Computer Science

Progression of Skills Milestones

Skills	EYFS	Milestone 1 (End of KS1 – Years 1-2)	Milestone 2 (End of LKS2 – Years 3-4)	Milestone 3 (End of UKS2 – Years 5-6)
Computer Science Hardware	• Operate a camera to take photographs of meaningful creations or moments. • Explore and tinker with hardware to develop familiarity and explain relevant vocabulary. • Recognise and identify familiar letters and numbers on a keyboard. • Develop basic mouse skills such as moving and clicking	• Explain what a computer is and that it's made up of different components. • Recognise that buttons cause effects and that technology follows instructions. • Explain how we know that technology is doing what we want it to do via its output. • Use greater control when taking photos with cameras, tablets or computers. • Develop confidence with the keyboard and the basics of touch typing.	• Explain what the different components of a computer do and how they work together. • Draw comparisons across different types of computers. • Explain the purpose of routers. • Use tablets or digital cameras to film a weather forecast. • Explain that weather stations use sensors to gather and record data which predicts the weather.	• Explain that external devices can be programmed by a separate computer. Explain the difference between ROM and RAM. • Recognise the size of RAM affects the processing of data. Explain the fetch, decode, execute cycle. • Explaining about the history of computers and how they have evolved over time. • Explain and identify barcodes, QR codes and RFID. • Identify devices and applications that can scan or read barcodes, QR codes and RFID. • Explain how corruption can happen within data during transfer (for example when downloading, installing, copying and updating files). • Identify different types of AI and their applications in everyday life.

Computer Science Networks and data representation			• Explain that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration. • Explain the role of the key components of a network. • Identify the key components within a network, including whether they are wired or wireless. • Recognise links between networks and the internet. • Explain how data is transferred • Explain that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.	• Use vocabulary associated with data: data and transmit. • Explain how the data for digital images can be compressed. • Recognise that computers transfer data in binary and Explaining simple binary addition. • Relate binary signals (Boolean) to the simple character-based language, ASCII. • Explain that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations. • Explain how bit patterns represent images as pixels. • Explain that computer networks provide multiple services.
Computer Science Computational Thinking	• Use logical reasoning to Explain simple instructions and predict the outcome.	• Articulate that decomposition means breaking a problem down into smaller parts. • Decompose a game to predict the algorithms used to create it	• Explain the purpose of an algorithm. • Use logical thinking to explore more complex software; predicting, testing and explaining what it does. • Use logic, pattern recognition and	• Decompose animations into a series of images. • Decompose a program without support. • Decompose a story to be able to plan a program to tell a story.

		• Use logical reasoning to predict the behaviour of simple programs. • Develop the skills associated with sequencing in unplugged activities. • Explain what an algorithm is. • Follow an algorithm. • Create a clear and precise algorithm. • Explain that programs are executed by following precise instructions. • Incorporate loops within algorithms.	decomposition to solve simple problems. • Use decomposition to solve a problem by finding out what code was used. • Use decomposition to Explain the purpose of a script of code. • Identify patterns through unplugged activities. • Use abstraction to identify the important parts when completing both plugged and unplugged activities. • Work towards a given goal that a program needs to accomplish. Breaking down what they want to achieve into smaller, manageable parts.	• Predict how software will work based on previous experience. • Write more complex algorithms for a purpose. • Write increasingly complex algorithms for a purpose. • Analyse the effectiveness of prompts and refine them for improved AI outputs
Computer Science Programming	• Follow instructions as part of practical activities and games. • Explain to give simple instructions. • Programming a Bee-bot to give it simple commands. • Debug instructions, with the help of an adult, when things go wrong.	• Program a Floor robot to follow a planned route. • Debug instructions when things go wrong. • Use programming language to explain how a floor robot works. • Debug an algorithm in an unplugged scenario. • Recognise that robots are programmed by humans.	• Remix code to alter and add to an existing program. • Recognise the relationship between what is happening in a program and the written (block) code. • Work backwards, beginning to identify the code they think a program uses.	• Debug quickly and effectively to make a program more efficient. • Remix existing code to explore a problem. • Use and adapt nested loops. • Program using the language Python. • Change a program to personalise it. • Evaluating code to Explain its purpose. • Predict code and adapt it to a chosen purpose.

		• Change instructions or algorithms into code that the robot Explains. • Identify errors in algorithms. • Use logical thinking to explore software, predicting, testing and explaining what it does. • Use an algorithm to write a basic computer program. • Use loop blocks when programming to repeat an instruction more than once. • Verbally plan what they aim to achieve with a program. Looking at different forms of code and predicting how a program will execute.	• Run small chunks of code at a time to find the error or bug. • Create algorithms for a specific purpose. • Code a simple game. • Use abstraction and pattern recognition to modify code. • Incorporate variables to make code more efficient. • Create loops to make code more efficient in block-based programs	• Apply coding skills like decomposition and pattern recognition to interact with AI applications. • Recognise a wider range of text-based programming languages. Live coding (improvising with code). • Make links between different programming interfaces they are faced with. • Recognise examples of programming elements in real-life applications. • Decompose a program independently when given a specific outcome or task to achieve. • Alter existing code with a new, specific outcome in mind. • Independently use loops to make code more efficient in text-based programs. • Use nested loops to make code more efficient • Systematically identify mistakes, problems or 'bugs' in a program

