

# Lea Community Primary School



## Progression of Knowledge- Computing



Academic year 2023-2024

## Progression of Knowledge at Lea Community Primary School - Computing

### Substantive Knowledge

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b><u>Vocabulary</u></b>	Icon, button, login, log out, menu	As EYFS and;  Search, tool bar, notification, device, data, pictogram, algorithm, code, debugging, sequence, program, execute, software, hardware	As Year One and;  Action, bug, command, input, output, internet, e-mail, table, network, search engine, sound effect, e-book, filter	As Year Two and;  Properties, nest, permission, verify, carbon copy, blind carbon copy, inbox, draft, binary tree, vlog	As Year Three and;  Code blocks, if statement, if/else statement, prompt, variable, cookies, malware, phishing, components, CPU, motherboard, RAM	As Year Four and;  Abstraction, string, concatenation, decomposition, copywrite, encrypt, formula, format cell, Computer Aided Design (CAD),	As Year Five and;  Simulation, x and y properties, QR code, sprite, ethernet, IP Address, binary, nibble, byte, kilobyte, megabyte, gigabyte, terabyte
<b><u>Coding</u></b>	Learn how to follow instructions during practical activities and games.  Develop an understanding of giving simple instructions.  Follow simple instructions.	To understand what instructions are and can predict what might happen when they are followed.	To understand what an algorithm is and can explain that it is a set of instructions and that algorithms follow a sequence.  To understand how to create a computer program using an algorithm.	To understand what a flowchart is and how flowcharts are used in computer programming.  To understand how to use a flowchart to create a computer program.  To understand how to create a range of programs using coding knowledge.	To begin to understand what selection is in computer programming.  To understand how to interpret an IF statement and therefore know how to create a program that includes an IF statement.	To begin to understand how to simplify code in order to make own programming more efficient.  To understand what decomposition and abstraction are in computer science.  To understand how to use decomposition to	To understand how to implement a game which includes timers and a score.  To understand what the launch command is.  To understand how to use multiple functions in own program.

	<p>Learn how to debug when things go wrong.</p> <p>Understand an algorithm is a set of instructions to carry out a task in a specific order.</p> <p>Learn the meaning of directional arrows and follow a simple set of instructions.</p> <p>Learn how to program a Bee-bot.</p> <p>Follow an algorithm as part of an unplugged game.</p>			<p>To understand how to run, test and debug their own programs.</p>	<p>To understand how an IF/ELSE statement works.</p> <p>To understand what a variable is in programming.</p> <p>To understand how to use variables within their programs.</p>	<p>make a plan of a real-life situation.</p> <p>To understand what a function is in coding and know how to use a function in own program to make it more efficient.</p> <p>To understand how to set and change variable values in code.</p> <p>To understand and use concatenation in own programs.</p>	<p>To understand how to arrange code in multiple tabs.</p> <p>To develop creativity when coding to generate novel effects.</p> <p>To understand how to attribute variables to user input.</p> <p>To understand the need to code for all possibilities when using user inputs.</p> <p>To understand how they can alter existing programs to reflect their own ideas</p>
<b><u>Online Safety</u></b>	<p>Engage with technology within the classroom.</p> <p>Show an interest in technology.</p> <p>Learn what a keyboard is and how to locate relevant keys.</p> <p>Begin to understand how to log in and out.</p>	<p>To know how to login safely</p> <p>To know how to navigate to a document area where saved work by child can be found.</p> <p>To know how to open, save and print work.</p>	<p>To know how searches can be refined when searching digitally and therefore attempts refining when searching.</p> <p>To know that digitally created work can be shared with others.</p> <p>To have knowledge and understanding</p>	<p>To understand what makes a safe password and how to keep it safe.</p> <p>To understand the main outcomes of not keeping passwords safe.</p> <p>To know that a blog can be used to help communicate with a wider audience.</p>	<p>To know that information put online leaves a digital footprint or trail and can expand on prior years' scope of this fact.</p> <p>To know some of the ways children can protect themselves from online identity theft.</p>	<p>To know in more detail from prior learning of the impact that sharing digital content can have.</p> <p>To know how to think critically about information they share online.</p> <p>To know responsibilities they have for themselves</p>	<p>To know the benefits and risks of mobile devices broadcasting the location of the user/device, e.g., apps accessing location.</p> <p>To know what secure sites are.</p> <p>To know that secure sites will have</p>

