



LEARNING BEYOND THE CLASSROOM



COMPUTING CURRICULUM COVERAGE

Level Expected at the End of EYFS

Key Stage 1 National Curriculum Expectations

Pupils should be taught:

- 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

Key Stage 2 National Curriculum Expectations

Pupils should be taught: ♣ 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.

Knowledge and Skills Progression							
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Humankind: Communication	Digital technology is used in all parts of everyday life. Some technology is used to communicate with others. Explain that digital technology is used in the home and at school for communication.	Digital technology is used in all parts of everyday life, such as using a tablet to play a game or 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. Explain simply that digital technology can be used to connect with others locally and globally	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. Use digital technology appropriately to communicate	Advantages of communicating electronically are that it is available at any time, instant and global. Disadvantages include easier misunderstandings, people pretending to be someone they are not, lack of privacy (once something is published online, it cannot be removed) and a threat to personal safety (access to personal information). Concerns should be reported to a trusted adult. Explain the	Cyberbullying is bullying using technology, such as social media or gaming networks and can involve teasing, name calling, harassment, deliberate exclusion, threatening or being undermined. 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. Explain actions to report and prevent cyberbullying.	Working online requires a level of responsibility and strategies to stay 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. Demonstrate appropriate online behaviour and apply a range of strategies to protect themselves and others from potential online dangers,	Knowing someone online is not the same as knowing them face to face. 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'. Privacy and personal boundaries are

				advantages and disadvantages of communicating electronically and strategies for preventing issues.		inappropriate behaviour and bullying.	important when communicating with others online. Recognise that sending intimate images and content and using offensive language online is a risk, has a permanent online trail (digital footprint) and is not appropriate behaviour.
Staying safe	Know that if they see something online that makes that sad, scared or worried, they should tell an adult straight away. Describe what they would do if they saw something online that made them sad, scared or worried.	Private information includes names, addresses, dates of birth or schools and this information should not be shared online. Any concerns or worries should be reported to a trusted adult. Recognise that some websites ask for private information and discuss how to handle these requests and where to go for help and support.	Some websites are not age-appropriate and so it is important to tell a trusted adult about any concerns or worries. Stay safe online by choosing websites that are appropriate to visit (based on the confidence you have in the author(s) of the website) and know where to go for help and support when they have concerns about content or contact on the internet and other online technologies.	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. Describe simple rules for sharing images and data safely	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. Both mental and physical health can be negatively influenced by technology. Technology can have positive influences on the environment, such as using systems to monitor and control energy usage. Negative influences on the environment include contributing to pollution by travelling and using a lot of power. Identify the positive and negative influences of technology on health and the environment and how to protect themselves	igital 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 stay safe, it is important to discuss technology use with a trusted adult. Discuss the impact that digital content can have and why it is important to discuss their use of technology with an adult.	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, victimisation and threat to privacy. Identify the benefits and risks of devices broadcasting the user's location and of giving personal information to different organisations.
Digital citizenship	Ask to use digital devices to create work in a safe and responsible way.	When work is saved electronically, it needs to have a name that identifies it and is easily remembered. Recognise that work they have created belongs to them	A digital footprint is the information that exists on the internet, following a user's online activity. Recognise that information put online leaves a digital footprint	As with face to face communication, online communication should be done respectfully and responsibly, considering the impact on others. Compose clear and appropriate messages in online communities.	appropriate behaviour when contributing to collaborative online projects includes consideration towards others, awareness of copyright and keeping personal data safe. Identify appropriate behaviour when contributing to collaborative online projects for learning.	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. Cite all sources when researching and explain why sources should be provided.	digital content may have been edited online by anyone, and so it is important to verify content against other independent or reputable sources. Recognise that digital content can be edited online.
Processes: Physical interactions	Technological toys need instructions to operate in a particular way. Errors in instructions can be checked and fixed. Input simple instructions to make technological toys operate, including floor robots and onscreen sprites.	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. Mistakes are called bugs and finding and fixing them is called debugging. Observe and explore outcomes when buttons are pressed in sequences on a robot and identify and debug a simple algorithm.	robots can be programmed to follow a series of instructions using algorithms. Plan and enter a sequence of instructions using a robot, specifying distance and angle of turn.	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. Design, write and enter a sequence of instructions using a robot or other device to achieve specific outcomes, debugging if necessary.	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. Use sensors to 'trigger' an action, such as sound or movement.	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. Use a range of sensors to control a physical system	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. Design, write and debug a program to control a physical system, which may include output devices, such as motors, lights and buzzers
Creativity: Creation	Use age-appropriate software to create images	Software is the programs that are used by a computer, such as word processing	multimedia components, such as text, images,	text, images, animation, audio and video clips can	manipulating a range of text, images, sound or	Creating, selecting and combining a range of texts,	A variety of software, such as word processing

