



Progression of Skills and Knowledge in Computing – KS2

Computing Intent:

The technological world is ever-changing and Earlsmead Primary School understands and values the importance of teaching Computing from a young age. Therefore, it is our aim to ensure that the key skills and knowledge needed in Computing are taught, sought and caught, to enable learners to develop in the following three core areas of Computing:

1. **Computer Science.**
2. **Information Technology.**
3. **Digital Literacy.**

Through considered planning and high-quality teaching, we aim to support all pupils in their journey of development. Our teaching objectives at Earlsmead Primary School are as follows:

- To embed enthusiasm and curiosity in Computing through engaging and coherently sequenced lessons linked, where possible, to our localised curriculum offer.
- To use the Teach Computing Curriculum to support planning across year groups, ensuring that National Curriculum objectives are met in full, and that the progression of skills is clear and sequential.
- To ensure staff are supported in offering Computing lessons, providing CDP and specialist support where needed.
- To support children to be responsible and safe when using computers.

Key Area	Year 3	Year 4	Year 5	Year 6
Units of Learning	<p>Autumn 1 – Networks</p> <p>Autumn 2 – Programming Scratch</p> <p>Spring 1 – Emailing using Google/ Microsoft</p> <p>Spring 2 – Journey inside a computer</p> <p>Summer 1 – With or without iPads</p> <p>Summer 2 – Comparison cards databases</p>	<p>Autumn 1 – Collaborative learning using Google/ Microsoft</p> <p>Autumn 2 – Further coding with Scratch</p> <p>Spring 1 – Website design</p> <p>Spring 2 – HTML</p> <p>Summer 1 – Computational thinking</p> <p>Summer 2 – Stop motion animation using Stop motion studio/ cameras</p>	<p>Autumn 1 – Search Engine</p> <p>Autumn 2 – Programming Music</p> <p>Spring 1 – Mars Rover</p> <p>Spring 2 – Micro-bit</p> <p>Summer 1 – Stop motion animation using Stop motion studio/camera</p> <p>Summer 2 – Mars Rover 2</p>	<p>Autumn 1 – Bletchley Park and the History of Computers</p> <p>Autumn 2 – Exploring AI</p> <p>Spring 1 – Big Data 1</p> <p>Spring 2 – Intro to Python</p> <p>Summer 1 – Big Data 2</p> <p>Summer 2 – Inventing a Product</p>



Online Safety

Key Area	Year 3	Year 4	Year 5	Year 6
Progression of knowledge	<p>To know that not everything on the internet is true: people share facts, beliefs and opinions online.</p> <p>To understand that the internet can affect your moods and feelings.</p> <p>To know that privacy settings limit who can access your important personal information, such as your name, age, gender etc.</p> <p>To know what social media is and that age restrictions apply.</p>	<p>To understand some of the methods used to encourage people to buy things online.</p> <p>To understand that technology can be designed to act like or impersonate living things.</p> <p>To understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology.</p> <p>To understand what behaviours are appropriate in order to stay safe and be respectful online.</p>	<p>To know different ways, we can communicate online.</p> <p>To understand how online information can be used to form judgements.</p> <p>To understand some ways to deal with online bullying.</p> <p>To know that apps require permission to access private information and that you can alter the permissions.</p> <p>To know where I can go for support if I am being bullied online or feel that my health is being affected by time online.</p>	<p>To know that a 'digital footprint' means the information that exists on the internet as a result of a person's online activity.</p> <p>To know what steps are required to capture bullying content as evidence.</p> <p>To understand that it is important to manage personal passwords effectively.</p> <p>To understand what it means to have a positive online reputation.</p> <p>To know some common online scams.</p>



Computer Science				
Key Area	Year 3	Year 4	Year 5	Year 6
Hardware	<p>To know the components that make up a network (Wireless access point/WAP, Network switch, Router, Server and devices).</p> <p>Drawing comparisons across different types of computers.</p> <p>To know that a router connects us to the internet.</p> <p>To know that a server is central to a network and responds to requests made.</p>	<p>Using tablets or digital cameras to film a weather forecast.</p> <p>Understanding that weather stations use sensors to gather and record data which predicts the weather</p>	<p>Learning that external devices can be programmed by a separate computer.</p> <p>Learning the difference between ROM and RAM.</p> <p>Recognising how the size of RAM affects the processing of data.</p> <p>Understanding the fetch, decode, execute cycle.</p>	<p>Learning about the history of computers and how they have evolved over time.</p> <p>Using the understanding of historic computers to design a computer of the future.</p> <p>Understanding and identifying barcodes, QR codes and RFID.</p> <p>Identifying devices and applications that can scan or read barcodes, QR codes and RFID.</p> <p>Understanding how corruption can happen within data during transfer (for example when downloading, installing, copying and updating files).</p> <p>Identify different types of AI and their applications in everyday life.</p>
Networks and data representation	<p>Understanding that websites and videos are files that are shared from one computer to another.</p> <p>To know what a packet is and why it is important for website data transfer.</p> <p>Understanding how networks work and their purpose.</p> <p>Recognising links between networks and the internet.</p> <p>Learning how data is transferred.</p>	<p>Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.</p>	<p>Learning the vocabulary associated with data: data and transmit.</p> <p>Learning how the data for digital images can be compressed.</p> <p>Recognising that computers transfer data in binary and understanding simple binary addition.</p> <p>Relating binary signals (Boolean) to the simple character-based language, ASCII.</p> <p>Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.</p> <p>Understanding how bit patterns represent images as pixels.</p>	<p>Understanding that computer networks provide multiple services.</p>



<p>Computational Thinking</p>	<p>Using decomposition to explain the parts of a laptop computer.</p> <p>Using decomposition to explore the code behind an animation.</p> <p>Using repetition in programs. Using logical reasoning to explain how simple algorithms work.</p> <p>Explaining the purpose of an algorithm.</p> <p>Forming algorithms independently.</p>	<p>Using decomposition to solve a problem by finding out what code was used.</p> <p>Using decomposition to understand the purpose of a script of code. Identifying patterns through unplugged activities.</p> <p>Using past experiences to help solve new problems.</p> <p>Using abstraction to identify the important parts when completing both plugged and unplugged activities.</p>	<p>Decomposing animations into a series of images.</p> <p>Decomposing a program without support.</p> <p>Decomposing a story to be able to plan a program to tell a story.</p> <p>Predicting how software will work based on previous experience.</p> <p>Writing more complex algorithms for a purpose.</p>	<p>Decomposing a program into an algorithm. Using past experiences to help solve new problems.</p> <p>Writing increasingly complex algorithms for a purpose.</p> <p>Analysing the effectiveness of prompts and refine them for improved AI outputs.</p>
<p>Programming</p>	<p>Using logical thinking to explore more complex software; predicting, testing and explaining what it does.</p> <p>Incorporating loops to make code more efficient. Continuing existing code.</p> <p>Making reasonable suggestions for how to debug their own and others' code.</p>	<p>Creating algorithms for a specific purpose.</p> <p>Coding a simple game. Using abstraction and pattern recognition to modify code.</p> <p>Incorporating variables to make code more efficient.</p>	<p>Programming an animation. Iterating and developing their programming as they work.</p> <p>Confidently using loops in their programming.</p> <p>Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.</p> <p>Writing code to create a desired effect. Using a range of programming commands.</p> <p>Using repetition within a program. Amending code within a live scenario.</p>	<p>Understanding how search engines work.</p>



Information Technology

Key Area	Year 3	Year 4	Year 5	Year 6
Using Software	<p>Taking photographs and recording video to tell a story.</p> <p>Using software to edit and enhance their video adding music, sounds and text on screen with transitions.</p>	<p>Building a web page and creating content for it.</p> <p>Designing and creating a webpage for a given purpose.</p> <p>Use online software for documents, presentations, forms and spreadsheets.</p> <p>Using software to work collaboratively with others.</p>	<p>Using logical thinking to explore software more independently, making predictions based on their previous experience. Using software programme Sonic Pi/Scratch to create music.</p> <p>Using the video editing software to animate. Identify ways to improve and edit programs, videos, images etc.</p> <p>Independently learning how to use 3D design software package TinkerCAD.</p>	<p>Using logical thinking to explore software independently, iterating ideas and testing continuously.</p> <p>Using search and word processing skills to create a presentation.</p> <p>Planning, recording and editing an audio recording.</p> <p>Creating and editing sound recordings for a specific purpose.</p> <p>Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions.</p> <p>Using design software TinkerCAD to design a product.</p> <p>Creating a website with embedded links and multiple pages. Using text-based and image-based AI tools to generate content.</p>
Using email and internet searches	<p>Learning to log in and out of an email account.</p> <p>Writing an email including a subject, 'to' and 'from.'</p> <p>Sending an email with an attachment. Replying to an email.</p>	<p>Understanding why some results come before others when searching.</p> <p>Using keywords to effectively search for information on the internet.</p> <p>Understanding that information found by searching the internet is not all grounded in fact.</p> <p>Searching the internet for data.</p>	<p>Developing searching skills to help find relevant information on the internet.</p> <p>Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns.</p>	



