Computing: Sequence of Learning

		Autumn		Spring		Summer	
5	**Unit**	**An introduction into the Computing Lab**	**Programming sequencing and repetition**	**Cryptographers**	**Vector drawings**	**Flat-file databases**	**Web developers**
	Concepts	An introduction to the computing room Word processing documents and developing typing skills	Using a block-based programming language to create a game.	Securely communicating information through cryptography.	Creating images in a drawing program by using layers and groups of objects	Using a database to order data and create charts to answer questions	Working collaboratively online to create a website together.
	Knowledge	● To use our computers safely, respectfully and responsibly. ● School360 ● Word processing (googledoc) ● Use google slide ● To develop their touch typing skills. ● Managing online information ● Health, well-being and lifestyle ● Privacy and security	● Computer programming using block-based coding (scratch) ● To create a game using coding. ● Privacy and security ● Managing online information	● Communicating information securely through a variety of different code systems. ● Investigate and use different early methods of communicating over distance. ● Why would messages need to be secure? How do we use this in the present day?	● Use different drawing tools to create vector images.	● Organise data ● Use a flat-file database to store, order and sort data ● To use tools to answer questions about the data stored in the database. ● Online reputation ● Managing online information	● How to research information on the internet ● How search engines select and rank results ● Work together to create website ● To work safely and responsibly online ● Online Reputation ● Managing online information ● Online relationships ● Copyright and ownership
	Skills	● Use software tools to support computer work ● Individuals and systems ● How to use School360 ● How to use word and google docs effectively and efficiently ● How to format text ● How to use google slides effectively ● Develop touch typing skills ● Understand risks when using technology and how to protect ● Secure passwords	● Be familiar with creating new and additional sprites ● Be able to change costumes and backgrounds on Scratch ● Use FOREVER , IF and IF THEN loops to control how a Sprite moves ● Use repetitions to allow the computer to control how the Sprite moves ● Create secure usernames and passwords	● Be familiar with semaphore and Morse code ● Understand the need for private information to be encrypted ● Encrypt and decrypt messages in simple ciphers ● Appreciate the need to use complex passwords and to keep them secure ● Have some understanding of how encryption works on the web.	● Identify that drawing tools can be used to produce different outcomes ● Create a vector drawing by combining shapes ● Use tools to achieve a desired effect ● Recognise that vector drawings consist of layers ● Group objects to make them easier to work with ● Evaluate their vetor drawing	● Use a form to record information ● Compare paper and computer-based databases ● Outline how grouping and then sorting data allows use to answer questions ● Explain that tools can be used to select specific data ● Explain that computer programs can be used to compare data visually ● Use search technologies effectively	● Develop their research skills to decide what information is appropriate ● Understand some elements of how search engines select and rank results ● Question the plausibility and quality of information ● Develop and refine their ideas and text collaboratively ● Develop their understanding of online safety and responsible use of technology. ● Credibility of information shared online ● To work online collectively
	RSE	My Media choices *Children learn what makes a healthy media choice.* ● Health, wellbeing and lifestyle ● Online reputation ● Online relationships ● Privacy and security ● Self-image and identity	Be a Super Citizen *Children will discuss how they can be upstanders when they see cyberbullying* ● Online bullying ● Online relationships	Keeping Games Fun and Friendly *Children will discuss how they can help themselves and others be positive and have fun whilst playing online games.* ● Online reputation ● Online relationships ● Privacy and security ● Self-image and identity	A Creator's Rights and Responsibilities *Children will discuss what rights and responsibilities they have as creators.* ● Copyright and ownership ● Managing online information	Private and Personal Information *Children will discuss what information about themselves is OK to share online.* ● Privacy and security ● Self-image and identity ● Online relationships ● Online reputations	Our online Tracks *Children will discuss how their online activity affects the digital footprint of themselves and others.* ● Managing online information ● Health, well-being and lifestyle ● Online reputation ● Self-image and identity
