Computing - Progression of Knowledge and Skills

National Curriculum Key stage 1 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
● 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.

National Curriculum Key stage 2 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
● 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.

	EYFS	Class 2	Class 3	Class 4
	Pupils can:	Pupils can:	Pupils can:	Pupils can:
Computing skills	Recognise a range of technology is used in places such as homes and schools. Begin to share their experiences of technology at home and school.	Recognise common uses of information technology beyond school. Improved understanding of use of technology outside school.	Develop understanding of how a computer and technology works, focusing on computational thinking. Continue to develop confidence in using a range of devices and to	Continue to develop computational thinking in different aspects of the curriculum.

	Engage in conversations about digital applications and respond appropriately. Use a broad range of simple devices and applications appropriately with increasing independence (pcs, laptops, tablets, sound or recording devices, cameras, toys, phones etc.). Select an appropriate device for a chosen activity.	Use an extended range of devices (pcs, laptops, tablets, sound or recording devices, cameras, toys, phones etc.). To develop typing speed through regular use of keyboards, mouse, keypad and touch screens and games.	justify their choice for a specific purpose. Develop understanding of shared documents. Create, contribute to and edit these documents being aware that that they are visible to all users. Build on developing typing speed.	Justify their choice of technology or computational software.
Programming	Use simple instructional language control simple onscreen devices. Explore and investigate digital toys. Develop skills to control the computer using different devices and input methods including mouse, touch pad, buttons, switches and touch screen with increasing accuracy and independence. Know that technology can be used to make things happen (output); move, make sound or music, change light etc. Explore and find out that different things happen based on the choice made (selection). Investigate real and pretend	Develop their computational skills; recognise the sequence based on choices made, and explain their findings. Understand what algorithms are and how they are implemented as programs on digital devices. Use logical reasoning to predict the behaviour of simple programs. Use algorithms to create and debug simple programs. Investigate programmable devices relating their understanding of inputs and outputs to natural and digital systems. Use simulations, drag and drop to test digital systems or model systems. Explain their findings in terms of input, output and algorithm.	Explore simulations within other curriculum areas discussing the pros and cons. Use simulations to make and test predictions. Test, debug and refine programs. Use visual and text-based programs. Solve problems by decomposing them into smaller parts. Plan complex sequences using onscreen programming tools and physical devices/turtles/robots. Use sequence, selection, and repetition in programs. Make programming efficient by writing procedures. Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.	Explore a range of complex simulations, observe, record and analyse the effect of changing variables in the simulation. Suggest improvements with reasons and methods to improve. Program physical devices by first creating algorithms, testing and debugging. Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems. Work with variables and various forms of input and output.

	digital devices and explain, in simple terms how they think they work.	Create algorithms linked to their simulations. Develop an understanding of how repetition can make a program/ algorithm more efficient. Explain how certain simulations help our understanding of real life situations. Program onscreen characters.	Develop computational thinking in context of the wider curriculum by building games, simulations, puzzles and quizzes.	Apply the understanding of computational thinking in writing programs. Continue to develop efficient algorithms and code. Continue to use a range of visual and text based programming languages to write code and create a physical system/game/ maths quiz /function machine. Add variables to make a program more interesting. Design a game so that there is a possibility of adding an external input/output device. Test and debug the digital system created to achieve the goal.
Data collection and handling	Explore and build simple onscreen pictograms with support. Discuss the information displayed.	Investigate how we derive information from different sources. Understand that not all information available online is reliable. Present their research using charts, graphs and mind maps. Edit charts including adding titles and labels. Use sensing devices to explore environmental conditions. Explore how computers might sort objects. Develop a range of question	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. Continue to create and use graphs, tables and charts in a wider context. Generate graphs and information from a ready database by querying the database.	Design and create databases, generate information using these and share this as multimedia reports /files for a specific purpose. Continue to generate graphs and information from a ready database by querying the database. Continue to collect own data linked to different aspects of the curriculum, converting this to a report with analysis and graphs to support.