Using data	<p>Understanding the vocabulary to do with databases: field, record, data.</p> <p>Learning about the pros and cons of digital versus paper databases.</p> <p>Sorting and filtering databases to easily retrieve information.</p> <p>Creating and interpreting charts and graphs to understand data.</p>	<p>Understanding that data is used to forecast weather.</p> <p>Recording data in a spreadsheet independently.</p> <p>Sorting data in a spreadsheet to compare using the 'sort by...' option.</p> <p>Designing a device which gathers and records sensor data</p>	<p>Understanding how data is collected in remote or dangerous places.</p> <p>Understanding how data might be used to tell us about a location.</p>	<p>Understanding how barcodes, QR codes and RFID work.</p> <p>Gathering and analysing data in real time.</p> <p>Creating formulas and sorting data within spreadsheets.</p>
Wider use of technology	<p>Understanding the purpose of emails.</p> <p>Recognising how social media platforms are used to interact.</p>	<p>Understanding that software can be used collaboratively online to work as a team.</p>	<p>Learn about different forms of communication that have developed with the use of technology.</p>	<p>Learning about the Internet of Things and how it has led to 'big data'</p> <p>Learning how 'big data' can be used to solve a problem or improve efficiency.</p>



Digital Literacy

Key Area	Year 3	Year 4	Year 5	Year 6
	<p>Recognising that different information is shared online including facts, beliefs and opinions.</p> <p>Learning how to identify reliable information when searching online. Learning how to stay safe on social media.</p> <p>Considering the impact technology can have on mood.</p> <p>Learning about cyberbullying. Learning that not all emails are genuine, recognising when an email might be fake and what to do about it</p>	<p>Recognising that information on the internet might not be true or correct and that some sources are more trustworthy than others.</p> <p>Learning to make judgements about the accuracy of online searches.</p> <p>Identifying forms of advertising online.</p> <p>Recognising what appropriate behaviour is when collaborating with others online.</p> <p>Reflecting on the positives and negatives of time spent online.</p> <p>Identifying respectful and disrespectful online behaviour.</p>	<p>Identifying possible dangers online and learning how to stay safe.</p> <p>Evaluating the pros and cons of online communication.</p> <p>Recognising that information on the internet might not be true or correct and learning ways of checking validity.</p> <p>Learning what to do if they experience bullying online.</p> <p>Learning to use an online community safely</p>	<p>Learning about the positive and negative impacts of sharing online. Learning strategies to create a positive online reputation.</p> <p>Understanding the importance of secure passwords and how to create them.</p> <p>Learning strategies to capture evidence of online bullying in order to seek help.</p> <p>Using search engines safely and effectively.</p> <p>Recognising that updated software can help to prevent data corruption and hacking.</p> <p>Exploring ethical considerations around AI use and its impact on society.</p>



Computing Systems and Networks

Key Area	Year 3	Year 4	Year 5	Year 6
	<p>To know what a tablet is and how it is different from a laptop/desktop computer.</p> <p>To know the components that make up a network (Wireless access point/WAP, Network switch, Router, Server and devices).</p> <p>To know that a server is central to a network and responds to requests made.</p> <p>To know that the internet connects all the networks around the world. To know that a router connects us to the internet.</p> <p>To know what a packet is and why it is important for website data transfer. To know the roles that inputs and outputs play on computers.</p> <p>To understand that email stands for 'electronic mail.' To know that an attachment is an extra file added to an email.</p> <p>To understand that emails should contain appropriate and respectful content.</p> <p>To know what some of the different components inside a computer are e.g. CPU, RAM, hard drive, and how they work together.</p>	<p>To understand that software can be used collaboratively online to work as a team.</p> <p>To know what type of comments and suggestions on a collaborative document can be helpful.</p> <p>To know that you can use images, text, transitions and animation in presentation slides.</p>	<p>To know how search engines work.</p> <p>To understand that anyone can create a website and therefore we should take steps to check the validity of websites.</p> <p>To know that web crawlers are computer programs that crawl through the internet.</p> <p>To understand what copyright is.</p> <p>To know the difference between ROM and RAM.</p>	<p>To understand the importance of having a secure password and what "brute force hacking" is.</p> <p>To know that the first computers were created at Bletchley Park to crack the Enigma code to help the war effort in World War 2.</p> <p>To know about some of the historical figures that contributed to technological advances in computing.</p> <p>To understand what techniques are required to create a presentation using appropriate software.</p> <p>To know that AI is artificial intelligence and is used in everyday life.</p> <p>To know that AI is trained on data to recognise patterns and generate outputs.</p> <p>To know that AI can be used to generate written content.</p> <p>To know that AI can be used to create visual content like pictures.</p> <p>To know that AI can help generate basic HTML code to create the structure and layout of a website.</p> <p>To know that there are ethical issues surrounding AI, including data privacy, bias and responsible use</p>



