

Knowledge Progression document for Computing



Practical Knowledge

Practical Knowledge						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
HT1	<p>-identify the technology I use in my classroom and school e.g. computer, iPad, interactive board, Chromebook</p> <p>- name the main components of a computer (desktop/laptop) – it has a screen, a base unit, a keyboard and a mouse/trackpad</p> <p>-carry out the main operational functions on a computer e.g. log on and off, control the mouse/trackpad to click and drag</p>	<p>-technology can be found in shops and how it can be used. You should also know which devices can work together, for example:</p> <p>-Barcode scanner, till</p> <p>-Bank card, chip and PIN card reader, till</p> <p>-Traffic light, crossing button, crossing signal</p>	<p>-a network is made up of components (devices e.g. printers, computers, iPads) which are run by a server (a networked computer that shares and talks to other devices in the network), connected through a router (manages the flow of data between devices in a network).</p> <p>-a digital device has functions beyond simply turning off or on</p>	<p>-the world wide web is a service provided via the internet that allows access to web pages and other shared files</p> <p>-the internet is the global connection of many networks</p> <p>-a web page is a HTML document located on a website</p> <p>- a website is a collection of webpages designed around a theme, topic or workplace.</p> <p>-Just because information appears on the internet doesn't mean it is true – you need to check the reliability of the information first.</p>	<p>-IPO cycle of input, process and output is at the heart of all digital systems and exists all around us</p>	<p>Internet Protocol (IP) addresses - the set of rules governing the format of data sent via the internet or local network.</p> <p>Domain Name – refers to the web address and what it is e.g. www.bbc.com is the domain name for the bbc's website</p> <p>Domain Name Server (DNS) – the telephone book of the internet – matching searches to websites</p> <p>data packet – the way data is transferred over the internet. The header includes instructions about the data carried by the packet and the payload is the actual data carried by the packet.</p>
HT2	<p>- open a painting tool application</p> <p>-create digital dots, lines, brush colours and tools to create digital art in the style of an artist</p>	<p>-using photo editing applications</p> <p>-applying filters to photos to enhance/alter their appearance</p> <p>-save and download photo images onto a</p>	<p>-device capturing images needs to be stable</p> <p>-animation tool uses onion skinning to review subject positioning</p> <p>-small movements of captured subjects are</p>	<p>-to create a podcast you need to record, edit and share vocal recordings using the programme Audacity.</p>	<p>-A storyboard is used as a planning tool.</p> <p>-A video is edited and checked prior to download or sharing of content for others to see the final version – this is usually in an mp4 format</p>	<p>-'copyright' – ownership of content that forbids others to copy, distribute and sell the content without legal consent</p>

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		device from an application	essential for a smooth animation transition		which is commonly support across a wide range of output devices.	-‘fair use’ – conditions when copyrighted content can be used -a web browser is program used to view, navigate, and interact with web pages -a web page is a HTML document located on a website - a website is a collection of webpages designed around a theme, topic, or workplace. -when visiting websites, you leave a ‘breadcrumb trail’ or digital footprint that companies or individuals can analyse -‘navigation’ - the way you interact with and search the internet
HT3	Children know the key programming terms: Command – A single instruction that can be used in a program to control a computer Program - A set of ordered commands that can be run by a computer to complete a task	-give a sequence of commands to create a program that causes an output on a device	-blocks of code can command a sprite to move -sequence of command blocks produce a desired sequence of movements of your sprite	-Repeating a command or action is placed into a ‘loop’ which can be indefinite or finite – this is called a ‘count-controlled loop e.g. it loops for a certain amount of time. -call procedures are create to name a collection of programmed instructions – this is used	-a condition can only be true or false -count-controlled loop contains a condition -condition-controlled loop will stop when a condition is met -selection can be used to branch the flow of a program	-Variable - A named piece of data (often a number or text) stored in a computer’s memory, which can be accessed and changed by a computer program

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	<p>Debug - The process of finding and correcting errors in a program</p> <p>Algorithm - A precise set of ordered steps that can be followed by a human or a computer to achieve a task</p>			<p>to speed up the process or creating a shape</p>		
<p>HT4</p>	<p>-name objects and their properties and then put them in groups</p> <p>-we can use devices to input data</p>	<p>-present data in a range of forms e.g. tally chart, pictograms.</p>	<p>- A branching database is a collection of data organised in a tree structure using yes/no or true/false questions. In computer science, these are known as binary trees.</p>	<p>-attribute-A word or a phrase that can be used to describe an object such as its colour, size, or price</p> <p>-input devices allow data to be entered into a computer. Keyboards, mice, and microphones are all input devices.</p> <p>-A sensor is a type of input designed to allow computers to capture data from the physical environment. Sensors can be connected to a computer to capture data about temperature, light, sound, humidity, pressure, etc. A microphone can be used to record audio into a computer, or it can be used as a sound sensor.</p> <p>-data loggers capture data at given time intervals. The interval is</p>	<p>-Flat-file database is a collection of data organised in a single table.</p> <p>- Databases allow people to search and sort large quantities of data to find information.</p> <p>- Data can be letters, words, numbers, dates, images, sounds, etc.</p> <p>- 'grouping' and 'sorting' data records based on different fields. For example, grouping objects by colour, or sorting into alphabetical order.</p> <p>-An attribute includes its 'name' and a 'value'. For example, a ball will have a 'colour', which might be 'red'. 'Colour' is the attribute 'name'; 'red' is the attribute 'value'. In a flat-file database the attribute names become</p>	<p>- data can be words, numbers, dates, images, sounds Just as words need to be in a sentence to give them meaning, data items need to be part of a structure. For example, the number 6 isn't data unless it's part of a larger structure, such as included in a spreadsheet with data headings.</p> <p>-spreadsheets organise data in columns and rows. Organising data is an important aspect of data and information. It supports the use of calculations and provides the opportunity to use sorting and filtering, which enables ease of use and reduces human error.</p> <p>-Spreadsheets enable number formats to alter</p>

