a cause	<p>In this unit students will create a digital product for a real-world cause.</p> <ul style="list-style-type: none"> Apply the key features of a word processor to format a document Evaluate formatting techniques to understand why we format documents Identify the key features of a word processor Select the most appropriate software to use to complete a task Apply appropriate formatting techniques Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licenses Demonstrate the ability to credit the original source of an image Select appropriate images for a given context Apply techniques in order to identify whether or not a source is credible Critique digital content for credibility 	<p>Word Processor</p> <p>Formatting</p> <p>Font</p> <p>Alignment</p> <p>Justify</p> <p>Bullet Points</p> <p>Numbered List</p> <p>Header</p> <p>Footer</p> <p>Software</p> <p>Creative Commons</p> <p>License</p> <p>Source</p> <p>Crediting</p> <p>Copyright</p> <p>Credible</p> <p>Evaluate</p> <p>Critique</p> <p>Insert</p> <p>Appropriate</p>	End of topic test (30 mins)	Key Stage 3

SJBC Curriculum Termly Plan: Y8 Computer Science

Term	Topic(s) and links to other subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	Introduction to Python programming	<p>Students will learn the basics of a text based programming language and how the language is structured to create programs.</p> <ul style="list-style-type: none"> • Describe what algorithms and programs are and how they differ • Locate and correct common syntax errors • Recall that a program written in a programming language needs to be translated in order to be executed by a machine • Write simple Python programs that display messages, assign values to variables, and receive keyboard input • Describe the semantics of assignment statements • Receive input from the keyboard and convert it to a numerical value • Use simple arithmetic expressions in assignment statements to calculate values • Generate and use random integers • Use binary selection (if, else statements) to control the flow of program execution • Use relational operators to form logical expressions • Describe how iteration (while statements) controls the flow of program execution • Use multibranch 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 	<p>Algorithm Program Syntax Error Translate Interpreter Compiler Python Variable Assignment Statement Semantics Input Output Integer Arithmetic Expression Random Selection Relational Operator Logical Expression Iteration While Loop Multibranch Selection Counter Variable Control Flow</p>	<p>Rubric/ End of topic test (30 mins)</p>	<p>Core resources: Key Stage 3</p> <p>Enrichment and extension resources:</p>

		<ul style="list-style-type: none"> • Use Boolean variables as flags 			
Autumn 2	Layers of computing systems	<p>Students will be understanding the internal systems that make up a computer system and how it processes data.</p> <ul style="list-style-type: none"> • Explain the difference between a general-purpose computing system and a purpose-built device • 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 • Describe how the hardware components used in computing systems work together in order to execute programs • Describe the function of the hardware components used in computing systems • 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 how hardware is built out of increasingly complex logic circuits • Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions • Recall that, since 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 • Associate the use of artificial intelligence with moral dilemmas • Describe how machine learning differs from traditional programming • Describe the steps involved in training machines to perform tasks (gathering data, training, testing) 	<p>General-purpose system Purpose-built device Program Instruction Data Hardware CPU RAM Storage Input device Output device Architecture Operating system (OS) Logic circuit Logic gate Binary Logical operator NOT gate AND gate OR gate Artificial Intelligence (AI) Machine Learning (ML) Moral dilemma Code sharing Implications</p>	End of topic test (30 mins)	<p>Core resources: Key Stage 3</p> <p>Enrichment and extension resources:</p>

		<ul style="list-style-type: none"> Identify examples of artificial intelligence and machine learning in the real world Provide broad definitions of 'artificial intelligence' and 'machine learning' Explain the implications of sharing program code 			
Spring 1	Understanding AI, Legal Issues & E-Safety	<p>Students will be generating AI Media and analysing how to construct prompts effectively. This will lead to conversations about the legality of AI and issues of student's personal safety online.</p> <ul style="list-style-type: none"> Identify important terms like artificial intelligence, copyright, data privacy. Describe why it's important to know the rules about using and downloading content from AI tools. Show how to use AI safely and legally. Spot possible risks or mistakes in examples where AI is used incorrectly and Creative commons. Assess the safety and legality of AI generated content in case studies. Design a short guide or infographic on How to Stay Safe and Legal When Using AI. Recognize and apply school policies and UK laws. 	Artificial Intelligence Copyright Data Privacy Intellectual Property Creative Commons Fair Use Plagiarism Attribution Terms of Service Bias Misinformation Consent Digital Footprint Safe Search Source Reliability Algorithm Deepfake UK Data Protection Act Age-Appropriate Use School Acceptable Use Policy	End of topic test (30 mins)	
Spring 2	Developing for the Web	<p>Students will be developing an understanding of how the internet works and the core languages of the internet HTML & CSS</p> <ul style="list-style-type: none"> Describe what HTML is Modify HTML tags using inline styling to improve the appearance of web pages Use HTML to structure static web pages Apply HTML tags to construct a web page structure from a provided design Display images within a web page 	HTML Tag Inline Styling Static Web Page Structure Attribute Image Tag CSS Style Rule Class Selector Hyperlink Navigation	End of topic test (30 mins)	Key Stage 3

