Computing

‘When I invented the Web, I didn’t ask anyone’s permission. Now 100s of millions of people are using it freely.’ Sir Tim Berners-Lee

Curriculum Intent

Pupils will leave school having had a broad experience using computing technology for a range of purposes. They will acquire general fluency in a fast moving, ever changing field. They will be taught how to respect technology, its risks and fragility, while also demystifying it. That way, they will realise that a computer is designed, created and programmed by a human to enable it to function. When teaching the children, an effort will be made to allow them to freely explore the different programs we will be using, both at school and at home. E-Safety will be interwoven throughout the year through whole school activities and in all computing lessons, with the aim of empowering children to keep themselves and others safe online. There is a clear plan for progression. Children will be supported to close any gaps in their learning. Where children show high ability, talent and interest, they will be appropriately challenged in and beyond school. Children will be supported to amend, improve and collaborate with their peers using technology as a resource to lift barriers to learning. The subject will be presented as one to enjoy across the curriculum.

Curriculum Implementation

Computing skills are taught both discretely and as part of cross-curricular themes, supporting other areas of learning across the school. In Reception and Key Stage 1, children are taught to use equipment and software confidently and purposefully, to communicate and handle information and to support their problem solving, recording and creative skills. In Key Stage 2, our children extend their use of computing applying their knowledge, skills and understanding to communication, investigation, research, programming and online safety. Our curriculum for digital literacy that includes online safety is broad understanding current issues like fake news and responsible use of social media. There is a clear plan for progression moving at the pace of individual children’s progress. Teachers model using computer technology with confidence and use subject specific vocabulary in their teaching to enrich children’s language acquisition.

Curriculum Impact

The school celebrates children's achievements in computing in celebration assemblies, displays and on the website and in newsletters demonstrating the subject's valued status in the school. Outcomes evidence a broad and balanced computing curriculum and demonstrate children's acquisition of identified key knowledge, skills and understanding.
A range of formative assessment strategies are used to inform and address any trends or gaps in progress and attainment. Children are encouraged to self and peer assess. Summative assessments are carried out and teachers record the progress and attainment against National Curriculum expectations of attainment. Teachers use this information to inform future lessons; ensuring children are supported and challenged appropriately.
Further information is gathered through pupil feedback; highlighting strengths and achievement and any improvements, knowledge and skills that still need to be embedded.

Children in Foundation Stage are assessed within Understanding the World and their progress is tracked in their individual learning journeys. Age related expectation levels are reported to parents at the end of the reception year.

The desired impact of our computing curriculum is that it helps children know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Computing, in general, is a significant part of everyone's daily life and we are aware our children should be at the forefront of new technology, with a thirst for learning and an ability to adapt to an evolving technological world.

Progression Document - Computing

Foundation	Images Video and Animation	Interact and explore their environment using a range of multi media equipment Become familiar with control buttons eg play/pause Use a program that allows children to select objects and animate them Use short cuts such as icons on the desk top to navigate a website Capture still and moving images using multi media equipment
	Sound	Explore ways of listening to sound and making sounds using simple programs and devices Use buttons to play back sounds on devices
	Digital Research	Explore a website to find a desired page using hyperlinks and navigation buttons
	Data handling	Collect information eg taking photos Sorting, classifying and grouping objects Sort and sequence objects on the IWB Produce simple pictograms
	Logo and control	Explore the commands needed to control a range of electronic toys Explore simulation toys to try and find out how they works Explore simple electronic toys needing directional instructions
	Data logging	Explore digital devices that can be used to show external changes eg thermometers metal detectors

https://www.foundationyears.org.uk/

A: **Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.**	
Year 1	Children understand that an algorithm is a set of instructions used to solve a problem or achieve an objective. They know that an algorithm written for a computer is called a program
Year 2	Children can explain that an algorithm is a set of instructions to complete a task. When designing simple programs, children show an awareness of the need to be precise with their algorithms so that they can be successfully converted into code.
Year 3	Children can turn a simple real-life situation into an algorithm for a program by deconstructing it into manageable parts. Their design shows that they are thinking of the desired task and how this translates into code. Children can identify an error within their program that prevents it following the desired algorithm and then fix it
Year 4	When turning a real-life situation into an algorithm, the children's design shows that they are thinking of the required task and how to accomplish this in code using coding structures for selection and repetition. Children make more intuitive attempts to debug their own programs.
Year 5	Children may attempt to turn more complex real-life situations into algorithms for a program by deconstructing it into manageable parts. Children 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.
Year 6	Children are able to turn a more complex programming task into an algorithm 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. Children 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.

