Computing

National Curriculum Aims

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.

Core Concepts

Computing Science	Digital Literacy
Information Technology	Online safety

End of phase expectations

EYFS expectations	Key Stage 1 National Curriculum Expectations	Key Stage 2 National Curriculum Expectations
3 and 4 Year olds - Explore how things work. **Reception children** **ELG**	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.	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.

		• 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.	• 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

Core Concepts	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer science	Children give commands / instructions such as forward and backwards when	Children give commands / instructions such forward, backwards, go,	Children understand that an algorithm is a set of instructions used to solve a problem or	Children can explain that an algorithm is a	Children can turn a simple real-life situation into an algorithm for a program by	Children show that they are thinking of the required task and how to accomplish	Children may attempt to turn more complex real-life situations into algorithms for	Children are able to turn a more complex programming task into an algorithm

using simple software such as Bee-Bots	stop, when using simple software or hardware such as Bee-Bots	achieve an objective.	set of instructions to complete a task.	deconstructing it into manageable parts.	this in code using coding structures for selection and repetition, when turning a real-life situation into an algorithm.	a program by deconstructing it into manageable parts.	by identifying the important aspects of the task (abstraction) and then decomposing them in a logical way using their knowledge of possible coding structures and applying skills from previous programs.
can say or predict what will happen when they press or swipe on a game using the iPad / whiteboard.	make choices about the buttons/icons to press, touch or click when using simple software/hardware.	know that an algorithm written for a computer is called a program.	when designing simple programs, show an awareness of the need to be precise with their algorithms so that they can be successfully converted into code.	show through their design that they are thinking of the desired task and how this translates into code.	make more intuitive attempts to debug their own programs.	are able to test and debug their programs as they go and can use logical methods to identify the approximate cause of any bug but may need some support identifying the specific line of code.	
	understand that goals can be achieved by following a sequence of steps.	can work out what is wrong with a simple algorithm when the steps are out of order.		can identify an error within their program that prevents it following the desired algorithm and then fix it.	use timers to achieve repetition effects which are becoming more logical and are integrated into their program designs.		test and debug their program as they go and use logical methods to identify the cause of bugs, demonstrating a systematic approach to try to identify a particular line of code causing a problem.
	can make predictions about what a programme will do /do next.	when looking at a program, can read code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program.	can identify the parts of a program that respond to specific events and initiate specific actions. For example, write a cause and effect sentence of what will happen in a program.	demonstrate the ability to design and code a program that follows a simple sequence.	understand 'if' statements for selection and attempt to combine these with other coding structures including variables to achieve the effects that they design in their programs.	can translate algorithms that include sequence, selection and repetition into code with increasing ease and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures.	translate algorithms that include sequence, selection and repetition into code and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures, including nesting structures within each other.
		can interpret the end of a program.		experiment with timers to achieve repetition effects in their programs.	understand how variables can be used to store information while a program is executing, as well as using and manipulating the value of variables.	can combine sequence, selection and repetition with other coding structures to achieve their algorithm design.	
				are beginning to understand the difference in the effect of using a timer command rather than a repeat command when creating repetition effects.			display an improving

| | | | | | | understand how variables can be used to store information while a program is executing.

design their programs and show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures. For example, 'if' statements, repetition and variables.

make good attempts to 'step through' more complex code in order to identify errors in algorithms and can correct this.

can 'read' programs with several steps and predict the outcome accurately.

can list a range of ways that the internet can be used to provide different methods | can make use of user inputs and outputs such as 'print to screen'.

design their programs and show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures. For example, 'if' statements, repetition and variables.

can trace code and use step-through methods to identify errors in code and make logical attempts to correct this.

recognise the main component parts of hardware which allow computers to join and form a network.

improve their understanding of the safety implications associated with the ways the internet can be used to communicate. | begin to think about their code structure in terms of the ability to debug and interpret the code later, e.g. the use of tabs to organise code and the naming of variables.

understand the value of computer networks but are also aware of the main dangers.

recognise what personal information is and can explain how this can be kept safe.

can select the most appropriate form of online communications contingent on audience and digital content. | understanding of variables in coding, outputs such as sound and movement, inputs from the user of the program such as button clicks, and the value of functions.

are able to interpret a program in parts and can make logical attempts to put the separate parts of a complex algorithm together to explain the program as a whole.

understand and can explain in some depth the difference between the internet and the World Wide Web.

know what a WAN and LAN are and can describe how they access the internet in school. |

Information Technology					of communication and use some of these methods of communication appropriately.			
Information Technology	Children	Children	Children	Children	Children	Children	Children	Children
	use technology appropriately through role-play.

can recognise some technology that is used at home or school.

can name and use an iPad with developing control. | can use a digital device to create and store content e.g taking a photo, videoing, artwork.

can select and use technology for a particular purpose.

can name a keyboard and mouse and use them with developing control. | are able to sort, collate, edit and store simple digital content.

. | demonstrate an ability to organise data using, for example, a database, and can retrieve specific data for conducting simple searches.

are able to edit more complex digital data.

are confident when creating, naming, saving and retrieving content.

use a range of media in their digital content including photos, text and sound. | can collect, analyse, evaluate and present data and information using a selection of software.

can consider what software is most appropriate for a given task.

can create purposeful content to attach to emails.

can carry out simple searches to retrieve digital content and understand that to do this, they are connecting to the internet and using a search engine | understand the function, features and layout of a search engine.

can appraise selected webpages for credibility and information at a basic level.

are able to make improvements to digital solutions based on feedback.

make informed software choices when presenting information and data.

create linked content using a range of software.

share digital content within their community. | search with greater complexity for digital content when using a search engine.

are able to explain in some detail how credible a webpage is and the information it contains.

are able to make appropriate improvements to digital solutions based on feedback received and can confidently comment on the success of the solution

can objectively review solutions from others.

are able to collaboratively create content and solutions using digital features within software such | readily apply filters when searching for digital content.

are able to explain in detail how credible a webpage is and the information it contains.

compare a range of digital content sources and are able to rate them in terms of content quality and accuracy.

use critical thinking skills in everyday use of online communication.

make clear connections to the audience when designing and creating digital content.

design and create their own blogs to become a content |

							as collaborative mode. are able to use several ways of sharing digital content.	creator on the internet. are able to use criteria to evaluate the quality of digital solutions and are able to identify improvements, making some refinements.
Digital Literacy	Children can recognise some technology that is used in places such as home and school. use technology appropriately through role play.	Children can select and use technology for a particular purpose. can access and use simple activities using touch technology with increasing control. can name some uses of IT beyond school e.g audio books, listening to music, watching films, creating paintings, sending messages.	Children understand what is meant by technology and can identify a variety of examples both in and out of school. can make a distinction between objects that use modern technology and those that do not e.g. a microwave vs. a chair.	Children can effectively retrieve relevant and purposeful digital content using a search engine. can apply their learning of effective searching beyond the classroom and can share this knowledge. make links between technology they see around them, coding and multimedia work they do in school.	Children understand the importance of staying safe and the importance of their conduct when using familiar communication tools.	Children can assess whether an information source is true or reliable	Children are aware of appropriate and inappropriate communication, including; text, photographs and videos, and the impact of sharing these online.	Children demonstrate safe and respectful use of a range of different technologies and online services. understand the impact of sharing personal information or images online and their digital footprint.
Online Safety	Children have an understanding of the world online can say if something they find on the internet	Children understand the world online. know that we need to stay safe when using technology.	Children understand the importance of keeping information such as usernames and passwords private and actively	Children know the implications of inappropriate online searches. begin to understand how	Children demonstrate the importance of having a secure password and not sharing this with anyone else and explain the	Children can explore key concepts relating to online safety, including identity theft, installing software and apps, plagiarism, and	Children have a secure knowledge of common online safety rules and can apply this by demonstrating the safe and respectful	Children identify more discreet inappropriate behaviours through developing critical thinking.

makes them feel bad. can speak to an adult about what they have seen.	know that some information should be kept private. know what to do if they see things that upset them online.	demonstrate this in lessons. take ownership of their work and save this in their own private space.	things are shared electronically. develop an understanding of using email safely and know ways of reporting inappropriate behaviours and content to a trusted adult. understand that information put online leaves a digital footprint	negative implications of failure to keep passwords safe and secure. understand that not all information on the internet is true or appropriate. know more than one way to report unacceptable content and contact.	online communication. can help others to understand the importance of online safety. know a range of ways of reporting inappropriate content and contact.	use of a few different technologies and online services. implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others.	recognise the value in preserving their privacy when online for their own and other people's safety. are aware of appropriate and inappropriate online communication, including; text, photographs, videos and voice chats.