	and record sounds and videos.	software, presentation software or image editing software. It can be used to create and combine digital content for different audiences and purposes. Select appropriate software to complete given tasks using text, images, audio and video clips	audio and video clips, can be created, edited and combined to create content for a range of tasks. Create and edit multimedia components for a range of tasks.	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. Combine a range of text, images, animation and audio and video clips for given purposes.	video clips and animation may include changing their style, size, colour, effect, shape, location or format. Manipulate a range of text, images, sound or video clips and animation for given purposes.	images, sound clips and videos for given purposes could include creating a web page, slide show presentation, short film or an animation. Create, select and combine a range of texts, images, sound clips and videos for given purposes.	software, image editing software or internet services, can be selected, used and combined to meet a goal. Select, use and combine a variety of software, including internet services, to meet a goal.
Investigation: Data and computational thinking	Technological toys need instructions to achieve an outcome. Input simple instructions to technological toys, including floor robots and onscreen sprites.	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. Follow a sequence of steps to solve a problem and create instructions that others can follow (for floor robots or onscreen sprites)	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. Create a simple solution that tests an idea, predict the outcome and	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. Identify and use repetitions or loops in a program sequence, predicting outcomes and noticing and correcting any mistakes.	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. Describe and demonstrate a simple program that contains a looping element and how part of a program may need repetition.	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. Design, write and debug simple sequences of instructions (algorithms), including IF, THEN and OTHERWISE commands, to decide if something is true or false.	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. Demonstrate how programs run in an exact order by following a sequence of instructions, and test and debug programs.
Networks	Recognise that digital work can be saved, shared and accessed from other devices.	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. Show awareness that work they create and save on a computer or tablet can be shown to others using another device	computers and devices can be linked in different ways, such as through a network, the internet and Bluetooth. This allows for the sharing of resources. Recognise that computers can be linked to share resources and digital content can be stored, organised and retrieved.	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). Recognise that saved work can be retrieved from another device on the same network.	school network has computers that are connected together so they can share hardware, software and data. Recognise that the school network links computers to allow the sharing of resources.	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. Compare the ways in which work can be shared on a school network with the ways work is shared at home or in the wider world.	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. Name some of the positives and negatives of communicating with others online.
Materials: Hardware	Smartphones, tablets, laptops, computers and floor robots are all types of computing hardware. Explore how to use different computing hardware.	Hardware is the parts of a computer that you can touch, such as a mouse, tablet or floor robot. Use a range of computing hardware for different purposes.	hardware, such as cameras, scanners and data loggers, can be used to collect data. Use computing hardware in different ways to collect data.	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. Use familiar computer hardware to successfully complete a task.	interacting regularly with hardware enables users to recognise common features and become confident in working with new or unfamiliar hardware. Use new and unfamiliar computing hardware	using prior knowledge and experience of computing skills can be applied to unfamiliar hardware to solve a problem successfully. Apply computing skills using unfamiliar hardware to solve a problem successfully.	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. Identify how using different hardware can increase creativity and productivity.
Software	Software is the programs we use on computers and mobile devices. Use age-appropriate software independently.	Software is the programs that are used by a computer, such as word processing software, presentation software or image editing software. Begin to use a range of software for different purposes.	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. Use different types	several pieces of software can be used together to complete one task, such as adding a video to a word processed document. Use a range of different software to successfully complete a project.	new computing software commonly has features that should be familiar to users, such as icons or terminology. Apply computing skills to use new computing software.	using prior knowledge and experience of computing skills can be applied to create content using unfamiliar programs or apps. Apply computing skills to create content using unfamiliar programs or apps.	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. Identify how