	<p>Learn what a mouse is and develop control using a mouse.</p> <p>Further develop mouse skills learning how to click and drag.</p> <p>Begin to understand aspects of how to stay safe online (read the story Penguinpig)</p> <p>Explore different hardware and develop vocabulary.</p> <p>Identify where technology is used in familiar places such as home, school.</p> <p>Operate a basic camera to take photos of independent play.</p> <p>Develop photography skills by taking photos during a walk.</p>	<p>To know the importance of logging out of an account.</p>	<p>about sharing more globally on the Internet.</p> <p>To know that email is a type of communication tool.</p> <p>To know that there is an appropriate way to communicate with others in an online situation.</p> <p>To know that information put online leaves a digital footprint.</p> <p>To know some steps that can be taken to keep personal data and hardware secure.</p>	<p>To know that some information held on websites may not be accurate or true.</p> <p>To begin to understand how to search the Internet and how to think critically about the results returned.</p> <p>To know why there are age restrictions on digital media and devices.</p> <p>To know where to turn to for help if they see inappropriate content or have inappropriate contact from others.</p>	<p>To know that information put online by users could be used for identity theft.</p> <p>To know the main risks and benefits of installing software and applications.</p> <p>To know that copying work of others and presenting it as their own is plagiarism and the consequences of that.</p> <p>To know appropriate behaviour when participating or contributing to collaborative online projects for learning.</p> <p>To know some of the main positive and negative influences technology has on health and the environment.</p> <p>To know the importance of balancing screen</p>	<p>and others regarding online behaviour.</p> <p>To know and have developed knowledge from prior years about maintaining secure passwords.</p> <p>To know about image manipulation using software and the advantages or disadvantages of this when shared online.</p> <p>To know what is meant by appropriate and inappropriate text, photographs and videos.</p> <p>To know about the impact of sharing media such as photographs and videos online.</p> <p>To know about the importance of citing content online from others and know how to do this.</p> <p>To know how to select keywords and</p>	<p>industry standard seals of approval.</p> <p>To build on knowledge of Digital Footprints. For example, know how and why people use their information.</p> <p>To build on knowledge of appropriate online behaviours and how this can protect themselves and others from possible online dangers. For example, the dangers of promoting inappropriate content online.</p> <p>To have greater knowledge of how to make more informed choices of how free time is used.</p> <p>To know the effects on individual health when having too much screen time.</p>
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					time with non-screen time.	search techniques to find relevant information to increase reliability.	
<b><u>Data and Data Handling</u></b>	<p>Sort and categorise objects.</p> <p>Learn branching databases through physical sorting and categorising.</p> <p>Learn how to interpret a basic pictogram.</p>	<p>To know that data can be represented in a picture format e.g. pictogram.</p> <p>To know how to contribute to a class pictogram.</p> <p>To know how to use a software, such as 2Count, to record results of an experiment into a pictogram format.</p> <p>To know what a spreadsheet program environment looks like including cells, rows and columns.</p> <p>To know how to enter data into spreadsheet cells.</p> <p>To know how to add images to cells.</p>	<p>To know how to use prior learning to perform composite task of creating a counting machine using software.</p> <p>To know how to copy, cut and paste in spreadsheet software.</p> <p>To know what totalling tools are and how to use them.</p> <p>To know how to use a spreadsheet to perform calculations for purpose.</p> <p>To know how to use some tools within a spreadsheet to support calculations.</p> <p>To know how to create a manual block graph within a spreadsheet from data.</p>	<p>To know how to create tables of data within a spreadsheet.</p> <p>To know how to use a spreadsheet program to automatically create charts and graphs from data.</p> <p>To know how to use various features within a spreadsheet to support solutions to calculations. For example, 'more than', 'less than', and 'equals'.</p> <p>To know how to describe a cell location in a spreadsheet.</p> <p>To know how to find specified locations in a spreadsheet.</p> <p>To know how to complete a branching database.</p>	<p>To know what cell formatting is.</p> <p>To know how to format cells as currency, percentage, decimal or fraction.</p> <p>To know how to use formula wizard tools.</p> <p>To know how to combine spreadsheet tools to create a purposeful spreadsheet e.g. a timed times table test.</p> <p>To know how to use a spreadsheet to model a real-life situation e.g. budget planner.</p> <p>To know how to add a formula to a cell in order to create automatic calculations.</p>	<p>To know how to use formulae within a spreadsheet to convert measurements of length and distance.</p> <p>To know how to use more advanced formulae effectively. For example, to use formulae to calculate area and perimeter of shapes.</p> <p>To know how to create formulae that use text variables.</p> <p>To know how to use tools within a spreadsheet and the count tool to answer hypotheses. For example, to answer hypotheses about common letters in use.</p> <p>To know how to search for information within a database.</p>	<p>To know how to create a spreadsheet to help answer a mathematical question relating to probability.</p> <p>To know how to take 'copy' and 'paste' shortcuts.</p> <p>To know how to problem solve during mathematical investigations when using spreadsheets by using tools such as the 'Count tool'.</p> <p>To know how to create a spreadsheet to produce computational models. For example, creating a spreadsheet that works out discounts and final price sales. Children will know how to use advanced formula to assist with this.</p>