	NC	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into small parts. Use sequence, selection and repetition in programs; work with variables and various forms of input and output. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information	Use search technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information	Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration. Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and

							presenting data and information. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
6	**Unit**	**Computer systems and networks - communication**	**Programming - variables in a game**	**Webpage creation**	**3D modelling**	**Introduction into spreadsheets**	**Sensing**
	Concepts	Recognise how the World Wide Web can be used to communicate and be searched to find information	Exploring variables when designing and coding a game	Designing and creating web pages, giving consideration to copyright, aesthetics and navigation	Planning, developing, and evaluating 3D computer models of physical objects	Answering questions by using spreadsheets to organise and calculate data	Designing and coding a project that capture inputs from a physical device
	Knowledge	● Finding information on the World Wide Web. ● How Search engines work. ● What influences searches. ● Comparing different search engines. ● Health, well-being and lifestyle ● Managing online information ● Online reputation ●	● Variables and how they are used in programming and real-world ● Use block-based coding to design and create a game that includes variables and a scoreboard. ● Managing online information ● Privacy and Security	● Features of a good web page. ● Copyright and fair use of media. ● The aesthetics of the site, and navigation paths. ● The creation of websites for a chosen purpose. ● Using Googlesites ● Online relationships ● Managing information online ● Copyright and ownership	● What is 3D modelling ● Create 3D models ● Use tinkercad ● Privacy and Security	● Use googlesheets ● Organising data into columns and rows. ● Format data to support calculations. ● Apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. ● Managing information online	● Block-based programming using sequences, repetition, selection and variables. ● Apply knowledge to a physical controllable device (a micro:bit)
	Skills	● Use software tools to support computing work ● Explain how to use a search engine ● Explain how search engines select results ● Explain how search results are ranked ● Understand why the order of results is important ● Recognise, explain and evaluate different methods of online communication ● Describe and assess the benefits and the potential risks of sharing information online ● Use a variety of additional tools to refine searches ● Explain how to use search effectively and use examples ● Explain how search engine rankings are returned and how they are influenced.	● Define a 'variable' ● Explain why a variable is used in programming ● Choose how to improve a game by using variables ● Design, make and evaluate a project that builds on a given example ● Creating save and secure usernames and passwords	● Review existing websites ● Explain the features of a 'good' website ● Discuss different types of media used on a website ● Understand that websites are written in HTML code ● Consider ownership and use of images (copyright and ownership) ● Design, make and evaluate a website that includes: a range of media, two or more pages and hyperlinks ● Understand the need to preview pages ● Use the internet safely and securely ● Navigate online content, to get the information i want ● Explain why copying someone's work without permission can cause problems ● Assess and justify when it is acceptable to use the work of others ● Use search tools to find and access online content which can be reused by others.	● Use a computer to create and manipulate three-dimensional digital objects ● Compare working digitally with 2D and 3D graphics ● Construct a digital 3D model of a physical object ● Design, develop, evaluate and improve a digital 3D model ● Describe strategies for keeping my personal information private	● Create a data set in a spreadsheet ● Build a data set in a spreadsheet ● Explain that formulas can be used to produce calculated data ● Use formulas ● Create spreadsheet to plan an event ● Use suitable charts and graphs to present data ● Describe how i can search for information ● Use different search technologies responsibly and respectfully ● Evaluate digital content and can explain how I make choice from search results	● Create a program to run a controllable device ● Explain that selection can control the flow of a program ● Update a variable with a user input ● Use conditional statements to compare a variable to a value (<>=) ● Design, make and evaluate a project that uses inputs and outputs on a controllable device.