Information Technology using Software	• Using a simple online paint tool to create digital art.	• Use a basic range of tools within graphic editing software. • Take and edit photographs. • Develop control of the mouse through dragging, clicking and resizing of images to create different effects. • Develop Explaining of different software tools. • Develop word processing skills, including altering text, copying and pasting and using keyboard shortcuts. • Use word processing software to type and reformat text. • Use software (and unplugged means) to create story animations. • Create and label images.	• Take photographs and record video to tell a story. • Use software to edit and enhance their video adding music, sounds an • Build a web page and creating content for it. • Design and create a webpage for a given purpose. • Use online software for documents, presentations, forms and spreadsheets. • Use software to work collaboratively with others. • Translate HTML into text and images. Identifying HTML tags. • Alter HTML on a live web page. • Replace images on a web page.	• Use logical thinking to explore software independently, iterating ideas and testing continuously. • Use search and word processing skills to create a presentation. • Plan, record and edit an audio recording. • Use software programme Sonic Pi/Scratch to create music. • Create and edit sound recordings for a specific purpose. • Create and edit videos, adding multiple elements: music, voiceover, sound, text and transitions. • Use design software TinkerCAD to design a product. • Create a website with embedded links and multiple pages. • Use text-based and image-based AI tools to generate content.

Information Technology using Email and Internet Searches		• Recognise devices that are connected to the internet. • Search and download images from the internet safely. • Explain that we are connected to others when using the internet.	• Log in and out of an email account. • Write an email including a subject, 'to' and 'from.' • Send an email with an attachment. • Reply to an email. • Explain why some results come before others when searching. • Use keywords to effectively search for information on the internet. • Explain that information found by searching the internet is not all grounded in fact. • Search the internet for data.	• Develop searching skills to help find relevant information on the internet. • Use search engines effectively to find information, focussing on keyword searches and evaluating search returns. • Explain how search engines work.
Information Technology using Data	• Represent data through sorting and categorising objects in unplugged scenarios. • Represent data through physical pictograms. • Explore branch databases through physical games.	• Explain how technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc. • Use representations to answer questions about data. • Use software to explore and create pictograms and branching databases.	• Understand and use key database vocabulary, including field, record and data. • Explain the advantages and disadvantages of digital and paper-based databases. • Enter, organise, sort and filter data in databases and spreadsheets (e.g. using "sort by…") to retrieve and compare information.	• Understand how data is collected in remote or dangerous environments and how it can be used to describe or monitor locations. • Explain how technologies such as barcodes, QR codes and RFID are used to collect and store data. • Gather and analyse data in real time to support understanding and decision-making.

		• Collect and input data into a spreadsheet. I • Interpret data from a spreadsheet.	• Create and interpret charts and graphs to analyse and present data. • Understand that collected data can be used to make predictions and forecasts (e.g. weather). • Design a device that gathers and records sensor data.	• Use spreadsheets to organise data, including creating formulas and sorting information for analysis.
Information Technology Wider use of Technology		• Recognise common uses of information technology, including beyond school. • Understand some of the ways we can use the internet. • Explain how computers are used in the wider world.	• Understand the purpose and appropriate use of email and how social media platforms enable communication and interaction. • Use online collaborative software to work effectively with others as part of a team. • Explore the structure of web pages, including examining basic HTML.	• Understand how technology has enabled new forms of communication and how these have developed over time. • Understand what the Internet of Things (IoT) is and how connected devices generate 'big data'. • Explain how big data can be analysed to solve problems and improve efficiency.
Digital Literacy	• Recognise that a range of technology is used for different purposes. • Log in and log out.	• Log in and out and save work on their own account. • Recognise how actions on the internet can affect others. • Recognise what a digital footprint is and how to be careful about what we post.	• Recognise that different types of information are shared online, including facts, beliefs and opinions. • Understand that information on the internet may not always be true or accurate and that some sources are more trustworthy than others.	• Identify potential dangers online and explain strategies to stay safe in different digital environments. • Evaluate the advantages and disadvantages of online communication. • Understand that online information may not always be accurate and use

		• Create a strong password. • Explain how to stay safe when talking to people online and what to do if they see or hear something online that makes them feel upset or uncomfortable Identifying whether information is safe or unsafe to be shared online. • Explain strategies for checking if something they read online is true.	• Make simple judgements about the reliability and accuracy of information found in online searches. • Identify reliable sources of information when searching online. • Recognise that not all emails are genuine, identify possible signs of fake emails, and know how to respond appropriately. • Identify different forms of online advertising. • Explan how to stay safe when using social media and online platforms. • Recognise appropriate and inappropriate behaviour when communicating or collaborating with others online. • Identify respectful and disrespectful online behaviour, including cyberbullying, and understand how to respond or seek help. • Understand that technology use can affect mood and wellbeing.	strategies to check validity and reliability. • Know what to do if they experience online bullying and how to report or seek help. • Safely and responsibly participate in online communities. • Understand the positive and negative impacts of sharing information online. • Use strategies to build and maintain a positive online reputation. • Understand the importance of secure passwords and know how to create and manage them effectively. • Know how to capture and keep evidence of online bullying or harmful behaviour in order to seek support. • Use search engines safely, effectively and efficiently. • Understand that keeping software updated helps protect devices from data loss, corruption and hacking. • Explore ethical considerations around the use of artificial intelligence

			• Reflect on the positive and negative effects of time spent online.	and its impact on individuals and society.