Progression in Computing

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 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	**Computer Science**					
	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 • Recognise common uses of information technology beyond school.		**Pupils should be taught to:** • Design write and debug programs that accomplish specific goals,…..solve problems by decomposing them in smaller parts • Use sequence, selection and repetition in programs • 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		**Pupils should be taught to:** • Design, write and debug programs that accomplish specific goals; including controlling or simulating physical systems and solving 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	

communication technology – at a level suitable for the future workplace and as active participants in a digital world.	**Digital Literacy**		
	Pupils should be taught to: • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content on the internet or other online technologies	**Pupils should be taught to:** • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact • Use search technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content	**Pupils should be taught to:** • Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact Use search technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content
	ICT		
	Pupils should be taught to: • Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.

Computer Science Units of Work

Year 1 / 2		Year 3 / 4		Year 5 / 6	
• 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		• Design write and debug programs that accomplish specific goals,…..solve problems by decomposing them in smaller parts • Use sequence, selection and repetition in programs Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs		• Design, write and debug programs that accomplish specific goals; including controlling or simulating physical systems and solving 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	
Spring 2 - Action Algorithms / Lego Pupils can understand, follow, write and edit simple algorithms. Pupils can apply the concept of algorithms to a variety of contexts (e.g. operating a crane, six bricks and Lego challenges). Summer 2 - Programming Direction	Summer 1 - Programming with Scratch Pupils learn to use a simple graphical programming language to navigate around the screen. Pupils write and debug algorithms and learn about repeating and different triggers to create actions.	Autumn 2 - Animation with Scratch Pupils learn to use a more complicated programming language. Pupils learn to sequence instructions to create an animation using Scratch. Summer 1 - 2Code Crash Course Pupils will learn an additional coding	Spring 1 - Programming Maze Games with Scratch Pupils become more familiar with Scratch's block-based coding language. Pupils include repetition, conditions and variables in algorithms. Pupils build adventure maze games and design	Spring 2 - 2Code Pupils will further develop their understanding of coding, using and combining increasingly complicated commands and variables. Summer 1 - Building Retro Games Pupils will analyse, build and improve a classic video game using Scratch.	Autumn 1 - 2Code Pupils will use flowcharts to test and debug programs. Children will explore how 2Code can be used to make a text-based adventure game.

	Pupils can program a basic floor turtle such as a BeeBot to follow certain algorithms. Pupils can make predictions about the algorithms. Pupils are able to debug their instructions when the turtle does not reach the intended destination.		language and how to use a range of different commands including timers and repetition. Pupils will learn how to debug a code using Purple Mash software. Summer 2 – Getting Started with Kodu Pupils will apply their coding skills to enable them to design 3D worlds and to create collecting and racing games.	their own levels, characters and objects to collect. Spring 2 – Computational Thinking: Alien Contact Pupils learn to break down a complex problem, so that it is more manageable. Pupils learn to identify potential solutions. Summer 1 – Kodu Sports Pupils create 3D video games using Kodu's graphical language.		
	• Recognise common uses of information technology beyond school		• Recognise common uses of information technology beyond school		• 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	

	Summer 1 - Technology Outside of School Pupils understand what is meant by technology. Pupils can name types of technology found inside and outside of school.	Spring 2 - Finding and Presenting Information Pupils understand some of the uses of the Internet. Pupils are able to use the Internet for a specific purpose, e.g. conducting research.	Spring 1 - Email Pupils will begin to think about different methods of online communication. Pupils will learn how to safely receive and send emails.	Autumn 1 - Searching the Web Pupils will be able to search the web with care and consideration. Pupils will be able to validate websites, improve their searches, search for images and for online maps.	Spring 1 - What is a Computer? Pupils will be able to recognise and name different components of a computer. Pupils will become familiar with memory data and binary code. Summer 2 - Building Collaborative Websites Pupils learn to collaborate electronically by blogging -mailing, and working on shared documents using Google resources.	Autumn 1 - Online Safety Pupils will be able to discuss the general positive and negative impacts of technology on society and the environment. Autumn 2 - Inside the Internet Pupils will learn how the web works, how it's built and written with HTML code. Pupils will create their own web pages written in HTML and CSS.

