Much Marcle Primary School – Computing Progression

CURRICULUM AREA	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Computer science KS1: • 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 KS2: • 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	Vocabulary: On, Off, Switch, Backwards, Forward, Instruction, Sound, Moving,	Vocabulary: algorithm, create, command, organise, sequence, software, store, program	Vocabulary: algorithm, blocks, command, debug, execute, manipulate, organise, scripted, sequence, software, sprite, store, predict, program, retrieve, reverse engineer	Vocabulary: algorithm, block language, command, debug, execute, input, output, loops, manipulate, organise, program, repetition, scripted, sequence, simulation, sprite, software, store, program, physical, system, repetition, retrieve, reverse engineer	Vocabulary: algorithm, block language, command, collaboration, debug, encrypted, execute, HTTP, input, output, loops, manipulate, organise, program, repetition, scripted, selection, sequence, simulation, sprite, software, store, packets of data, program, physical system repetition, retrieve, reverse engineer, URL	Vocabulary: algorithm, block language, command, control, collaboration, debug, decomposition, encrypted, execute, HTTP, input, output, loops, manipulate, organise, program, repetition, scripted, selection, sequence, simulation, sprite, software, store, packets of data, program, physical system, repetition, retrieve, reverse, engineer, URL, variables	Vocabulary: algorithm, block language, command, control, collaboration, debug, decomposition, encrypted, execute, hardware, HTTP, input, IP address, output, loops, manipulate, organise, program, repetition, scripted, selection, sequence, simulation, sprite, software, store, packets of data, program, physical system, repetition, retrieve, reverse engineer, URL, variables
	- Children give commands/instructions e.g. forward, backwards, go, stop, when using simple software/hardware -Make choices about the buttons/icons to press, touch or click on when using simple software/hardware	-Children understand that an algorithm is a set of instructions used to solve a problem or achieve an objective. They know that a computer program turns an algorithm into code that the computer can understand. -Children can work out what is wrong with a simple algorithm when the steps are out of order and can write their own simple algorithm. Children know that an unexpected outcome is due to the code they have created and can make logical attempts to fix the code. -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.	-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. -Children can create a simple program that achieves a specific purpose. They can also identify and correct some errors. Children's program designs display a growing awareness of the need for logical, programmable steps. -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.	-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. -Children demonstrate the ability to design and code a program that follows a simple sequence. -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. -Children can list a range of ways that the Internet can be used to provide different methods of communication. They can	-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 -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. -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	-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. -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. -When children code, they	-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 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. -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

collaboration.				use some of these methods of communication. They can describe appropriate email conventions when communicating in this way.	knowledge of coding structures. -Children recognise the main component parts of hardware which allow computers to join and form a network.	are beginning to think about their code structure in terms of the ability to debug and interpret the code later. -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.	whole. -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.
Information technology KS1 : • Use technology purposefully to create, organise, store, manipulate and retrieve digital content. KS2: • 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.	Vocabulary: Phone, Camera, Remote, Set of photos, Type, Buttons, Computer, Equipment, Keyboard, Keys, Monitor, Mouse, Movement, Organise, iPad	Vocabulary: digital content, digital devices, computer network	Vocabulary: data, digital content, digital devices, computer network	Vocabulary: data, digital content, digital devices, computer network, safe search mode, search technologies, software	Vocabulary: cached, collecting data, digital content, digital devices, network, safe search mode, search technologies, server, software	Vocabulary: cached, collecting data, digital content, digital devices, network, safe search mode, search technologies, server, software, evaluating	Vocabulary: cached, collecting data, digital content, digital devices, network, safe search mode, search technologies, server, software, evaluating
	- Children input commands using the space bar, backspace, enter, letters and numbers on a keyboard on any device (including on a tablet). -Input commands using a mouse to control a cursor and use the left click to select options OR use finger control to interact with a tablet (double tap, swipe)	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.	Children demonstrate an ability to organise data using, for example, a database and can retrieve specific data for conducting simple searches. Children are able to edit more complex digital data. 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.	- 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. -Children can collect, analyse, evaluate and present data and information using a selection of software, e.g. using a branching database and using software. Children can consider what software is most appropriate for a given task. They can create purposeful content to attach to emails.	-Children understand the function, features and layout of a search engine. They can appraise selected webpages for credibility and information at a basic level. -Children are able to make improvements to digital solutions based on feedback. Children make informed software choices when presenting information and data. They create linked content using a range of software. Children share digital content within their community, i.e. using Virtual Display Boards.	-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. - Children are able to make appropriate improvements to digital solutions based on feedback received and can confidently comment on the success of the solution. They objectively review solutions from others. Children are able to collaboratively create content and solutions using digital features within software. They are able to use several ways of sharing digital content.	-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. -Children make clear connections to the audience when designing and creating digital content. The children design and create their own blogs to become a content creator on the internet. They are able to use criteria to evaluate the quality of digital solutions and are able to identify improvements, making some refinements.
Digital literacy KS1: • Recognise common	Vocabulary: internet, website, create	Vocabulary: personal information, world wide web	Vocabulary: password, personal information, private, world wide web	Vocabulary: command, evaluating digital content, password, personal information private, world	Vocabulary: command, evaluating digital content, password, personal information private, world	Vocabulary: command, evaluating digital content, password, personal information private, world	Vocabulary: command, evaluating digital content, password, personal information private, world

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 KS2: • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concern about content and contact.				wide web	wide web, acceptable/ unacceptable behaviours	wide web, acceptable/ unacceptable behaviours, encryption	wide web, acceptable/ unacceptable behaviours, encryption, detect
	-Children will recognise technology that is used at home and in school. -Understand what a Computer is and the different uses of computers i.e. learning, communicating, finding information, playing games etc.	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 -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.	-Children can effectively retrieve relevant, purposeful digital content using a search engine. They can apply their learning of effective searching beyond the classroom. They can share this knowledge. Children make links between technology they see around them, coding and multimedia work they do in school. -Children know the implications of inappropriate online searches. Children begin to understand how things are shared electronically. They develop an understanding of using email safely and know ways of reporting inappropriate behaviours and content to a trusted adult.	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 to report unacceptable content and contact.	Children can explore key concepts relating to online safety using concept mapping. They can help others to understand the importance of online safety. Children know a range of ways of reporting inappropriate content and contact.	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.	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.

KS3

Pupils should be taught to:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
- use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
- understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns