Computing Curriculum Intent:
Knowledge & Skills Framework

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Computing knowledge & skills underpin modern life and the 21st Century economy. Children need to build a vital confidence, knowledge and understanding of the way technologies work - and how internet-connected systems can be employed - in order to adapt flexibly to rapid change over coming years.

Our framework is mapped into three broad strands: **Computer Science**, **Information Technology** and **Digital Literacy**. The National Curriculum's Computing content is used as a starting point for devising our curriculum - yet lengthy objectives are broken down into manageable, sequenced chunks for children over the six year groups, with further objectives added that widen the scope and reach of the subject to reflect its ever-growing breadth and importance.

Progression through the framework is based on key items of knowledge and skill being re-visited and expanded upon, allowing children to build solid foundations in their long-term understanding of Computing.

Our bespoke framework provides children with a broad, balanced set of learning experiences. With strategic hardware and software choices made by schools, a multitude of high-quality, yet easy-to-access, learning experiences are made available for staff and students.

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	KS1		KS2			
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Computer Science: Programming	Basic Logic Learners are introduced to on-screen programming. Learners explore the way a project looks by investigating sprites and backgrounds. They use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms.	Basic Logic Learners take their on-screen programming further. Learners continue to use programming blocks to use, modify, and create programs. Learners create algorithms or multiple algorithms. They practise predicting the behaviour of simple programs. They practise debugging (finding and fixing problems) within programs they have created.	Logic Learners explore the concept of sequencing in programming. Learners are introduced to a programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. Learners will explore all aspects of sequences, building knowledge incrementally. Events and Actions Learners explore the links between events and actions, while consolidating prior learning relating to sequencing. Learners begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. Learners are introduced to programming extensions, through the use of **Pen** blocks if using Scratch. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. Learners design and code their own maze-tracing program.	Logic: Repetition with shapes Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. Learners will use a text-based programming language. Logic: Repetition with games Learners will continue to explore the concept of repetition in programming using an on-screen coding environment. Learners will compare and contrast this coding environment with the one they explored 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. Learners will design and create a game which uses repetition, applying stages of programming design throughout.	Logic: Selection in quizzes Pupils develop their knowledge of 'selection' by revisiting how 'conditions' can be used in programming, and then learning how the 'if… then… else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'. They represent this understanding in algorithms, and then by constructing programs using an on-screen programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. They use this knowledge to design a quiz in response to a given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying how it meets the requirements of the task, the ways they have improved it, and further ways it could be improved.	Logic: Variables in games Learners explore the concept of variables in programming. First, pupils will learn what variables are, and relate them to real-world examples of values that can be set and changed. Learners will then use variables to create a simulation of a scoreboard. With the **Use-Modify-Create** model, children will experiment with variables in an existing project, then modify them. They will create their own project and apply their knowledge of variables and design to improve a created game.

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Computer Science: Controlling Hardware & Understanding Machines	Hardware: controlling robots Learners are introduced to early programming concepts. Learners explore using individual commands, both with other learners and as part of a computer program. They will identify what each floor robot command does and use that knowledge to start predicting the outcome of programs. Time is spent on a broad range of programming aspects, and builds knowledge in a structured manner. Learners are also introduced to the early stages of program design through the introduction of algorithms. IT Around us Learners develop their understanding of technology and how it can help us. They will start to become familiar with the different components of a computer by developing their keyboard and mouse skills. Learners will also consider how to use technology responsibly.	Hardware: controlling robots Pupils develop their understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Pupils use given commands in different orders to investigate how order can affect outcome. They will design algorithms and then test those algorithms as programs and debug them. IT Around us Learners will look at information technology at school and beyond, in settings such as shops, hospitals, and libraries. Learners will investigate how information technology improves our world, and they will learn about using information technology responsibly.	IT Around Us: Connecting Computers Learners develop their understanding of digital devices, consdiering inputs, processes, and outputs. Learners compare digital and non-digital devices. Following this, learners are introduced to computer networks, including devices that make up a network's infrastructure, such as wireless access points and switches. The unit concludes with learners discovering the benefits of connecting devices to a network.	IT Around Us: The Internet Learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which needs to be kept secure. They will learn that the World Wide Web is part of the internet, and be given opportunities to explore the World Wide Web for themselves 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.	Hardware: First use Microbits Learners will use physical computing to explore programming concepts. Learners will be introduced to a microcontroller (Microbit) and learn how to connect and program components (including output devices such as built-in LEDs). Learners will apply and build on their existing programming knowledge. Learners will be introduced to conditions as a means of controlling the flow of actions, and explore how these can be used in algorithms and programs through the use of input devices (physical switches / tilts). Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if... then...' structure) and write algorithms and programs that utilise this concept. Taking skills further, learners will design and make a working model of a fairground carousel that will incorporate their understanding of how	IT Around Us: Communication Children learn about the World Wide Web as a communication tool. First, they will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. They will then investigate different methods of communication, before focusing on internet-based communication. Finally, they will evaluate which methods of internet communication to use for particular purposes. Hardware: applied Microbits Children will bring together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables (introduced in Year 6). Learners will have the opportunity to use all of these