		<ul style="list-style-type: none"> Assess the benefits of using CSS to style pages instead of inline formatting Describe what CSS is Use CSS to style static web pages Analyse how search engines select and rank results when searches are made Describe what a search engine is Explain how search engines 'crawl' through the World Wide Web and how they select and rank results Create hyperlinks to allow users to navigate between multiple web pages Discuss the impact of search technologies and the issues that arise by the way they function and the way they are used Use search technologies effectively Complete summative assessment Implement navigation to complete a functioning website 	Search Engine Crawl Ranking Algorithm Search Technologies Website Web Page World Wide Web		
Summer 1	Representations – from clay to silicon	Students will learn how different types of data are represented on computers. <ul style="list-style-type: none"> List examples of representations Provide examples of how different representations are appropriate for different tasks Recall that representations are used to store, communicate, and process information Measure the length of a representation as the number of symbols that it contains Provide examples of how symbols are carried on physical media Recall that characters can be represented as sequences of symbols and list examples of character coding schemes 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 Symbol Binary Bit Byte Character Character Encoding ASCII Unicode Decimal Natural Number Media (Physical) Digital Device Storage Unit Kilobyte (KB) Megabyte (MB) Gigabyte (GB) Representation Length Encoding	End of topic test (30 mins)	Key Stage 3

		<ul style="list-style-type: none"> • Convert a decimal number to binary and vice versa • Describe how natural numbers are represented as sequences of binary digits • Convert between different units and multiples of representation size • Provide examples of the different ways that binary digits are physically represented in digital devices • Apply all of the skills covered in this unit 			
Summer 2	Generative AI – Prompt engineering	<p>In this unit students will learn about the current and potential future benefits of generative AI and how to wield it's power with prompt engineering.</p> <ul style="list-style-type: none"> • Identify what artificial intelligence is and describe how it creates images using written prompts. • Explain how different types of prompts can change the kind of image an AI tool generates. • Use a simple prompt to generate your first AI image and describe what the prompt told the AI to do. • Compare basic and detailed prompts to see how they affect the style, accuracy, and content of AI-generated images. • Improve a prompt to get a more specific or creative result from the AI image generator. • Give feedback on different AI images and explain how prompt changes could improve the outcome. • Design your own series of prompts to generate an AI image (Remodify the one created previously) • Explain why it's important to use clear, respectful, and ethical language when creating AI prompts. • Review your AI images and prompts, then refine them to better match your creative intention or audience. 	Artificial Intelligence (AI) Prompt Generate Image Generator Output Input Style Accuracy Refine Creative Intention Ethical Feedback Audience Modify Detailed Prompt Basic Prompt	End of topic test (30 mins)	Key Stage 3

SJBC Curriculum Termly Plan: Y9 Computer Science

Term	Topic(s) and links to other subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	Python programming with sequencing of data.	<p>Students will develop their skills in text-based programming to be able to apply more advanced features.</p> <ul style="list-style-type: none"> ○ Create lists and access individual list items ○ Locate and correct common syntax errors ○ Write programs that display messages, receive keyboard input, and use simple arithmetic expressions in assignment statements ○ Perform common operations on lists or individual items ○ Use selection(if/elif/else statements) to control the flow of the program execution ○ Perform common operations on lists or individual items ○ Perform common operations on strings or individual characters ○ Use iteration (while statements) to control the flow of program execution ○ Perform common operations on lists or strings ○ Use iteration (for statements) to iterate over list items ○ Combine key programming language features to develop solutions to meaningful problems ○ Use iteration (for loops) to iterate over lists and strings ○ Use variables to keep track of counts and sums ● Apply all of the skills covered in this unit 	List Index Syntax Error Assignment Input Output Arithmetic Operator Selection Boolean Condition String Character Iteration While Loop For Loop Loop Variable Trace Table Concatenation Function Debugging Variable Increment Accumulator Nested Loop	Rubric/ End of topic test (20 mins)	Core resources: Key Stage 3 Enrichment and extension resources:
Autumn 2	Data science	<p>Students will be understanding the internal systems that make up a computer system and how it processes data.</p> <ul style="list-style-type: none"> ● Define data science ● Explain how visualising data can help identify patterns and trends in order to help us gain insights ● Use an appropriate software tool to visualise data sets and look for patterns or trends 	Data Science Data Set Visualisation Trend Pattern Correlation	End of topic test (20 mins)	Core resources: Key Stage 3