			<p>To know that pictograms provide limited information.</p> <p>To know how to use yes/no questions to separate information.</p>	<p>To know how to edit and adapt a branching database.</p> <p>To know how to create a branching database including debugging it.</p> <p>To know how to enter data for a graph.</p> <p>To know how to select the most appropriate chart type for their data and explain reasoning.</p> <p>To know how to sort data in graphing software to enable easier analysis.</p>	<p>To know how to find information from a search results page.</p> <p>To know how to search effectively to find out information.</p> <p>To know how to identify if an information source is true and reliable.</p>	<p>To know the different ways to search for information in a database.</p> <p>To know how to add information into a shared database.</p> <p>To know how to create own database.</p> <p>To know how to create new records.</p> <p>To know what fields are and know how to correctly add information.</p> <p>To know how to phrase questions so they can be correctly answered using a search of database.</p>	<p>To know how to use a spreadsheet to help plan actions. For example, create a spreadsheet to plan how to spend pocket money and the effect of saving.</p> <p>To know that all data in a computer is saved in the computer memory in a binary format.</p> <p>To know that binary uses only the integers 0 and 1.</p> <p>To know that we can relate 0 as an 'off' switch and 1 to an 'on' switch.</p> <p>To know how to count up from 0 in binary using visual aids if required.</p> <p>To know that bits are related to computer storage.</p> <p>To know how to use the SUM function.</p> <p>To know how to manipulate the way data is presented.</p>
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							For example, flash fill, convert text to tables, splitting cells, sorting data.
<b><u>Creating Media</u></b>	Develop basic mouse skills such as moving and clicking (painting tool).	<p>To know what e-books are.</p> <p>To know of software that allows users to create interactive stories.</p> <p>To know how to add animation to an interactive story.</p> <p>To know how to add sound, including voice recordings and music to a story they have created using software.</p> <p>Beginning to know how to work on more complex digital stories, including adding backgrounds, copying and pasted pages.</p> <p>To know how to share digital stories with others.</p>	<p>To know the purpose and benefits of painting software tools.</p> <p>To know how to recreate Impressionism, surrealism and Pointillism using features within 2Paint a Picture.</p> <p>To know how to reproduce the style of William Morris by using repeating patterns, manipulating patterns and adding multiple effects in painting software such as 2Paint a picture.</p> <p>To know how to make forms of music, digitally, using age-appropriate software.</p> <p>To know how to edit and combine sounds.</p>	<p>To know what presentation is and how it can be used.</p> <p>To know how to add pages/slides, text and shapes to pages, and also format them.</p> <p>To know how to add media such as images, audio and videos.</p> <p>To know how to use effects and features such as animations and slide transitions.</p> <p>To know how timings can help when presenting and know how to include them in presentations.</p> <p>To know how to effectively present to an audience using presentation software.</p>	<p>To know the structure of the coding language of Logo.</p> <p>To know how to input simple instructions in Logo language environment.</p> <p>To know how to create letter shapes using Logo.</p> <p>To know what the repeat function in Logo is and its usefulness. Use it to create shapes such as squares.</p> <p>To know what procedures are and use this knowledge to build procedures in Logo.</p> <p>To know how animations are created by hand.</p> <p>To know how animations are created using computers.</p>	<p>To know what some of the main elements are that make a successful game.</p> <p>To know how to plan a playable game.</p> <p>To know how to incorporate media such as sound and images.</p> <p>To know how to manipulate media including adding animation.</p> <p>To know how to successfully evaluate games.</p> <p>To know what modelling software is and the skills of computer aided design.</p> <p>To know the effect of moving points when designing.</p> <p>To know how to design a 3D model</p>	<p>To know the purpose of writing a blog.</p> <p>To know the features of successful blog writing.</p> <p>To know how to plan and write a blog.</p> <p>To know that the way information is presented within a blog has an impact upon the audience.</p> <p>To know how to contribute to others' blogs.</p> <p>To know the importance of having an approval process when creating blog content or modifying it.</p> <p>To know how to convert a simple story with 2 or 3 levels of decision making into a logical design.</p>

