

Computing Curriculum Overview

Purpose of study (from National Curriculum): A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims (from National Curriculum): The national curriculum for computing aims to ensure that all pupils:

- 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.

Attainment targets: By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

National Curriculum Objectives		
EYFS	KS1	KS2
The EYFS framework is structured very differently to the national curriculum as it is organised across seven areas of learning rather than subject areas. This document demonstrates which statements from the 2020 Development Matters are prerequisite skills for computing within the national curriculum. The most relevant statements have been taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Birth to Three, Three and Four-Year-Olds and Reception to match the programme of study for computing. The most relevant statements for computing are taken from the following areas of learning: • Personal, Social and Emotional Development • Physical Development • Understanding the World • Expressive Arts and Design	Pupils should be taught to: • understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions • create and debug simple programs • use logical reasoning to predict the behaviour of simple programs • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.	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.

Autumn									
		EYFS		KS1		KS2		UKS2	
Prior Learning		Not Applicable		See above		See above		See above	
		Nursery All About Me & Festivals / Light & Dark	Reception We Are Special & We Are Zoologists	Year 1 We Are Superheroes & We Are Astronauts	Year 2 Crazy Castles & Courageous Characters	Year 3 The Stone Age & Amazing Animals	Year 4 The Romans & Awesome Oceans	Year 5 Settlers and Invaders & ¿Aliens?	Year 6 The Victorians & Evolution (Darwin)
Knowledge	Children will know (key learning)	PSED: Remember rules without needing an adult to remind them.	PSED: Know and talk about the different factors that support their overall health and wellbeing: -sensible amounts of 'screen time'	- When work is saved electronically, it needs to have a name that identifies it and is easily remembered. - Software is the programs that are used by a computer, such as word processing software, presentation software or image editing software. It can be used to create and combine digital content for different audiences and purposes. - When work is saved electronically, it can be stored on a hard drive, a shared drive called a server or online so that it can be opened on the same device or another device at a later time. - Digital technology is used in all parts of everyday life, such as on a tablet to play a game or using a microwave to heat food. Some of this digital technology can be used to connect with others locally, such as sharing digital work in the classroom, or globally, such as using Skype on a computer to speak to a friend overseas.	- Software is available that can be used to represent collected data digitally, such as in a pictogram or bar chart. - Hardware, such as cameras, scanners and data loggers, can be used to collect data. - Computers and devices can be linked in different ways, such as through a network, the internet and Bluetooth. This allows the sharing of resources. - A device is online if it is connected to the internet or a network and can communicate with other devices. A device is offline if it is not connected to the internet or network and cannot connect to other devices. - Multimedia components, such as text, images, audio and video clips, can be created, edited and combined to create content for a range of tasks.	- When work is saved, it is stored on a storage device, such as the computer's hard drive, a USB flash drive, a shared server or online. This work can then be retrieved from another device (except if it is saved on the computer's hard drive). - Text, images, animation, audio and video clips can be combined using tools within a piece of software or by using a range of software. For example, an image could be inserted into a word processing document or a video could be inserted into a presentation. - Several pieces of hardware can be used together to complete one task, such as using a camera to take a photograph, uploading it to a computer and then printing it using a printer. - Several pieces of software can be used together to complete one task, such as adding a video to a word processed document.	- Computers interact with the world using input and output devices. An input device may include sensors that can detect changes, such as in temperature, light level, sound level or movement. The input then sends the information to a computer, which tells the output device to trigger an action, such as making a sound or creating a movement. - Manipulating a range of text, images, sound or video clips and animation may include changing their style, size, colour, effect, shape, location or format. - Interacting regularly with hardware enables users to recognise common features and become confident in working with new or unfamiliar hardware. - New computing software commonly has features that should be familiar to users, such as icons or terminology.	- Computer networks are made up of computers that are connected by cables, fibres or wireless links. Each network can only be accessed by computers within their network, such as in school or at home. The internet network can be accessed by anyone. - Using prior knowledge and experience of computing skills can be applied to unfamiliar hardware to solve a problem successfully. - Using prior knowledge and experience of computing skills can be applied to create content using unfamiliar programs or apps. - A range of technologies can be selected, used and combined, such as using different hardware and software to create a solution that will have an impact on others. - Creating, selecting and combining a range of texts, images, sound clips and videos for given purposes could include creating a web page, slide show presentation,	- The positives of communicating online include the speed, low cost and ability to communicate globally. The negatives of communicating online include the threat to privacy, influencing of others, access to technology and anonymity. - A variety of software, such as word processing software, image editing software or internet services, can be selected, used and combined to meet a goal. - Some hardware is more effective than others in particular contexts, such as using virtual reality or a touchscreen rather than a mouse to meet a specific need. Choosing the right hardware can increase creativity and productivity. - Some software or apps are designed to help increase creativity by saving time or making tasks easier, such as being able to combine text, images, audio or video content into one place.