		<ul style="list-style-type: none"> • Evaluate findings to support arguments for or against a prediction • Recognise examples of where large data sets are used in daily life • Select criteria and use data set to investigate predictions • Define the terms 'correlation' and 'outliers' in relation to data trends • Identify the steps of the investigative cycle • Solve a problem by implementing steps of the investigative cycle on a data set • Use findings to support a recommendation • Create a data capture form • Identify the data needed to answer a question defined by the learner • Identify the steps of the investigative cycle • Apply data cleansing techniques to a data set • Describe the need for data cleansing • Visualise a data set • Analyse visualisations to identify patterns, trends, and outliers • Draw conclusions and report findings • Visualise a data set 	<p>Outlier Prediction Insight Evaluation Investigative Cycle Recommendation Data Capture Form Criteria Data Cleansing Analyse Conclusion</p>		<p>Enrichment and extension resources:</p>
Spring 1	Understanding AI, Legal Issues & ESafety	<p>Students will be generating AI Media and analysing how to construct prompts effectively. This will lead to conversations about the legality of AI and issues of student's personal safety online.</p> <ul style="list-style-type: none"> • Identify important terms like artificial intelligence, copyright, data privacy. • Describe why it's important to know the rules about using and downloading content from AI tools. • Show how to use AI safely and legally. • Spot possible risks or mistakes in examples where AI is used incorrectly and Creative commons. • Assess the safety and legality of AI generated content in case studies. 	<p>Artificial Intelligence Copyright Data Privacy Intellectual Property Creative Commons Fair Use Plagiarism Attribution Terms of Service Bias Misinformation Consent Digital Footprint Safe Search</p>	End of topic test (20 mins)	

		<ul style="list-style-type: none"> • Design a short guide or infographic on How to Stay Safe and Legal When Using AI. • Recognize and apply school policies and UK laws. 	Source Reliability Algorithm Deepfake UK Data Protection Act AgeAppropriate Use School Acceptable Use Policy		
Spring 2	Representations – going audiovisual	<p>Students will develop their understanding of how different types of data are represented on computers.</p> <ul style="list-style-type: none"> • Define key terms such as ‘pixels’, ‘resolution’, and ‘colour depth’ • Describe how an image can be represented as a sequence of bits • Describe how digital images are composed of individual elements • Recall that the colour of each picture element is represented using a sequence of binary digits • Compute the representation size of a digital image, by multiplying resolution (number of pixels) with colour depth (number of bits used to represent the colour of individual pixels) • Describe how colour can be represented as a mixture of red, green, and blue, with a sequence of bits representing each colour’s intensity • Describe the tradeoff between representation size and perceived quality for digital images • Describe and assess the creative benefits and ethical drawbacks of digital manipulation [Education for a Connected World](https://www.gov.uk/government/publications/educationforaconnectedworld) • Explain how the manipulation of digital images amounts to arithmetic operations on their digital representation • Perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation 	Pixel Resolution Colour Depth Bit Binary RGB (Red, Green, Blue) File Size Sample Sampling Rate Sample Size Sound Wave Microphone Speaker Compression Lossy Compression Lossless Compression Manipulation Ethics Bitmap Pulse Code Modulation	End of topic test (20 mins)	Key Stage 3

		<ul style="list-style-type: none"> • Define key terms such as ‘sample’, ‘sampling frequency/rate’, ‘sample size’ • Describe how sounds are represented as sequences of bits • Explain the function of microphones and speakers as components that capture and generate sound • Recall that sound is a wave • Calculate representation size for a given digital sound, given its attributes • Explain how attributes such as sampling frequency and sample size affect characteristics such as representation size and perceived quality, and the trade-offs involved • Perform basic sound editing tasks using appropriate software and combine them in order to solve more complex problems requiring sound manipulation • Define ‘compression’, and describe why it is necessary • Recall that bitmap images and pulse code sound are not the only binary representations of images and sound available 			
Summer 1	Introduction of cybersecurity	<p>Students will be developing an understanding of how the internet and networks work and the types of threats that exist. They will also develop an understanding of how to prevent reduce threats.</p> <ul style="list-style-type: none"> • Critique online services in relation to data privacy • Explain the difference between data and information • Explain the need for the Data Protection Act • Identify what happens to data entered online • Implement strategies to minimise the risk of data being compromised through human error • Recognise how human errors pose security risks to data • Define hacking in the context of cyber security • Explain how a DDoS attack can impact users of online services • Explain the need for the Computer Misuse Act • Identify strategies to reduce the chance of a brute force attack being successful 	<p>Data Information Data Privacy Data Protection Act Hacking DDoS Attack Computer Misuse Act Brute Force Attack Malware Virus Worm Trojan Horse Spyware Ransomware Malicious Bots Phishing Firewall</p>	End of topic test (20 mins)	Key Stage 3

		<ul style="list-style-type: none"> • Examine how different types of malware causes problems for computer systems • List the common malware threats • Question how malicious bots can have an impact on societal issues • Compare security threats against probability and the potential impact to organisations • Explain how networks can be protected from common security threats • Identify the most effective methods to prevent cyberattacks 	Antivirus Software Encryption Authentication Two-Factor Authentication Human Error Online Services Cybersecurity		
Summer 2	Introduction of cybersecurity	<p>This is a continuation of the previous unit to ensure appropriate GCSE level depth is reached and also give time for sufficient revision, assessment and feedback before PPE2</p> <ul style="list-style-type: none"> • Identify what happens to data entered online • Identify strategies to reduce the chance of brute force attack being successful. 		End of topic test (20 mins)	Key Stage 3