	RSE	Finding my media balance *Children will discuss what a mean balance means for them* Health, well-being and lifestyle Self-image and identity	Is it Cyberbullying? *Children will discuss what cyberbullying is and what they can do to stop it.* Online bullying Online relationships	Digital Friendship *Children will discuss how to keep online friendships safe,* Online relationships Online reputations Self-image and identity	Reading News online *Children will look at what are the important parts of an online news article.* Managing online information	You Won't Believe this! *Children will discuss what scams and clickbait are and how to avoid them.* Privacy and security	Beyond Gender Stereotypes *Children will discuss how gender stereotypes shape our experiences online.* Online relationships Self-image and identity Health, well-being and lifestyle
	NC	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into small parts. Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into small parts. Use sequence, selection and repetition in programs; work with variables and various forms of input and output.	Use technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals,	Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. .	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into small parts. Use sequence, selection and repetition in programs; work with variables and various forms of input and output.

		they offer for communication and collaboration. Use technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	including collecting, analysing, evaluating and presenting data and information. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.		Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.
7	Unit	**Impact of technology collaborating online responsibility**	**Networks: from semaphores to internet**	**Using media: gaining support for a cause**	**Programming essentials in Scratch 1**	**Programming essentials in Scratch 2**	**Modelling data: spreadsheets**
	Concepts	Identifying how to use online collaboration tools respectfully	Recognising networking hardware and explaining how networking components are used for communication.	Creating a digital product for a real-world cause.	Applying the programming constructs of sequence, selection and iteration in Scratch	Using subroutines to decompose a problem that incorporates lists in Scratch	Sorting and filtering data and using formulas and functions in spreadsheet software
	Knowledge	• To use technology responsibly and respectfully • To communicate online respectfully • Collaboratively create a googlgeslides presentation about cyberbullying • To present their presentation together. • Online relationships • Online bullying • Privacy and security	• Research different computer networks • Benefit and drawbacks of different networks • How data is transmitted across networks using protocols • Privacy and security	• Features of a word processor (googledocs) • Research, design and create a blog about a real world cause they are passionate about. • Managing online information • Copyright and Ownership • Credibility	• Block-based programming using the four key programming constructs (sequencing, variables, selection and reputation)	• Developing block-based programming understanding of the control structures' sequence, selection and iteration, • Use subroutines, • Develop their understanding of decomposition • Create and use lists in block-based programming.	• Using googlesheets • Cell referencing • Collecting, analysing and manipulating data • Using graphs and charts
	Skills	• Select and create a range of media including text, images, sounds and video. • Planning, creating and evaluating computing artefacts • Use software tools effectively • To work collaboratively at create a group presentation • Strategies for assessing the degree of trust I place in people or organisations online • How to make positive contributions online • How bullying may change • Identify and demonstrate actions to support others • Create strong and secure passwords • How my internet use is often monitored	• Understand the hardware and software components that make up computer systems • Understand how computer system communicate with one another and with other systems • Understand different types of networks and their benefits • Understand how networks can be used to retrieve and share information and come with associated risks • Explain the term "connectivity" as the capacity for connected devices • How devices collect and share information about me with or without my knowledge	• Identify and use most features on googledocs • Select and create a range of media including text, images, sounds and video. • Planning, creating and evaluating computing artefacts • Use software tools to support computing work • Use a range of features to quality assure the content I access online • Use search effectively • Commercial online content can be viewed, accessed or downloaded illegally • Define the concept of plagiarism • Creative Commons Licensing Protocols	• Define sequences, variables, conditions, iterations and reputation • Predict outcomes • Modify programs to include sequences, variables and/or selection • Create conditions that use comparisons • Detect and correct errors in programs (debug) ,	• Define subroutines , decomposition and lists • Implement condition-controlled iteration in programs • Use a list • Decompose a larger problem into smaller subproblems.	• Identity columns, rows, cells and cell references. • Use formatting techniques • Use formulas with cell references • Explain the difference between data and information • Collect, input and analyse data • Use functions SUM, COUNTA, MAX, MIN, AVERAGE, COUNTIF and IF