								short film or an animation.	
	Vocabulary	Stop, Go, I-pad, Beebot	Laptops, online, safety, software	Word processing, digital, editing	Online, offline, network, devices	Uploading, downloading, storage, shared drive	Animation, sensors, device, interact	Multimedia, wireless, fibreoptic cable	Virtual reality, app(lication), touchscreen
Skills		Physical Development: Match their developing physical skills to tasks and activities in the setting.	PSED: Show resilience and perseverance in the face of a challenge.	- Select appropriate software to complete given tasks using text, images, audio and video clips. - Search for or retrieve digital content, including images and information, in digital folders and, with supervision, online. - Show awareness that work they create and save on a computer or tablet can be shown to others using another device.	- Use different types of software and identify their purpose. - Create and edit multimedia components for a range of tasks. - Recognise that computers can be linked to share resources. - Recognise and demonstrate that some information can be found online and some offline. - Recognise some uses of the internet, in simple terms.	- Recognise that saved work can be retrieved from another device on the same network. - Combine a range of text, images, animation and audio and video clips for given purposes. - Use familiar computer hardware to successfully complete a task. - Use a range of different software to successfully complete a project.	- Recognise that the school network links computers to allow the sharing of resources. - Use new and unfamiliar computing hardware. - Apply computing skills to use new computing software. - Manipulate a range of text, images, sound or video clips and animation for given purposes.	- Compare the way in which work can be shared on a school network with the way work is shared at home or in the wider world. - Apply computing skills using unfamiliar hardware to solve a problem successfully - Apply computing skills to create content using unfamiliar programs or apps. - Select, use and combine appropriate technology to create a solution that will have an impact on others.	- Select, use and combine a variety of software, including internet services, to meet a goal. - Identify how using different hardware can increase creativity and productivity. - Identify how a new piece of software or an app can increase creativity. - Combine a range of technology to achieve a particular outcome.
Misconceptions		Schools might assume that, because pupils have grown up in a world of technology, they do not need to be taught how to use it.		Understanding where saved information is stored.	Thinking about which things are connected to the Internet at which times.	Understanding how two people can access a single document.	When a file is deleted, it is gone forever.	The computers in a network are physically connected.	That browsers and search engines are the same.
Implementation / contextual suggestions		Children will use and interact with electronic toys, cameras, phones, remote controls, CD players.	They will be given the opportunity to use IT equipment such as battery powered torches, the Interactive Whiteboard, Beebot to program and create algorithms.	Create, edit and publish information using word processing software. Save and recall information that is saved previously.	Create a workspace online where they can save their work and create digital artwork.	Create a multimedia presentation involving: images, audio and video clips.	Use online software to record audio and embed this in a multimedia presentation. Use video editing software to edit film media.	Create an online workspace and collaborate in creating a multimedia presentation including audio and visual components.	To use a range of software and hardware to create different effects comparing how effective each is.

Spring									
		EYFS		KS1		KS2		UKS2	
Prior Learning		See above		See above		See above		See above	
		Nursery We're Going on a Bear Hunt & Goldilocks and the three bears	Reception We Are Astronomers and We Are Engineers	Year 1 We Are Meteorologists & We Are Artists	Year 2 Where The Land Meets The Sea & Intrepid Explorers	Year 3 Ancient Egypt & Marvelous Magnets	Year 4 Ancient Greeks & Fantastic Food	Year 5 Off With Her Head & Golder Age of Islam	Year 6 Beating Hearts & Antarctica and Byond
Knowledge	Children will know (key learning)	Understanding the World: Explore how things work.	Expressive Arts and Design: Explore, use and refine a variety of artistic effects to express their ideas and feelings.	- To search for digital content, the user needs to know the file name, file type and folder name or keywords and search terms to find the correct information. - Hardware is the parts of a computer that you can touch, such as a mouse, tablet or floor robot. - Data can be collected manually or using digital technology, such as data loggers. It can be represented in different electronic forms, including charts and tables. - Private information includes name, address, date of birth or school and this information should not be shared online. Any concerns or worries should be reported to a trusted adult.	- Digital technology, such as email, social media platforms or blogs, can be used by individuals to communicate and connect with others but should be used appropriately, including using language that is not hurtful or disrespectful to others, having adult supervision or following the school's acceptable use policy. - Some websites are not age-appropriate and so it is important to tell a trusted adult about any concerns or worries. - A digital footprint is the information that exists on the internet, following a user's online activity. - Each type of software, such as word processing, presentation and image editing, can be used for different purposes, including writing reports and creating slide shows or posters.	- Images and data should not be shared online without the permission of the owner. Personal information, such as full name, age, school and address, should not be shared online. - Online communication should be done respectfully and responsibly, considering the impact on others. - Different software, websites and apps can be used to collaborate and communicate online. Each one has different terms and conditions that need to be adhered to stay safe, such as age restrictions. - The World Wide Web is a collection of web pages that are run via the internet. The information requested can be displayed as text, images or videos. - Advantages of communicating electronically are that it is available at any time, instant and global. Disadvantages include easier misunderstandings, lack of privacy (once something is published online, it cannot be removed) and a threat	- Pop-ups or adverts are a form of online advertising that companies use to encourage users to buy something or go to another website. Some pop-ups can be malicious and lead to a virus, whereas some are helpful and give information. Pop-ups can be blocked by computer software. Concerns should be reported to a trusted adult before clicking on anything. - Cyberbullying is bullying using technology, such as social media or gaming networks. A trusted adult or child safety organisation should be contacted if there are any concerns or worries. A trusted adult can provide help and support or contact the police if needed. - Technology can have positive influences on health, such as enabling people to hear using a hearing aid or helping doctors to diagnose or treat illnesses using special machines. Negative influences on health include problems like eye strain and poor posture. Technology can have positive influences on the environment, such as using systems to monitor and control energy usage. Negative influences on the	- Working online requires a level of responsibility and strategies to keep safe, including protecting private information and accounts. This enables people to protect themselves and others from potential online dangers, inappropriate behaviour and bullying. Any concerns should be reported to a trusted adult, the police or child protection organisations. - Digital content can affect others and be available to anyone. Digital content is traceable, which means it can be tracked to the person who created it. To keep safe, it is important to discuss technology use with a trusted adult. - Citing sources is giving credit to the person or website that created the information. Using someone else's work without citing it is called plagiarism and is a form of cheating. - Online collaborative projects can be shared with different permission settings, such as who can view, edit or comment on the documents. Privacy settings can be restricted to those who are invited, those who have access to the link or can be made open to the public.	- Search engines take many factors into account, such as the quality of the site, number of updates or number of matches to keywords. However, search engines do not consider whether the content is true, age-appropriate or relevant, and so users need to be aware of these things when searching. - People online are not always who they say they are and may use intimate images or content inappropriately. Once something is online, it is not under the user's control and can be made public. Using offensive language can affect others negatively and is a form of bullying called 'trolling'. - The benefits of devices broadcasting the user's location and passing on personal information include improved customer service, allowing organisations to analyse data and improving the quality of applications. Risks include identity theft, cyberstalking,