B: Use sequence, selection and repetition in programs; work with variables and various forms of input and output	
Year 1	Children can work out what is wrong with a simple algorithm when the steps are out of order
Year 2	Children can create a simple program that achieves a specific purpose. They can also identify and correct some errors
Year 3	Children demonstrate the ability to design and code a program that follows a simple sequence. They experiment with timers to achieve repetition effects in their programs. Children are beginning to understand the difference in the effect of using a timer command rather than a repeat command when creating repetition effects. Children understand how variables can be used to store information while a program is executing.
Year 4	Children's use of timers to achieve repetition effects are becoming more logical and are integrated into their program designs. They 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. As well as understanding how variables can be used to store information while a program is executing, they are able to use and manipulate the value of variables. Children can make use of user inputs and outputs such as 'print to screen'.

Year 5	Children 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. They are combining sequence, selection and repetition with other coding structures to achieve their algorithm design.
Year 6	Children 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.

C: Use logical reasoning to predict the behaviour of simple programs.	
Year 1	When looking at a program, children can read code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program.
Year 2	Children can identify the parts of a program that respond to specific events and initiate specific actions. For example, they can write a cause and effect sentence of what will happen in a program.
Year 3	Children's designs for their programs show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures.
Year 4	
Year 5	When children code, they are beginning 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.
Year 6	Children 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.

D: 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.	
Year 1	Gradual familiarity
Year 2	Gradual familiarity
Year 3	Children can list a range of ways that the internet can be used to provide different methods of communication. They can use some of these methods of communication
Year 4	Children recognise the main component parts of hardware which allow computers to join and form a network. Their ability to understand the online safety implications associated with the ways the internet can be used to provide different methods of communication is improving.
Year 5	Children understand the value of computer networks but are also aware of the main dangers. They recognise what personal information is and can explain how this can be kept safe.

Year 6	Children understand and can explain in some depth the difference between the internet and the World Wide Web. Children know what a WAN and LAN are and can describe how they access the internet in school.

E: Use technology purposefully	
Year 1	Children are able to sort, collate, edit and store simple digital content e.g. children can name, save and retrieve their work and follow simple instructions to access online resources
Year 2	children are confident when creating, naming, saving and retrieving content. Children use a range of media in their digital content including photos, text and sound.
Year 3	Children can carry out simple searches to retrieve digital content. They understand that to do this, they are connecting to the internet and using a search engine
Year 4	Children understand the function, features and layout of a search engine. They can appraise selected webpages for credibility and information at a basic level. .
Year 5	Children search with greater complexity for digital content when using a search engine. They are able to explain in some detail how credible a webpage is and the information it contains.
Year 6	Children readily apply filters when searching for digital content. They are able to explain in detail how credible a webpage is and the information it contains. They compare a range of digital content sources and are able to rate them in terms of content quality and accuracy. Children use critical thinking skills in everyday use of online communication.

F: Recognise common uses of information technology beyond school and our fully aware of the importance of E Safety	
Year 1	Children understand what is meant by technology and can identify a variety of examples both in and out of school. They can make a distinction between objects that use modern technology and those that do not e.g. a microwave vs. a chair. Children understand the importance of keeping information, such as their usernames and passwords, private and actively demonstrate this in lessons. Children take ownership of their work and save this in their own private space
Year 2	Children can effectively retrieve relevant, purposeful digital content using a search engine. They can apply their learning of effective searching beyond the classroom. Children know the implications of inappropriate online searches. Children begin to understand how things are shared electronically, Children know ways of reporting inappropriate behaviours and content to a trusted adult.
Year 3	Children demonstrate the importance of having a secure password and not sharing this with anyone else. Furthermore, children can explain the negative implications of failure to keep passwords safe and secure. They understand the importance of staying safe and the importance of their conduct when using familiar communication tools. They know more than one way of reporting inappropriate content.