	RSE	Finding balance in a Digital World *Children will discuss how they can balance digital media use in their lives.*	Digital Drama Unplugged *Children will discuss how they can de-escalate digital drama so it doesn't go too far.*	Chatting Safely Online *Children will discuss how to chat safely with people they meet online.*	Finding Credible News *Children will discuss how to find credible information on the internet.*	Don't Feed the Phish *Children will discuss how to protect themselves from phishing.*	Who Are You Online? *Children will discuss what are the benefits and drawbacks of presenting themselves in different ways online.*
	NC	Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability	Understand the hardware and software components that make up computer systems, and how they communicate with one	Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve	Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the	Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the	Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems

		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	another and with other systems	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	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] Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability	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] Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability	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
8	Unit	**Developing from the web**	**Representations from clay to silicon**	**Edublocks block to textbase programming**	**Media: vector graphics**	**Computing systems**	**Introduction to Python programming**
	Concepts	Using HTML and CSS to create a webpage	Representing numbers and text using binary digits	Code using both block-based code and text-based code	Creating vector graphics through objects, layering and path manipulations	Exploring the fundamental elements that make up a computer system	Applying the programming constructs of sequencing, selection and iteration in Python
	Knowledge	• HTML coding • CSS coding • Creating a website using HTML coding. • Using the internet responsibly, respectfully and effectively Managing online Information • Self-image and identity • Online reputation • Health, well-being and lifestyles	• Use symbols to record, process and transmit information • Binary digits • Numbers in binary • Prefixes for measuring large units in computing	• Transition from block-based programming to text-based programming • Programming to draw shapes in Turtle • Decomposition • Programming using Python • Variables • Functions and subroutines	• Work in Inkscape • Research the process involved in creating vector graphics • Use the tools and their knowledge to create their own vector graphic.	• How a computing system operates • Identify different hardware components of a computer system • Identify the components that store and execute programs • Different operating systems	• Text-based only programming with Python • Programming input and output • Programming using arithmetic operations, randomness, selection and iteration, • Decomposition of errors
	Skills	• Describe what HTML is • Use HTML to create a static webpage • Modify HTML tags • Describe what CSS is • Use CSS to style static webpages • Create hyperlinks • Use search technologies effectively • Understanding risks when using technology and how to protect individuals and systems	• List examples of different coding systems used to record, process and transmit • Explain what binary digits are • Measure the size or length of a sequence of bits as the number of binary digits • Convert a decimal number to binary and vice versa • Convert between different units and multiples of representation size.	• Compare block-based to text-based programming • Using algorithms/sequences • Use iteration • Decomposition of errors in Python • Use of different data types • Using variables in Python • Using Functions and subroutines in Python • Using arguments with functions in Python • Understand how functions can make code shorter	• Draw and manipulate shapes • Manipulate groups of objects • Combine multiple tools and techniques to create a vector graphic design • Evaluate project work	• Explain the difference between hardware and software • Describe the function of the hardware components • Describe how the hardware components work together • Define what an operating system is • Describe the NOT, AND, and OR logical operators and how they are used to form logical expressions.	• Describe what algorithms and programs are and how they differ • Use Python to write text-based programs that: display messages, assign values to variables and receive keyboard input • Locate and correct syntax errors
	RSE	My Media Use: A Personal Challenge *Children will discuss what their strategies are for finding a media balance.*	Upstanders and Allies: Taking Action Against Cyberbullying *Children will discuss how they can respond when cyberbullying occurs.*	My Social Media Life *Children will discuss how social media can affect their relationships.*	Copyright and Fair Dealing *Children will discuss what rights to fair dealing you have as a creator.*	Big, Big Data *Children will discuss how different companies collect and use the data about them.*	The Power of Digital Footprints. *Children will discuss how our digital footprints might shape our futures.*
	NC	Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability	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	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	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	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	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 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	for a given audience, with attention to trustworthiness, design and usability	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	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 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