						to personal safety (access to personal information). Concerns should be reported to a trusted adult.	environment include contributing to pollution by travelling and using a lot of power.		victimisation and threat to privacy.
	Vocabulary	Up, Down, Left, Right	Tapestry, communicate, username	Hardware, folder, access, search	Appropriate, technology, presentation, acceptable	World Wide Web (www), collaborate, web page, browser	Pop-ups, influence, cyberbullying, malicious	Collaboration, plagiarism, copyright	Trolling, cyberbullying, cyberstalking
Skills		Physical Development: • Match their developing physical skills to tasks and activities in the setting.	Physical Development: • Develop their small motor skills so that they can use a range of tools competently, safely and confidently	• Begin to use a range of software for different purposes. • Understand that there are online tools that can help people to create and communicate. • Select appropriate software to complete given tasks using text, images, audio and video clips. • Recognise that work they have created belongs to them • Recognise that some websites ask for private information and discuss how to handle these requests. • Select appropriate software to complete given tasks using text, images, audio and video clips.	• Stay safe online by choosing websites that are appropriate to visit (based on the confidence you have in the author(s) of the website). • Use digital technology appropriately to communicate and connect with others locally and globally. • Recognise that information put online leaves a digital footprint. • Use data handling skills to represent data digitally.	• Explain that the World Wide Web contains lots of web pages about different subjects that can be searched. • Explain the advantages and disadvantages of communicating electronically and strategies for preventing issues. • Describe simple rules for sharing images and data safely. • Use appropriate tools (software, websites and apps) to collaborate and communicate safely online.	• Explain that when searching online, some web pages may contain adverts or pop-ups that encourage people to click on them. • Identify the positive and negative influences of technology on health and the environment and how to protect themselves. • Identify appropriate behaviour when contributing to collaborative online projects for learning. • Exchange online communications with other learners, adding and responding to comments, such as in a blog.	• Discern where web content might originate from and recognise that this gives clues to its authenticity, reliability and security. • Demonstrate appropriate online behaviour and apply a range of strategies to protect themselves and others from potential online dangers, inappropriate behaviour and bullying. • Discuss the impact that digital content can have and why it is important to discuss their use of technology with an adult. • Cite all sources when researching and explain why sources should be provided.	• Name some of the positives and negatives of communicating with others online. • Critically evaluate search engine results and identify factors that may affect ranking, such as how long the site has existed, the number of links to the site and whether the organisation has paid to have their site promoted. • Recognise that sending intimate images and content and using offensive language online is a risk and has a permanent online trail (digital footprint). • Identify the benefits and risks of devices broadcasting the user's location and of giving personal information to different organisations.
Misconceptions		Schools might assume that, because pupils have grown up in a world of technology, they do not need to be taught how to use it.		They may not know that when a file is saved it shows who last saved it.	That a digital footprint can be used to trace people's online movements.	That once an image is shared it cannot be unshared.	Information online is always accurate.	That all information online is freely available.	That posting online is anonymous.
Implementation / contextual suggestions		Children will operate Sound Buttons – speak, record, playback. Children will use ipads-linked to Tapestry with adult support to see their photos and videos.	Children will sing a variety of songs and record performances which can be watched on Tapestry by parents/carers. Children will be given the opportunity to use a light box through independent activities and use i-pads to interact with age	Children to recall work previously saved. To create folders and workspaces which they can access. To be able to show each other how to navigate around a digital space. Children can create a piece of work around using the internet safely.	Children to understand about age-appropriate websites. Children to use the school's online learning platform to communicate with each other respectfully.	Children to create a piece of digital work around using the Internet safely. To create a set of rules that help to prevent harm from happening to others.	Children to create a piece of work around internet safety. Exploring cyberbullying and investigating more deeply the affects of poor behaviour online.	Children to create a piece of work around internet safety. Exploring ownership, trust of information and sharing a range of strategies for being safe online.	Children to complete a piece of work showing a deep understanding of Internet safety. To explore the risks fully and be able to explain what consequences may be.

			appropriate software and take photos.						
Summer									
		EYFS		KS1		KS2		UKS2	
Prior Learning		See above		See above		See above		See above	
		Nursery Handa’s Surprise & The Very Hungry Caterpillar	Reception We Are Environmentalists & We Are Explorers	Year 1 We Are Ecologists & We Are Authors	Year 2 Habitats & Viewpoints	Year 3 Our Planet & Running Rivers	Year 4 Wonderful Water & Mighty Mountains	Year 5 To Infinity and Beyond & Allotments	Year 6 Discovery of Modern Art & The World Is Our Stage
Knowledge	Children will know (key learning)	Understanding the World: Explore how things work.	PSED: Know and talk about the different factors that support their overall health and wellbeing: -sensible amounts of ‘screen time’	- An algorithm is a sequence of steps, instructions or rules that is used to perform a specific task. Algorithms can be followed by people or digital equipment. For algorithms to achieve the end goal, instructions have to be accurate and followed sequentially. - Technology is used in many ways to do different jobs, such as using an interactive whiteboard in the classroom, using a tablet to do online shopping at home or using scanners in a shop in the community.	- The internet is used to connect computers or devices around the world. - Digital technology is used in everyday life and can be used to support learning and connect with others. - Computers' behaviour can be predicted and the outcome tested by following the steps of an algorithm and recognising that the computer will follow instructions precisely. - Robots can be programmed to follow a series of instructions, using an algorithm.	- Repetitions or loops can be used in programming where a computer will continue to run part of a program a number of times or until a condition is met, using the term 'repeat... until'. The given feedback can be used to identify and correct any mistakes in the program. - Sequencing instructions is the step-by-step process that robots or other devices follow to achieve specific outcomes. This can be a single algorithm or series of algorithms called a program. - Some programs or apps have special types of technology, such as a built in camera or microphone, or sensors that measure light level, temperature or sound level. - Digital technology can be used for a range of purposes in different settings, such as using a tablet in the classroom to access educational material, in the home to access entertainment and in	- A loop is a sequence of instructions that repeats continually until a certain condition is met. A program that contains a looping element is useful for a wide range of scenarios, such as controlling traffic lights. - Digital technology can be used in different ways and settings to achieve a set goal, such as using data collection in the community and home to answer a classroom-based question. - A school network has computers that are connected together so they can share hardware, software and data. - An input device receives information about the outside world, such as light level, temperature or sound level, and sends it to a computer. This information can be tracked over time using a program or app.	- Sequences of instructions (algorithms) that contain IF, THEN and OTHERWISE statements are called selections. The computer will complete operations based on whether the conditions of these selections are met or not. - Sensors can be combined to control a physical system, such as using motion, light and sound sensors to control a road network of traffic lights and level crossings. - Sensing tools or apps have features that can be used for an investigation and the findings can be interpreted. For example, a sound sensor or app can be used to investigate the pitch of instruments.	- Decomposition is breaking down a problem down into smaller parts to make it easier to process and following a sequence of instructions. Decomposition is useful for checking programs and debugging because it saves time. - Input and output devices can be combined with programming software to control a physical system, such as using sensors to create a sensory station that incorporates motors, lights and buzzers. - There are a wide variety of online communication platforms, such as social media, blogs, vlogs, email or messaging, which have different available features, including the option to comment. It is important to be aware of security settings, such as age restrictions or property rights.