			of software and identify their purposes.				a new piece of software or an app can increase creativity.
Nature: Real world	Data can be collected and shown using digital technology. Notice how data can be collected and represented electronically.	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. Observe how collected data can be represented electronically	software is available that can be used to represent collected data digitally, such as in a pictogram or bar chart. Use data handling skills to represent data digitally.	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. Log light level, temperature or sound level using a program or app	n 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. Log light level, temperature or sound level using a program or app, over a period of time.	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. Use sensing tools or apps for an investigation and interpret the findings.	data handling includes databases, graphs, charts and tables. These can be used to present the findings of investigations. Plan data handling investigations and use the outcomes from data collection to show the findings
Place and space: Digital world	People use digital devices for many reasons, including playing games, communicating, finding information and watching videos. Talk about things that people do on digital devices, such as playing games, communicating with others and watching online videos.	Software available online, such as email, social media platforms or blogs, can be made by individuals to communicate their ideas. Understand that there are online tools that can help people to create content and communicate	the internet is used to connect computers or devices around the world. The internet is an important part of life for many people. However some people spend too much time on devices, which can have a negative impact on people's mental and physical health. Recognise some uses of the internet, in simple terms and some of its benefits and drawbacks.	different software, websites and apps can be used to collaborate and communicate online. Each one has different terms and conditions that need to be followed to stay safe, such as age restrictions. Use appropriate tools (software, websites and apps) to collaborate and communicate safely online.	there are various forms of online communication, such as email, blogging, vlogging and video chatting. Online communication should be used responsibly, remembering that online actions affect other people and there are rules that need to be followed. Exchange online communications with other learners, adding and responding to comments, such as in a blog.	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. Create an online collaborative project for a specific purpose, sharing documents and appropriately setting permissions for other group members.	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. Exchange online communications, making use of a growing range of available features and being aware of security settings.
Real world	Digital technology is used in all parts of everyday life. Examples include smartphones, tablets, microwaves and washing machines. Talk about and use digital technology with confidence and independence, giving examples of how it is used in the home, at school and beyond.	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. Recognise the ways digital technology can be used in the classroom, home and community	digital technology is used in everyday life and can be used to support learning and connect with others. Recognise why digital technology is used in the classroom, home and community.	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 the community to share local news. Use digital technology in different ways in the classroom, home and community.	digital technology can be used in different ways and settings to achieve a specific goal, such as using data collection in the community and home to answer a classroom based question. Use digital technology in different ways in the classroom, home and community to achieve a set goal.	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. Select, use and combine appropriate technology to create a solution that will have an impact on others.	range of technologies can be combined to achieve a particular outcome. For example, sensors (input), a computing device (hardware) and lights (hardware) can be used together to create a set of traffic lights. Combine a range of technology to achieve a particular outcome.
Comparison: Digital searching	Navigate to find digital content, in digital folders and online, with supervision.	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. Search for or retrieve digital content, including images and information, in digital folders and online, with supervision.	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. Recognise and demonstrate that some information can be found online and some offline.	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. Explain that the World Wide Web contains lots of web pages about different subjects that can be searched.	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. Explain that when searching online, some web pages may contain adverts or pop-ups that encourage people to click on them.	some websites have more reliable content than others and content should be verified with another independent source. Discern where web content might originate from and recognise that this gives clues to its authenticity, reliability and security.	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. 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