Digital Literacy Units of Work			
	Year 1 / 2	Year 3 / 4	Year 5 / 6
	• Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content on the	• Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report	• Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact

	internet or other online technologies.		concerns about content and contact			
	See Online Safety Progression of Skills document for examples and expectations.					
			• Use search technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content		• Use search technologies effectively, appreciate how results are selected and ranked and be discerning in evaluating digital content	
			Autumn 1 - Online Safety Pupils are introduced to the basics of online searching, including how to use effective keywords. Pupils will understand why some age restrictions are in place.	Autumn 1 - Searching the Web Pupils will be able to search the web with care and consideration. Pupils will be able to validate websites, improve their searches, search for images and for online maps.	Autumn 1 - Online Safety Pupils learn how to use effective keywords and how to analyse the usefulness and relevancy of the results. Pupils learn to conduct searches that provide them with the most helpful and relevant information.	Not taught as a discrete unit, but as part of Online Safety lessons throughout the academic year - see planning document. Pupils develop skills for evaluating websites, online information and advertising by rating the trustworthiness and usefulness of websites, and learning to identify the different types of online advertising.

ICT Units of Work

	Year 1 / 2		Year 3 / 4		Year 5 / 6	
	• Use technology purposefully to create, organise, store, manipulate and retrieve 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		• 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	
	Autumn 1 - Word Processing Pupils begin to become familiar with where letters are on a keyboard. Pupils learn how to use the shift key and space bar. Autumn 2 - Digital Art Pupils become familiar with a range of digital art packages. Pupils use digital tools to recreate and edit images in a range of different artistic styles.	Autumn 1 - Developing Word Processing Skills Pupils will further develop their typing skills through practising high frequency words and phrases. Autumn 2 - Writing in Different Styles Pupils will begin to format texts in a number of ways. Pupils will become familiar with a variety of different word processing and publishing tools. Pupils will begin to type up longer pieces of writing,	Autumn 1 - Online Safety and Touch Typing Pupils are introduced to the basics of online searching, including how to use effective keywords. Autumn 2 - Animation with Scratch Pupils learn how to design and create simple animations with some degree of independence. Spring 1 - Email Pupils can safely send and receive	Autumn 1 - Searching the Web Pupils will be able to search the web with care and consideration. Pupils will be able to validate websites, improve their searches, search for images and for online maps. Autumn 2 - Digital Imagery: Patterns in Nature Pupils learn how to take, adapt or create images to enhance or further develop their work.	Autumn 1 - Spreadsheets Pupils will use spreadsheets to solve increasingly difficult problems. Pupils will use spreadsheets to display data in a variety of ways. Autumn 2 - Manipulating Sound Pupils will become familiar with a range of sound editing websites and pieces of software. Pupils can use multiple digital devices (such as tablets and laptops or digital cameras	Autumn 2 - Inside the Internet Pupils can choose for themselves from a range of available programs on laptops, tablets or cloud-based services to achieve particular goals. Pupils can show that they can use effectively a range of different search technologies, including alternatives to Google (such as Bing or Yahoo) and site-specific search engines (such as those for the App Store or Google Play).

	Spring 1 - Making Multimedia Stories Pupils will learn about simple text formatting. Pupils will add sound and animation to stories.	e.g. a newspaper article about the Great Fire of Newcastle. Pupils will be able to store, edit and retrieve their work. Spring 1 - An Introduction to Animation Pupils will become familiar with a range of different types of animation including 2D, 3D and Stop Motion. Pupils will create their own 2D animations using a variety of tools and techniques. Pupils will plan and create their own Stop Motion animation using iPads. Pupils will be able to compare different types of animation. Spring 2 - Finding and Presenting Information Pupils learn to present their	emails. Pupils can begin to collect information using email. Spring 2 - Spreadsheets Pupils can use computers to collect information and present this to an audience.	Pupils can use multiple programs on laptop or tablet computers to achieve particular goals. Summer 2: 3D Modelling using Sketchup Pupils will be introduced to 3D modelling. Pupils will become familiar with Sketchup software and will use various tools to work on different projects.	and laptops) to achieve particular goals. Pupils can apply their skills to create radio adverts and audio books, complete with sound effects and atmospheric music. Summer 2 - Building Collaborative Websites Pupils learn to collaborate electronically by blogging -mailing, and working on shared documents using Google resources.	Spring - Instructional Videos Pupils can plan, design and implement a system with multiple, interrelated components with a given goal in mind. Summer 1 - Manipulating Images Pupils learn how to take, adapt or create images to enhance or further develop their work and incorporate it in a wider project. Summer 2 - Editing Videos Sound and video: Pupils record and edit media to create a short sequence - extended by editing the final product in using video editing software.

		information in pictograms and bar charts. Summer 2 - Spreadsheets Pupils will learn how to present work using spreadsheets. Pupils will begin to be able to answer simple questions using spreadsheets.				