						the community to share local news.			
	Vocabulary	Photos, screen, program	Follow, sound buttons, videos	Algorithm, inputs, outputs, sequence	Debug, precise, program, devices		Loops, triggers, program	IF, THEN and OTHERWISE	Social media, blogs, vlogs
Skills		Physical Development: • Match their developing physical skills to tasks and activities in the setting.	PSED: • Show resilience and perseverance in the face of a challenge.	• Follow a sequence of steps to solve a problem and create instructions that others can follow (for floor robots or onscreen sprites). • Recognise the ways digital technology can be used in the classroom, home and community. • Observe and explore outcomes when buttons are pressed in sequences on a robot and identify and debug a simple algorithm. • Begin to use a range of software for different purposes.	• Recognise why digital technology is used in the classroom, home and community. • Create a simple solution that tests an idea, predict the outcome and test that the intended solution works. • Plan and enter a sequence of instructions using a robot, specifying distance and angle of turn.	• Plan and enter a sequence of instructions using a robot or other device to achieve specific outcomes. • Use digital technology in different ways in the classroom, home and community. • Compose clear and appropriate messages in online communities. • Identify and use repetitions or loops in a program sequence, predicting outcomes and noticing and correcting any mistakes.	• Describe and demonstrate a simple program that contains a looping element and how part of a program may need repetition. • Use digital technology in different ways in the classroom, home and community to achieve a set goal. • Begin to use sensors to 'trigger' an action, such as sound or movement.	• Design simple sequences of instructions (algorithms), including IF, THEN and OTHERWISE commands, to decide if something is true or false. • Use a range of sensors to control a physical system. • Use sensing tools or apps for an investigation and interpret the findings.	• Demonstrate how programs run in an exact order by following a sequence of instructions, and test and debug programs. • Write a program to control a physical system, which may include output devices, such as motors, lights and buzzers. • Exchange online communications, making use of a growing range of available features and being aware of security settings. • Recognise that digital content can be edited online.
Misconceptions		Schools might assume that, because pupils have grown up in a world of technology, they do not need to be taught how to use it.		That robots can act without any inputs from humans.	That robots are thinking machines.	That computer code is written in binary.	That all code requires constant inputs.	That computers' impacts are only online.	
Implementation / contextual suggestions		Children will program a Beebot, giving simple IT instructions. They will use and interact with the IWB.	They will learn how to log-on to the lap tops using their class username and password and discuss the importance of staying safe online.	To program Beebots or similar devices to follow a set of instructions.	To program Beebots to follow more complex instructions.	To write simple programmes using Scratch. To use a range of inputs and outputs.	To write a more complex programme using Scratch – include loops	To use Microbits and Scratch to explore how code can affect offline events.	To use Microbits and Scratch to create complex code to engage with a range of inputs.