			<p>To know how to refine composed music.</p> <p>To know how to upload/import and record sounds beyond the software environment.</p> <p>To know that digital content can be presented in many different forms e.g. stories.</p>		<p>To know what onion skinning is when referring to animation.</p> <p>To know that animations can be enhanced using features in software such as background and sounds.</p> <p>To know what 'stop motion' animation is.</p> <p>To know that computers can be used to create music compositions.</p> <p>To know how to apply knowledge of music to create own composition using software.</p>	<p>to fit certain criteria.</p> <p>To know how to refine and print a model.</p> <p>To know how to create a word processing document.</p> <p>To know how to alter the look of text and navigate around a document.</p> <p>To know how to alter page layout including heading and columns.</p> <p>To know how to add features to enhance look and usability within a document. For example: textboxes, hyperlinks, contents pages.</p>	<p>To know the difference between a map-based game and a sequential story-based game.</p> <p>To know how to use written plans to code a map-based adventure using 2Code.</p> <p>To know how to recall existing knowledge to support coding a map-based adventure game. For example, using functions, two-way selection (IF/ELSE statements) and repetition.</p>
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## Disciplinary Knowledge

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Computer Science</b>						
	<p>* 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.</p> <p>* Children can work out what is wrong with a simple algorithm when the steps are out of order, e.g. The Wrong Sandwich in Purple Mash and can write their own simple algorithm, e.g. Colouring in a Bird activity. Children know that an unexpected outcome is due to the code they have created and can make logical attempts to fix the code, e.g. Bubbles activity in 2Code.</p>	<p>* 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.</p> <p>* Children can create a simple program that achieves a specific purpose. They can also identify and correct some errors, e.g. Debug Challenges: Chimp. Children's program designs display a growing awareness of the need for logical, programmable steps.</p> <p>* Children can identify the parts of a program that respond to specific events and initiate</p>	<p>* 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.</p> <p>* Children demonstrate the ability to design and code a program that follows a simple sequence. They experiment with timers to achieve repetition effects in their programs. Children are beginning to understand the difference in the effect of using a timer</p>	<p>* 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.</p> <p>* 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. As well as</p>	<p>* 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.</p> <p>* 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,</p>	<p>* 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 test and debug their program as they go and use logical methods to identify the cause of bugs, demonstrating a systematic approach to try to identify a particular line of code causing a problem.</p> <p>* Children translate algorithms that include sequence, selection and repetition into code and their own designs show</p>