			Create and use branching databases using yes and no questions. Create databases by collecting own data, converting this to a report with some analysis and graphs to support.	Understand real life applications of spreadsheets using basic formulae and functions for analysis and answering questions. Use this to present a report to an audience for a purpose.
Information Technology	Select and use technology for particular purposes. Know that technology can be used to find things out.	Use technology purposefully to create, organise, store, manipulate and retrieve digital content. Name the main external parts of a computer and explore how they work together. Investigate differences between hardware and software. Explore the idea of a network related to computers at home and school, logging on to their area. Save and retrieve files in designated spaces. Develop an understanding of file names. Save sequences of drafts while doing research or a p	Can save and retrieve files from different locations on a computer network. Can use sensible file names.	Understand computer networks; use appropriate file names, save, organise and retrieve files from various locations both online and offline. 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. Understand the reasons why different search engines display different results for the same search. Understand that online activities may leave a digital footprint.

				Investigate the concept of data and how this is used in today's world.
Digital Literacy **Creating digital content including text, images and sound**	Explore ways in which technology can be used to create digital content, including writing and drawing. Begin to create digital content; drawing pictures and making sounds using simple digital applications. Use simple graphics and drawing/painting software and tools to create digital drawings. Listen and respond to a range of music.	Begin to use technology creatively and edit digital images. Explore digital texts. Begin to use varied devices and software to create digital content combining text, image and sound. Insert text box and format font. Change font size, colour, and size, bold, capitalise and use word art for a purpose. Cut, copy and paste. Edit the content and appearance of digital images using simple software. Insert an image and format and resize an image. Use simple software with speech support to help with reading.	Develop an understanding of editing software to use technology creatively and safely. Take notes digitally alongside researching. Work on collaborative documents and incorporate hyperlinks, images and other media in a finished product. Edit documents and keep drafts while working on long projects. Present the finished project using a multimedia text.	Continue to use computers for projects across the curriculum. Work reliably on collaborative documents and spaces, using these creatively to collate materials from varied sources and present projects with text, images and sound. Create 3d models using 3dmodelling software in the context of the wider curriculum. Be a responsible digital citizen and create digital content respectfully in different software based on the use of the features of the chosen software. Make choices about the style, animation and effect.
Digital Literacy **Research and Digital communication**	Know that technology can be used to communicate. Compare digital and no digital experiences and share what they have discovered. Be able to choose a regular activity on a safe site via a link or icon. Know that different types of information can be searched using a range of digital and non-	understand the use of technology in daily life including research and communication Develop understanding of researching using non-digital and digital sources, including the world wide web. Navigate within a website using menu, tabs and hyperlinks to locate information.	Share and communicate digitally using; emails, blogs, wikis or other digital communication tool. Understand the advantages of digital communication. |Send e-mails within the school domain. Understand the use of cc, bcc. Send and respond to emails with attachments.	Communicate safely and work collaboratively on an online space. Compare different search engines and give an opinion about the search engines with a reason. Know the origin of a website by looking at the web address. Navigate a website efficiently

	digital sources; cd, stored information, eBooks, cd players, audio books, to, videos and websites. Navigate using simple navigation tools using simple navigation tools like arrows, onscreen instructions, icons, buttons (talk about links).	Find specific websites using the links on an intranet or 'favourites'. Begin to understand that there are different ways to communicate; letters, instant messaging, text, email, blog. Begin to understand that certain on-line spaces are collaborative areas. Be aware that emails can be a means of digital communication.	Find specific websites by copying and pasting the address in the address bar. Use keywords in a search engine for researching a topic safely. Know that information found online is not always reliable. Check the reliability of the information from various sources.	for a purpose using the index, menu and hyperlinks. Understand the implications of incorrect information and to pro-actively safeguard against this by finding information from various sources and quote the sources.
E Safety	Increasingly know who to tell if something they see makes them worried or uncomfortable. Understand they should ask permission when capturing an image or recording a sound of others. Take sensible pictures.	Develop E-safety practices and use technology safely and respectfully. Understand the need to keep 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. Begin to respect copyright and ownership.	Use technology safely, respectfully and responsibly. Identify a range of ways to report concerns about content and contact. To recognise safe websites and know the signs of an unsafe website.	•Recognise acceptable/unacceptable behaviour. Apply copyright rules in their work and recognise sources used.