Computing programmes of study:
Key stages 1 and 2 National Curriculum in England

Purpose of study

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

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 problem
- are responsible, competent, confident and creative users of information and communication technology.

Progression of Skills in Computing

Computer Science	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computing PoS	Pupils should be taught to - complete a simple program on a computer.	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.		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 select.			
Skills	- I can program a toy (Bee-Bot) using simple instructions - I understand that I control the programmable toy	- I understand that a programmable toy can be controlled by inputting a sequence of instructions. - I can develop and record sequences of instructions as an algorithm.	- I have a clear understanding of algorithms as sequences of instructions - I can convert simple algorithms to programs	- I can create an algorithm for an animated scene in the form of a storyboard - I can write a program in Scratch to create the animation	- I can develop an educational game using selection and repetition - I understand and can use variables - I am beginning to debug computer programs - I can design and make an on-screen	- I can create original artwork and sound for a game - I can design and create a computer program for a computer game, which uses sequence, selection, repetition and variables	- I can learn some of the syntax of a text-based programming language - I can use commands to display text on screen, accept typed user input, store and retrieve data using variables and select from a list

	- I can use a suitably aged program on a computer/iPad effectively - I know that information can be retrieved from computers - I can make toys work by pressing parts or lifting flaps to achieve effects. - I can recognise that technology is used in places such as homes and schools.	- I can program a toy to follow an algorithm - I can debug my programs - I can predict how a program will work - I can break down a process into simple, clear steps, as in an algorithm	- I can predict what a simple program will do - I can spot and fix debugs in my programs - I can describe what happens in computer games - I can think critically about computer games and their use. - I can use logical reasoning to make predictions - I can test my predictions	- I can correct mistakes in animation programs - I can develop a number of strategies for finding errors in programs - I have an increasing knowledge of Scratch - I can recognise a number of common types of bugs in software - Build up resilience and strategies for problem solving. - Understand the qualities of effective video, such as the importance of narrative, consistency, perspective and scene length.	prototype of a computer-controlled toy - I understand different forms of input and output - I can design, write and debug the control and monitoring program for my toy - I can code up a simple web page with useful content	- I can detect and correct errors in my computer game - I can use iterative development techniques (making and testing a series of small changes) to improve my game - I am familiar with semaphore and Morse code - I can encrypt and decrypt messages in simple ciphers	- I can thoroughly debug the program - I am developing the ability to reason logically about algorithms - I understand how key algorithms can be expressed as programs - I understand that some algorithms are more efficient than others for the same problem - I understand common algorithms for sorting and searching
Vocabulary	Click, On/Off, Up, Down, Space, Left, Right, Clear	Instructions, Input, Sequence	Scratch, Test, Predict, Algorithm, Robot, Debug, Program	Animation, Software. Code	HTML, HTTP, Hyperlink, URL, tag, input, output, simulation, interactive, prototype	Binary Code, Cipher, Decrypt, Encrypt, Morse Code, Semaphore	Python, Variable, Procedure, Syntax, Flowchart, Pseudocode, Linear Search, Random Search, Binary Search, Quicksort, Selection Sort
Information Technology	**EYFS**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Computing PoS	Pupils should be taught to: - use ICT hardware to interact with age-appropriate computer software.	Pupils should be taught to: - use technology purposefully to create, organise, store, manipulate and retrieve digital content - recognise common uses of information technology beyond school.		Pupils should be taught to: - 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.			

Skills	- I know how to turn the computer on/off - I can use the mouse effectively to achieve a desired outcome - I am beginning to use the keyboard effectively - I know how to operate simple equipment e.g. turn on a a CD player, uses a remote control. etc. - I can complete a simple program on a computer. - I can use ICT hardware to interact with age-appropriate computer software. - I show an interest in technological toys with knobs or pulleys. - I show an interest with real objects such as camera or mobile phone.	- I can use different features of a video camera - I can select and use appropriate painting tools to create and change images on the computer. - I can use sound recording equipment to record sound. - Use a video camera to capture moving images. - Discuss their work and think about how it could be improved. - Understand how this use of ICT differs from using paint and paper. - Reflect on their work and act on feedback received. - I can find and use pictures on the web. - Group images on the basis of a binary (yes/no) question. - Organise images into more than two groups according to clear rules - Sort (order) images according to some criteria	- I can use a digital camera or camera app - I can edit and enhance photographs - I can review and reject or rate the images I take. - I can select my best images to include in a shared portfolio. - I can record information on a digital map - I can collect data using tick charts or tally charts - I can use simple charting software to produce pictograms and other basic charts	- I am gaining skills in shooting live video, holding the camera steady and reviewing - I can edit videos, add narration and set in/out points - I can understand some elements of survey design. - I can understand some ethical and legal aspects of online data collection. - I can use the web to facilitate data collection. - I can gain skills in using charts to analyse data. - I can gain skills in interpreting results.	- I can use computer-based data logging to automate the recording of some weather data - I can analyse data, explore inconsistencies and make predictions - I can use one or more programs to edit music - I can create and develop a musical composition, refining ideas through reflection and discussion - I can research for a purpose - Develop collaboration skills - Develop and awareness of how their composition can enhance work in other media - Understand different measurement techniques for weather, both analogue and digital - I can use hyperlinks to connect ideas and sources - I can understand some technical aspects of how the internet makes the web possible - I can recognise the importance of user interface design, including	- I am developing my research skills to decide which information is appropriate - I understand some elements of how search engines select and rank results - I am developing a familiarity of a simple CAD (computer aided design) tool - I understand the work of architects and engineers working in 3D - I can explore and experiment with 3D virtual environments, developing my spatial awareness - I can become familiar with the tools and techniques of a vector graphics package. - I am developing an understanding of turtle graphics - I can experiment with tools available, refining and evaluating as I do - I have an awareness of computer-generated art, in particular fractal-based landscapes	- I can develop or source the individual interface components (media assets) they will use - I understand key features of internet communication protocols - I can shoot suitable original footage and source additional content, acknowledging intellectual property rights - I can import existing media assets to projects - I can use a wire framing tool to create a design prototype of their app