	<p>* 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, for example, interpret where the turtle in 2Go challenges will end up at the end of the program.</p>	<p>specific actions. For example, they can write a cause and effect sentence of what will happen in a program.</p>	<p>command rather than a repeat command when creating repetition effects.</p> <p>* 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. For example, repetition and use of timers. They make good attempts to 'step through' more complex code in order to identify errors in algorithms and can correct this. e.g. In programs such as Logo, they can 'read' programs with several steps and predict the outcome accurately.</p> <p>* Children can list a range of ways that the Internet can be used to provide different methods of communication. They can use some of these methods of communication, e.g. being able to open, respond to and attach files to emails using 2Email. They can</p>	<p>understanding how variables can be used to store information while a program is executing, they are able to use and manipulate the value of variables. Children can make use of user inputs and outputs such as 'print to screen'. e.g. 2Code.</p> <p>* 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. For example, 'IF' statements, repetition and variables. They can trace code and use step-through methods to identify errors in code and make logical attempts to correct this. In programs such as Logo, they can 'read' programs with several steps and predict the outcome accurately.</p> <p>* Children recognise the main component parts of hardware which allow computers to join and form a network. Their</p>	<p>selection and repetition with other coding structures to achieve their algorithm design.</p> <p>* When children code, they are beginning to think about their code structure in terms of the ability to debug and interpret the code later, e.g. the use of tabs to organise code and the naming of variables.</p> <p>* 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. Children can select the most appropriate form of online communications contingent on audience and digital content, e.g. 2Blog, 2Email, Display Boards.</p>	<p>that they are thinking of how to accomplish the set task in code utilising such structures, including nesting structures within each other. Coding displays an improving understanding of variables in coding, outputs such as sound and movement, inputs from the user of the program such as button clicks and the value of functions.</p> <p>* 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 whole.</p> <p>* 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.</p>
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			describe appropriate email conventions when communicating in this way.	ability to understand the online safety implications associated with the ways the internet can be used to provide different methods of communication is improving.		
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### Information Technology

	<p>* 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, use Purple Mash 2Quiz example (sorting shapes), 2Code design mode (manipulating backgrounds) or using pictogram software such as 2Count.</p>	<p>* Children demonstrate an ability to organise data using, for example, a database such as 2Investigate and can retrieve specific data for conducting simple searches. Children are able to edit more complex digital data such as music compositions within 2Sequence. 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.</p>	<p>* 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 such as Purple Mash search or internet-wide search engines.</p> <p>* Children can collect, analyse, evaluate and present data and information using a selection of software, e.g. using a branching database (2Question), using software such as 2Graph. Children can consider what software is most appropriate for a given task. They can create purposeful content to attach to emails, e.g. 2Respond.</p>	<p>* Children understand the function, features and layout of a search engine. They can appraise selected webpages for credibility and information at a basic level.</p> <p>* 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 such as 2Connect and 2Publish+. Children share digital content within their community, i.e. using Virtual Display Boards.</p>	<p>* 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.</p> <p>* Children are able to make appropriate improvements to digital solutions based on feedback received and can confidently comment on the success of the solution. e.g. creating their own program to meet a design brief using 2Code. They objectively review solutions from others. Children are able to collaboratively create content and solutions using digital features within software such as collaborative mode.</p>	<p>* 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.</p> <p>* 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, e.g. 2Blog. They are able to use criteria to evaluate the quality of digital</p>
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					They are able to use several ways of sharing digital content, i.e. 2Blog, Display Boards and 2Email.	solutions and are able to identify improvements, making some refinements.
<b>Digital Literacy</b>						
	<p>* 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 e.g. a microwave vs. a chair.</p> <p>* 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 such as their My Work folder on Purple Mash.</p>	<p>* 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, e.g. 2Publish example template. Children make links between technology they see around them, coding and multimedia work they do in school e.g. animations, interactive code and programs.</p> <p>* Children know the implications of inappropriate online searches. Children begin to understand how things are shared electronically such as posting work to the Purple Mash display board. They develop an understanding of using email safely by using 2Respond activities on</p>	<p>* 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 such as 2Email in Purple Mash. They know more than one way to report unacceptable content and contact.</p>	<p>* Children can explore key concepts relating to online safety using concept mapping such as 2Connect. They can help others to understand the importance of online safety. Children know a range of ways of reporting inappropriate content and contact.</p>	<p>* 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.</p>	<p>* 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, e.g. 2Respond activities. They recognise the value in preserving their privacy when online for their own and other people's safety.</p>

		Purple Mash and know ways of reporting inappropriate behaviours and content to a trusted adult.				
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