					the microcontroller and its components are connected, and how selection can be used to control the operation of the model. IT Around Us: Sharing Information Learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small-scale systems as well as large-scale systems. They will explain the input, output, and process aspects of a variety of different real-world systems. Learners will also take part in a collaborative online project with other class members and develop their skills in working together online.	constructs in a different, but still familiar environment, while also utilising a physical device — the micro:bit. Learners begin with a simple program for learners to build in and test in the programming environment, before transferring it to their micro:bit. Learners take on increasingly difficult projects as their skills heighten and progress.

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Information Technology: Operate / Understand / Implement	Data & information Pupils are introduced to labelling, grouping and searching - important aspects of data and information. Pupils will begin by using labels to put objects into groups, and labelling these groups. They will demonstrate that they can count a small number of objects, before and after the objects are grouped. Pupils will begin to demonstrate their ability to sort objects into different groups, based on the properties they choose. Finally, pupils will use their ability to sort objects into different groups to answer questions about data. Input Devices & typing Learners will develop their understanding of the various aspects of using a computer to create and manipulate text. Learners will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method they prefer and explain their reasoning for choosing this.	Data & information Learners will begin to understand what the term data means and how data can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data presented to answer questions. Input Devices & typing Learners continue to practise their typing skills within a variety of cross-curricular contexts. They practise key skills such as two-finger scrolling, use of the shift key and editing basic text.	Data & Information Learners develop their understanding of what a branching database is and how to create one. They will gain an understanding of what attributes are and how to use them to sort groups of objects by using yes/no questions. The learners will create physical and on-screen branching databases. Finally, they will evaluate the effectiveness of branching databases and will decide what types of data should be presented as a branching database. Input Devices & typing Children use software to edit and improve written work from a cross-curricular subject. Children develop their use of the shift key and punctuation further, using numerous types of punctuation correctly within their on-screen writing. Children type to achieve a completed piece that can be printed or published directly to the internet.	Data & Information Learners will consider how and why data is collected over time. Learners 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. Learners 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. Learners will spend time using a computer to review and analyse data. Towards the end of the unit, learners will pose questions and then use data loggers to automatically collect the data needed to answer those questions.	Data & Information Learners look at how a flat-file database can be used to organise data in records. Learners use tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others.	Data & Information Children are introduced to the fundamental operations of spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, learners will create graphs and charts, and evaluate their results in comparison to questions asked.

