Long Term Plan Computing
Year 4

Aims:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- 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 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.

Term	Unit	Overview	Knowledge	Skills	Assessment
Autumn 1	Computing systems and networks – The Internet	Learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and will	To describe how networks connect to other networks To outline how information can be shared via the World Wide Web To recognise that the World Wide Web is part of the internet To explain that the global interconnection of networks is the internet To recognise the need for security on the internet To describe how to access the World Wide Web	To explain the benefits of the World Wide Web To evaluate the reliability of content and the consequences of unreliable content To use technology effectively To use technology safely	Can children explain the benefits of the World Wide Web? Can children say how networks are connected? Can children evaluate the reliability of content? What are the consequences of unreliable content? Can children use technology effectively? Can children explain how they can use technology safely?

		be given opportunities to explore the World Wide Web for themselves in order to learn about who owns content and what they can access, add, and create. Finally, they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information. This unit requires devices with an internet connection. Chrome Music Lab is used in one lesson to demonstrate content which can be produced on the World Wide Web.	To describe the types of content/media that can be added, created, and shared on the World Wide Web To explain how the content of the World Wide Web is created, owned, and shared by people To explain that the internet enables us to view the World Wide Web To explain that the World Wide Web comprises of websites and web pages To describe the current limitations of World Wide Web media		
		Vocabulary Internet, network, router, network security, network switch, wireless access point (WAP), router, website, web page, web address, router, routing, route tracing, browser, World Wide Web, content, links, files, use, download, sharing, ownership, permission, accurate, honest, adverts			

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Autumn 2	Creating media – Audio editing	Learners will identify the input device (microphone) and output devices (speaker or headphones) required to work with sound digitally. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podcast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners will evaluate their work and give feedback to their peers.	To identify that sound can be recorded To identify that an input device is needed to record sound To identify that output devices are needed to play audio To recognise that recorded audio can be stored on a computer To recognise that audio can be edited To recognise that sound can be represented visually as a waveform To recognise that audio can be layered so that multiple sounds can be played at the same time To consider the results of editing choices made	To record sound using a computer To play recorded audio To import audio into a project To delete a section of audio To change the volume of tracks in a project	Can children record sound using a computer? Can children play recorded audio? Can children import audio into a project? Can children delete a section of audio? Can children change the volume of tracks in a project? Could children explain to a peer how to use audacity?
		Vocabulary Audio, record, playback, microphone, speaker, headphones, input, output, start, stop, podcast, save, file, selection, edit, mixing, time shift, export, MP3, evaluate, feedback			

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Spring 1	Programming A – Repetition in shapes	This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming. Pupils will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language.	To relate what 'repeat' means To identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves To explain that we can use a loop command in a program to repeat instruction To identify patterns in a sequence To identify a loop within a program To explain that in programming there are indefinite loops and count-controlled loops To explain that an indefinite loop will run until the program is stopped To explain that you can program a loop to stop after a specific number of times To identify patterns in a sequence, eg 'step 3 times' means the same as 'step, step, step' To justify when to use a loop and when not to To explain the importance of instruction order in a loop To recognise that not all tools enable more than one process to be run at once	To list an everyday task as a set of instructions including repetition To use an indefinite loop to produce a given outcome To use a count-controlled loop to produce a given outcome To plan a program that includes appropriate loops to produce a given outcome To recognise tools that enable more than one process to be run at the same time (concurrency)	Can children list an everyday task as a set of instructions including repetition? Can children use an indefinite loop to produce a given outcome? Can children use a count-controlled loop to produce a given outcome? Can children plan a program that includes appropriate loops to produce a given outcome? Can children recognise tools that enable more than one process to be run at the same time (concurrency)?
		Vocabulary Program, turtle, commands, code, snippet, algorithm, design, debug, logo commands, pattern, repeat, repetition, count-controlled loop, value, decompose, procedure			

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Spring 2	Data and information – Data logging	Pupils will consider how and why data is collected over time. Pupils will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Pupils will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer to review and analyse data. Towards the end of the unit, pupils will pose questions and then use data loggers to automatically collect the data needed to answer those questions.	To suggest questions that can be answered using a given data set To identify the data that we need to answer questions To use a digital device to collect data automatically To identify that sensors are input devices To recognise that a sensor can be used as an input device for data collection To explain that a data logger captures 'data points' from sensors over time To use a larger data set to find information To export information in different formats	To choose how often to automatically collect data samples To use a computer program to sort data by one attribute To present data in a table To present data in a graph	Can children choose how often to automatically collect data samples? Can children use a computer program to sort data by one attribute? Can children present data in a table? Can children present data in a graph?

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		Vocabulary Data, table (layout), input device, sensor, data logger, logging, data point, interval, analyse, import, export, logged, collection, analyse, review, conclusion			

Summer 1	Creating media – Photo editing	Learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices.	To use a computer to (further) manipulate images To open/retrieve an image To arrange (rotate, flip) To crop To cut out a part To adjust colours To apply filters To add effects To retouch To reuse To draw To add text To add an element (e.g. a border)	To recognise that digital images can be manipulated To recognise that images can be changed for different purposes To use the most appropriate tool for a particular purpose To recognise that not all images are real To consider the impact of changes made on the quality of the image	Can children recognise that digital images can be manipulated? Can children recognise that images can be changed for different purposes? Can children use the most appropriate tool for a particular purpose? Can children recognise that not all images are real? Can children consider the impact of changes made on the quality of the image?
		Vocabulary Image, edit, arrange, select, digital, crop, undo, save, search, copyright, composition, save, pixels, rotate, flip, adjustments, effects, colours, hue/saturation, sepia, version, illustrator, clone, recolour, magic wand, sharpen, brighten, fake, real, composite, background, foreground, retouch, paste, alter, publication, elements, original, font style, border, layer			

Summer 2	Programming B – Repetition in games	This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where	To relate what 'repeat' means To identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves To explain that we can use a loop command in a program to repeat instructions To identify patterns in a sequence To identify a loop within a program To explain that in programming there are indefinite loops and count-controlled loops	To list an everyday task as a set of instructions including repetition To use an indefinite loop to produce a given outcome To use a count-controlled loop to produce a given outcome To plan a program that includes appropriate loops to produce a given outcome	Can children list an everyday task as a set of instructions including repetition? Can children use an indefinite loop to produce a given outcome? Can children use a count-controlled loop to produce a given outcome? Can children plan a program that includes appropriate loops to produce a given outcome?

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		learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughou	To explain that an indefinite loop will run until the program is stopped To explain that you can program a loop to stop after a specific number of times To identify patterns in a sequence, eg 'step 3 times' means the same as 'step, step, step' To justify when to use a loop and when not to To explain the importance of instruction order in a loop To recognise that not all tools enable more than one process to be run at once	To recognise tools that enable more than one process to be run at the same time (concurrency) To create two or more sequences that run at the same time	Can children recognise tools that enable more than one process to be run at the same time (concurrency)? Can children create two or more sequences that run at the same time?
		Vocabulary Scratch, programming, sprite, blocks, code, loop, repeat, value, forever, infinite loop, countcontrolled loop, animate, costume, event block, duplicate, modify, debug, refine, evaluate, algorithm			

Enrichment
Internet safety week
Remote learning at home learning using the internet
Anti-bullying week (keeping safe online opportunities)