Skills						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Programming	Physically follow & give each other instructions to move around. Explore outcomes when buttons are pressed in sequences on a robot. Begin to identify an algorithm to achieve a specific purpose. Execute a program on a floor robot to achieve an algorithm. Use the word debug to correct any mistakes when programming a floor robot. Begin to predict what will happen for a short sequence of instructions in a program.	Articulate an algorithm to achieve a purpose Plan and enter a sequence of instructions to achieve an algorithm. Explore outcomes when giving instructions in a simple Scratch program Watch a Scratch program execute & debug any problems Predict what will happen & test results Talk about similarities & differences between floor robots and Scratch on screen.	Begin to use and compare different coding languages, including Scratch, Kodu and 2Code to achieve outcomes. Explore outcomes when giving sequences of instructions in different types of coding software. Test & improve / debug programmed sequences. Use repeat to achieve solutions to tasks. Create an algorithm to make a simple animation or game. Talk about algorithms planned by others & identify any problems &	Create & edit procedures inputting Scratch and Kodu commands. Solve open-ended problems using efficient procedures and computational thinking. Experience a variety of resources to extend knowledge & understanding of programming. Create an algorithm & a program that will use a simple selection command for a game. Begin to correct errors (debug) as they program devices & actions on screen, & identify bugs in	Explore procedures using repeat to achieve solutions to problems with 2Code and Scratch. Talk about procedures as parts of a program. Refine procedures to improve efficiency. Use a range of variables in coding. Explore instructions to control software or hardware with an input & using if... then... commands. Change inputs on a model to achieve different outputs.	Record in some detail the steps (the algorithm) that are required to achieve an outcome & refer to this when programming Predict the outputs for the steps in an algorithm Increase confidence in the process to plan, program, test & review a program Write a program which follows an algorithm to achieve a planned outcome for appropriate programming software, e.g. 2Code. Create variables to provide a score/trigger an action in a game.

			the expected outcome.	programs written by others. Use an algorithm to sequence more complex programming into order. Link the use of algorithms to solve problems to work in Maths, Science & DT.	Refine & extend a program. Identify difficulties & articulate a solution for errors in a program Group commands as a procedure to achieve a specific outcome within a program. Write down the steps required (an algorithm) to achieve the outcome that is wanted and refer to this when programming.	Link errors in a program to problems in the original algorithm.
Multimedia	Record their own voices and play back to an audience. Use a video or camera to record an activity. Create sounds and simple music phrases using ICT tools. Add text and images to a	Use an increasing variety of tools and effects in animation programs and talk about their choices. Use templates to make different types of electronic text, e.g. stories and	Explore & begin to evaluate the use of multimedia to enhance communication. Create & begin to edit documents, spreadsheets & text, experimenting with fonts, size, colour, alignment	Explore how multimedia can create atmosphere & appeal to different audiences Be confident in creating & modifying text & presentation documents to	Select an appropriate ICT or online tool to create and share ideas. Explore the effects of multimedia (photos, video, sound) in a presentation or video and show	Identify the purpose for selecting an appropriate online tool. Discuss audience, atmosphere and structure of a presentation or video. Use a wide range of effects in art programs and

	template document using an image & word bank. Use index fingers (left and right hand) on a keyboard to build words &sentences. Know when & how to use the SPACE BAR (thumbs) to make spaces between words. Know how to use the shift key to insert capital letters.	newspaper articles. Explore the effects of sound and music in animation and video. Create own documents, adding text and images. Use keyboard to enter text (index fingers left & right hand). Know when and how to use the RETURN/ ENTER key. Use SHIFT & CAPS LOCK to enter capital letters. Use DELETE & BACKSPACE buttons to correct text. Create sentences, SAVE & edit later.	for emphasis & effect. Explore the use of video and animation. Amend text & save changes. Use individual fingers to input text & use SHIFT key to type characters. Amend text by highlighting & using SELECT/ DELETE & COPY/ PASTE. Look at own work & consider how it can be improved for effectiveness.	achieve a specific purpose. Use art programs & online tools to modify photos for a specific purpose using a range of effects. Use ICT tools to create models and sculpture for a specific purpose Use a keyboard effectively, including the use of keyboard shortcuts. Use font sizes & effects such as bullet points appropriately. Know how to use a spell check. Look at their own, and a friend's work & provide feedback that is constructive & specific.	how they can be modified. Use a wide range of effects in music programs and online tools, discussing the choices made and their effectiveness. Know how to use text and video editing tools in programs to refine their work. Use online tools to create and share spreadsheets, radio adverts and audio books.	online tools, discussing the choices made and their effectiveness. Collect information and media from a range of sources (considering copyright issues) into a web page or presentation for a specific audience. Use sound, images, text, transitions, hyperlinks and HTML code effectively. Store presentations and videos online where they can be accessed by themselves and shared with others. Evaluate the effectiveness of their own work and the work of others