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Information Technology: Media & Sound	Digital Design Learners develop their understanding of a range of tools used for digital painting. They use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. Learners consider their preferences when painting with and without the use of digital devices.	Digital Design Learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real. Digital Sound Learners will use a computer to create music. They will listen to a variety of pieces of music and consider how music can make them think and feel. Learners will compare creating music digitally and non-digitally. Learners will look at patterns and purposefully create music.	Digital Design: Animation Learners will use a range of techniques to plan and create stop-frame animations. Next, they will apply those skills to create a story-based animation. Learners will add other types of media to their animation, such as music and text.	Digital Sound Learners will examine devices capable of recording digital audio, which will include identifying the input device (microphone) and output devices (speaker or headphones) if available. 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 software 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. Digital Design: Photo Manipulation 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.	Digital Design: Vector Graphics Learners will find out that vector images are made up of shapes. They will learn how to use the different drawing tools and how images are created in layers. They will explore the ways in which images can be grouped and duplicated to support them in creating more complex pieces of work. Digital Design: Video Learners have the opportunity to learn how to create short videos in groups. As they progress, they will develop the skills and processes of capturing, editing, and manipulating video. Active learning is encouraged through guided questions and by working in small groups to investigate the use of devices and software. Learners are guided to take their idea from conception to completion. The use of green screen can be incorporated into this unit, giving an opportunity for learners to use cross-curricular knowledge and giving extra purpose to the main video project.	Digital Design: 3D Modelling Learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, including combining 3D objects to make a house and examining the differences between working digitally with 2D and 3D graphics. Learners will progress to making accurate 3D models of physical objects, such as a pencil holder, which include using 3D objects as placeholders. Finally, learners will examine the need to group 3D objects, then go on to plan, develop, and evaluate their own 3D model. Digital Design: Web Page creation Children learn how to create websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website. Throughout the process, learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths.

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Digital Literacy	Learners give examples of when and how to speak to an adult when they need to. Learners recognise some ways in which the internet can be used to communicate. Learners describe what information I should not put online without asking a trusted adult first. Learners describe how to behave online in ways that do not upset others Learners identify devices they could use to access information on the internet. Learners explain rules to keep us safe when we are using technology both in and beyond the home. Learners identify some simple examples of personal information (e.g. name, address, birthday, age, location). Learners name their work so that others know it belongs to them.	Learners describe ways in which people might make themselves look different online. Learners explain some risks of communicating online with others they don't know well. Learners explain how information put online about them can last for a long time. Learners describe how to behave online in ways that do not upset others. Learners demonstrate how to navigate a simple webpage to get to information they need (e.g. home, forward, back buttons; links, tabs and sections). Learners create rules for using technology safely Learners explain why I should always ask a trusted adult before I share any information about myself online. Learners recognise that content on the internet may belong to other people.	Learners describe ways in which media can shape ideas about gender. Learners explain how their own and other people's feelings can be hurt by what is said or written online. Learners know who they should ask if they are not sure if they should put something online. Learners describe rules about how to behave online and how to follow them. Learners evaluate digital content and can explain how to make choices from search results. Learners identify situations where they might need to limit the amount of time they use technology. Learners describe simple strategies for creating and keeping passwords private. Learners explain why copying someone else's work from the internet without permission can cause problems.	Learners explain how their online identity can be different to the identity they present in 'real life'. Learners explain what it means to 'know someone' online and why this might be different from knowing someone in real life. Learners describe how they can find out information about someone by looking online. Learners explain why they need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation). Learners analyse information and differentiate between 'opinions', 'beliefs' and 'facts'. Learners understand what criteria have to be met before something is a 'fact. Learners describe ways technology can affect healthy sleep and can describe some of the issues. Learners explain how internet use can be monitored. Learners assess and justify when it is acceptable to use the work of others.	Learners explain how identity online can be copied, modified or altered. Learners explain how impulsive and rash communications online may cause problems (e.g. flaming, content produced in live streaming). Learners describe ways that information about people online can be used by others to make judgments about an individual. Learners explain how they would report online bullying on the apps and platforms that they use. Learners explain why lots of people sharing the same opinions or beliefs online does not make those opinions or beliefs true. Learners describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose. Learners explain how many free apps or services may read and share private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others. Learners demonstrate the use of search tools to find and access online content which can be reused by others.	Learners explain how they can represent themselves in different ways online. Learners demonstrate how they would support others (including those who are having difficulties) online. Learners describe some simple ways that help build a positive online reputation. Learners identify a range of ways to report concerns both in school and at home about online bullying. Learners demonstrate strategies to enable them to analyse and evaluate the validity of 'facts. Learners explain why using these strategies are important. Learners assess and action different strategies to limit the impact of technology on their health (e.g. nightshift mode, regular breaks, correct posture, sleep, diet and exercise). Learners describe ways in which some online content targets people to gain money or information illegally; learners describe strategies to help them identify such content (e.g. scams, phishing). Learners demonstrate how to make references to and acknowledge sources they have used from the internet.