Programming

Key Area	Year 3	Year 4	Year 5	Year 6
	<p>To know that Scratch is a programming language and some of its basic functions.</p> <p>To understand how to use loops to improve programming.</p> <p>To understand how decomposition is used in programming. To understand that you can remix and adapt existing code.</p>	<p>To understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch.</p> <p>To know what a conditional statement is in programming.</p> <p>To understand that variables can help you to create a quiz on Scratch.</p> <p>To know that combining computational thinking skills (sequence, abstraction, decomposition etc) can help you to solve a problem.</p> <p>To understand that pattern recognition means identifying patterns to help them work out how the code works.</p> <p>To understand that algorithms can be used for a number of purposes e.g. animation, games design etc.</p>	<p>To know that a soundtrack is music for a film/video and that one way of composing these is on programming software.</p> <p>To understand that using loops can make the process of writing music simpler and more effective.</p> <p>To know how to adapt their code while performing their music.</p> <p>To know that a Micro-bit is a programmable device.</p> <p>To know that Micro-bit uses a block coding language similar to Scratch.</p> <p>To understand and recognise coding structures including variables.</p> <p>To know what techniques to use to create a program for a specific purpose (including decomposition).</p>	<p>To know that there are text-based programming languages such as Logo and Python.</p> <p>To know that nested loops are loops inside of loops.</p> <p>To understand the use of random numbers and remix Python code.</p>

Creating Media

Key Area	Year 3	Year 4	Year 5	Year 6
	<p>To know that different types of camera shots can make my photos or videos look more effective.</p> <p>To know that I can edit photos and videos using film editing software.</p> <p>To understand that I can add transitions and text to my video</p>	<p>To know some of the features of web design software.</p> <p>To know that a website is a collection of pages that are all connected.</p> <p>To know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks.</p> <p>To know that websites should be informative and interactive.</p>	<p>To understand that stop motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph.</p> <p>To know that decomposition of an idea is important when creating stop-motion animations.</p> <p>To know that editing is an important feature of making and improving a stop motion animation.</p>	<p>To know that sound clips can be recorded using sound recording software and that sound clips can be edited and trimmed.</p>



Data Handling

Key Area	Year 3	Year 4	Year 5	Year 6
	<p>To know that a database is a collection of data stored in a logical, structured and orderly manner.</p> <p>To know that computer databases can be useful for sorting and filtering data.</p> <p>To know that different visual representations of data can be made on a computer.</p>	<p>To know that computers can use different forms of input to sense the world around them so that they can record and respond to data.</p> <p>This is called 'sensor data'. To know that a weather machine is an automated machine that responds to sensor data.</p> <p>To understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.</p>	<p>To know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock.</p> <p>To know what numbers using binary code look like and be able to identify how messages can be sent in this format.</p> <p>To understand that RAM is Random Access Memory and acts as the computer's working memory.</p> <p>To know what simple operations can be used t</p>	<p>To know that data contained within barcodes and QR codes can be used by computers.</p> <p>To know that infrared waves are a way of transmitting data. To know that Radio Frequency Identification (RFID) is a more private way of transmitting data.</p> <p>To know that data is often encrypted so that even if it is stolen it is not useful to the thief.</p> <p>To know that data can become corrupted within a network but this is less likely to happen if it is sent in 'packets'.</p> <p>To know that devices or that are not updated are most vulnerable to hackers.</p> <p>To know the difference between mobile data and WiFi.</p>