Technology In Our Lives	Recognise uses of technology in their homes, schools and in their community. Understand that there are online tools that can help them create and communicate.	Begin to understand there are a variety of sources of information and begin to recognise the differences. Begin to understand what the Internet is and the purposes that it is used for. Understand the different types of content on websites and that some things may not be true or accurate. Save work to school computers and Purple Mash.	Save work on the school network, on the Internet and on individual devices Use appropriate tools to communicate on-line. Use simple search tools and find appropriate websites. Talk about the owner of information online.	Talk about the school network & the different resources they can access, including the Internet. Frame questions & identify key words to search for information on the Internet. Consider reliability of information & ways it may influence you. Check who the owner is before copying photos, clipart or text.	Identify different parts of computing devices. Choose appropriate tools for communication and collaboration and use them responsibly. Use effective strategies to search with appropriate search engines. Talk about the different elements on web pages. Find out who the information presented on a webpage belongs to.	Identify different parts of the Internet. Describe different services provided by the Internet & how information moves around the Internet. Describe different parts of a computing device & how it connects to the Internet. Connect a computing device to a keyboard, mouse or printer. Identify appropriate forms of online communication for different audiences. Use search engines as part of an effective research strategy. Describe how search results are selected & ranked.

						Acknowledge who resources belong to that they have found on the internet.
Data Handling	Take photographs, video and record sound to record learning experiences. In Maths, contribute to and interpret a pictogram.	In Science, use microscopes or other devices to capture magnified images. Ask questions and consider how they will collect information. Collect data, generate graphs and charts to find answers. Save & retrieve the data to show to others. Investigate different types of digital data e.g. online encyclopaedias	Find out information from a pre-prepared database, asking straightforward questions. Contribute towards a database. Record data in a variety of ways. Present data for others.	In Maths, identify different types of data. Ask questions carrying out simple searches on a database or website. Identify inaccurate data. Present data in appropriate format for an audience.	Collect and record information using spreadsheets and databases Carry out complex searches (e.g. using and/or; ≤ / ≥) Solve problems and present answers using data tools. Analyse information and question data. Identify poor quality data.	Use the whole data process - generate, process, interpret, store, and present information - realising the need for accuracy and checking plausibility. Identify and present results. Interrogate a database, refining searches to provide answers to questions.

Vocabulary				
EYFS	Year 1	Year 2	Year 3/4	Year 5/6
Control Information Internet Program Technology	Control Information Internet Program Algorithm Data Debug Online Repeat Search Selection Sequence	Control Information Internet Program Algorithm Data Debug Repeat Search Selection Sequence Browser Computer networks Execute Input Loop Output Software World Wide Web Web browser	Control Information Internet Program Algorithm Data Debug Search Search engine Selection Sequence Computer networks Execute Input Loop Output Software World Wide Web Web browser Abstraction Block Blocks Palette Browser Command Condition Control Block Costume Decomposition Digital content Evaluation Logic Logical reasoning PageRank Patterns Processor Procedure Repetition (sometimes	Control Information Internet Program Algorithm Data Debug Search Search engine Selection Sequence Computer networks Execute Input Loop Output Software World Wide Web Web browser Block Blocks Palette Browser Command Condition Control Block Costume Decomposition Digital content Evaluation Logic Logical reasoning PageRank Patterns Processor Procedure Repetition Script Scripts area

			referred to as 'iteration' in upper KS2) Script Scripts area Server Services Simulation Software Sprite Stage Variables	Server Services Simulation Software Sprite Stage Variables Abstraction Array CPU CSS GPU Hard drive Hardware HTML Iteration List Operating system RAM ROM