	- I can select and use technology for particular purposes	- Share recordings with an audience.			consideration of input and output - I can use presentation software and video		
Vocabulary	Mouse, Keyboard, Monitor, Printer, Cursor		Pixel, Picasa, Portfolio, Chart, Classification Key, Data, Database	Internet, The Web,	Data-logging, spreadsheet, sample, software, copyright,	Geometric, Landscape, op art, Symmetry, Tessellations, Screencast, Navigation	Command Prompt, IP address, Packet of Data, Webserver, Domain Name Service (DNS)
Digital Literacy/E-Safety	**EYFS**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Computing PoS		Pupils should be taught to: - use technology purposefully to create, organise, store, manipulate and retrieve digital content. - 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: - 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. - use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.			
Skills		- Develop basic keyboard skills, through typing and formatting text. - I am developing basic mouse skills - I can develop skills in combining text and images. - Know how to save, retrieve and change their work. **E-Safety** - I can use the web safely to find and use illustrations - I know what to do if I encounter	- I can understand that emails can be used to communicate. - I can develop skills in opening, composing and sending emails. - I can edit and format text in emails - I can create and deliver a short multimedia presentation **E-Safety** - I am aware of how to use games safely and	- I can use search engines to learn about a new topic - I can plan, design and deliver an interesting and engaging presentation - I can create my own original images - I can create a video slide cast of a narrated presentation **E-Safety** - I have a developing understanding of how the internet, web and search engines work	- I can write for a target audience using a wiki tool - I can use spreadsheets to create charts - Understand the conventions for collaborative online work, particularly in wikis. - Develop collaboration skills - Develop proofreading skills - I can use HTML tags for elementary mark up **E-Safety**	- I am becoming familiar with blogs as a medium and a genre of writing - I can create a sequence of blog posts on a theme - I can incorporate additional media and comment on the posts of others **E-Safety** - I understand the need for private information to be encrypted - I appreciate the need to use complex passwords and to keep them secure - I have some understanding of how	- I can manage or contribute to large collaborative projects, facilitate using online tools - I can write and review content - I can design and produce a high-quality print document - I can showcase shared media content **E-Safety** - I can research a location online using a range of resources appropriately - I understand the safe use of mobile

		pictures that cause concern	in balance with other activities - I am aware of online safety issues when using email - I can use appropriate language in emails - I can search for information safely	- I have a developing understanding of how email works - I am gaining skills in using emails - Search for and evaluate online images - I am aware of broader issues surrounding email including 'netiquette' and online safety - I can work collaboratively with a remote partner. - I have experience in video conferencing.	- I understand some of the risks in using the web - I am becoming familiar with Wikipedia, including potential problems associated with its use - I am aware of the responsibilities when editing other people's work	encryption works on the web - I decide what information is appropriate when researching - I understand how search engines select and rank results - I can question the plausibility and quality of information.	technology, including GPS - I can source digital media while demonstrating safe, respectful and responsible use
Vocabulary		Text, image, save, find, E-Safety	Address, Attachment, Email, Fact File, Evidence, Header, Presentation Google, Search Engine, Research, Password	Slidecast, presentation, Security, Email	Spreadsheets, Wikipedia, Wikipedia's Five Pillars, Reliable, Wiki	Blog, Copyright, Hyperlinks, Bias, Page Rank, Revision History,	Desktop Publishing (DTP), Typeface, Yearbook, Footage, Final Cut, Creative Commons, Advert, Rough Cut Geotagging, GPS, Tracklog, Smartphone, Metadata