Year 4	Children can help others to understand the importance of online safety. Children know a range of ways of reporting inappropriate content and contact.
Year 5	Children have a secure knowledge of common online safety rules and can apply this by demonstrating the safe and respectful use of a few different technologies and online services. Children implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others.
Year 6	Children demonstrate the safe and respectful use of a range of different technologies and online services. They identify more discreet inappropriate behaviours through developing critical thinking. They recognise the value in preserving their privacy when online for their own and other people's safety.

https://www.computingatschool.org.uk/data/uploads/primary_national_curriculum_-_computing.pdf

Pupils working at greater depth	
Foundation	Can follow and evaluate a set of instructions Can save or capture and retrieve their original content
Year 1	Can use and apply logical thinking to solve a problem involving programming Can use digital technology to organise and edit content Can apply navigational skills for a specific function or purpose Can use appropriate icons, buttons or shortcuts to complete an action
Year 2	Can appreciate that some algorithms are more efficient than others and use methods of efficiency to test these Can use digital technology to create, organise and edit a range of content for a specific purpose using an appropriate app?Can consider how text is presented and formatted and adapt this to suit the purpose of a document
Year 3	Can recognise the impact of keyword choice on search engine results Can evaluate content (created/researched) against a given goal
Year 4	Can design and create content on a computer in response to a given goal, paying attention to the needs of a known audience Can give reasons for errors in programs and explain how they have corrected these through decomposition and debugging Can explain an algorithm using sequence, repetition and selection in their own words
Year 5	Can create a multimedia project that contains an appropriately selected range of media Can save an image using a range of commands Can evaluate content according to its effectiveness and impact on a target audience Can write programs that have sequences, repetitions and variables Consider audience when editing media and justify their choices

Year 6	Can incorporate images within a document or project where appropriate, using the most effective text wrapping formats within documents? Can compare the information provided on two tabbed websites looking for bias and perspective? Can apply a range of logical and computational thinking to program robotics and simulate this using an appropriate?

Vocabulary for Computing	
algorithm	an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective
computer networks	the computers and the connecting hardware (wifi access points, cables, fibres, switches and routers) that make it possible to transfer data using an agreed method ('protocol'
control	using computers to move or otherwise change 'physical' systems. The computer can be hidden inside the system or connected to it
data	a structured set of numbers, representing digitised text, images, sound or video, which can be processed or transmitted by a computer
debug	to detect and correct the errors in a computer program
digital content	any media created, edited or viewed on a computer, such as text (including the hypertext of a web page), images, sound, video (including animation), or virtual environments, and combinations of these (i.e. multimedia
information	the meaning or interpretation given to a set of data by its users, or which results from data being processed
input data	provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors
internet	the global collection of computer networks and their connections, all using shared protocols (TCP/IP - transmission control protocol/internet protocol) to communicate
logical reasoning	a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules
output	the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly through the control of motors in physical systems
program	a stored set of instructions encoded in a language understood by the computer that does some form of computation, processing input and / or stored data to generate output

repetition	a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped
search	to identify data that satisfied one or more conditions, such as web pages containing supplied keywords, or files on a computer with certain properties
selection	a programming construct in which the instructions that are executed are determined by whether a particular condition is met sequence to place programming instructions in order, with each executed one after the other
services	programs running on computers, typically those connected to the internet, which provide functionality in response to requests; for example, to transmit a web page, deliver and email or allow a text, voice or video conversation
simulation	using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical and social systems; an integral part of most computer games
software	computer programs, including both application software (such as office programs, web browsers, media editors and games) and the computer operating system. The term also applies to 'apps' running on mobile devices and to web-based services variables a way in which computer programs can store, retrieve or change simple data, such as a score, the time left, or the user's name
World Wide Web	a service provided by computers connected to the internet (web servers), in which pages of hypertext (web pages) are transmitted to users; the pages typically include links to other web pages and may be generated by programs automatically