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				a regular time period between each data capture and can vary according to the experiment. For example, if data is being logged for a week, the interval might be every hour.	the fields when the data about the object is stored as a record. The values of the attributes become the values that are saved in the database fields.	cells. It is important to understand that this type of formatting changes how a spreadsheet interacts with the data and is different to applying style formatting (bold, italics, etc.), which only changes the appearance of data.
HT5	<p>-keys on a keyboard are used to input information on a device</p> <p>-the mouse/trackpad can position the cursor to a desired location on the screen ready for information to be typed</p>	<p>-you can alter the way music sounds on a computer by changing the rhythm, pitch or tempo.</p>	<p>-learners need to have the knowledge to: input and edit text and images, add templates, change font and text styles</p> <p>- a placeholder allocates space in document for you to insert content (text, image or media)</p>	<p>-pupils will know that cloning, editing, cropping, retouching or rotating an image will all impact the final remastered digital version of an image.</p>	<p>-drawing tool apps include shape and line drawing tools, fill, undo and redo, select, and delete. They can move, resize, and rotate shapes, including the use of size and alignment guides. Many of these tools are available in presentation software such as Google Slides and Microsoft PowerPoint.</p>	<p>-CAD stands for computer aided design. Planning objects using a 3D model on a graphics piece of digital software.</p> <p>-on 3D modelling software shapes can be:</p> <ul style="list-style-type: none"> ● viewed in 3 dimensions (width, length and height) ● duplicated, resized, and moved (including lifting and lowering) ● Rotated ● Combined ● Grouped and ungrouped as objects
HT6	<p>-sprites are objects that can be programmed within an application</p> <p>-a series of commands becomes an algorithm to program a sprite</p>	<p>-changing blocks of code alters the ordering of a sequence and produces a new output</p>	<p>-This unit focuses on the links between 'events' and 'actions' in programming, while also developing learners' understanding of sequencing. It highlights</p>	<p>-Count controlled loop – series of programmed commands in a time defined loop</p> <p>-Infinite loops - are a series of programmed</p>	<p>If... Then... Else structure – a two way selection control structure. 'If' conditions are met then do this, if not then do the 'else' condition e.g. if expression is true</p>	<p>-A condition - a statement that can be either True or False</p> <p>If... Then... Else structure – a two way selection control structure. 'If' conditions are met then</p>

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			that events cause actions, and that the order of those actions can have an impact on the outcome of a program.	instructions which continually repeat.	then do this else because it is false do this	do this, if not then do the 'else' condition e.g. if expression is true then do this else because it is false do this
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Theoretical Knowledge						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
HT1	-Technology is something that has been made for a specific purpose e.g. computer -We follow rules that keep us safe when using technology	-Information technology (IT) can be described as being a computer or something that has been made to work with computers. Examples could include: Computers: PCs, laptops, tablets Devices made to work with computers: scanners, barcode scanners, printers., smart speakers	-IPO cycle refers to <u>input (a thing)</u> , <u>process (an action)</u> and <u>output (an impact)</u> e.g. dirty clothes (input) are cleaned (processed) and become clean (output) – keyboard is used to type (input), computer accepts the movement of the individual leys (process) and words appear in a document (output). -connections between devices in a network produce an output (something is created)	-data packets are used to transport information from a webpage to a device in the quickest way possible -data on a webpage is too large to be sent in one 'data packet' so the data is divided into small chunks of data and delivered to the device in the quickest way possible.	-Indexing is the process by which search engines organise information before a search to enable super-fast responses to queries -personal data can be used to predict desired search responses which can narrow the variety of information a consumer receives, hence creating an echo chamber	-huge quantities of data can be transferred from a hub thousands of miles away from the receiving device in nano seconds
HT2	-art influences how we use technology	-images can be alters and filtered in such a way that means they no longer represent the	- Stop motion animation is a filmmaking technique in which objects are physically	-podcasts are used to share information about a given topic in an entertaining and	-Video is the recording, reproducing, or broadcasting of moving visual images.	-Workflow systems allow multiple individuals, not necessarily in the same

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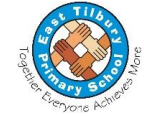
		original image being captured -understand that when we upload or share images we are leaving behind a traceable digital photoprint that others can follow	moved in small increments and captured one frame at a time so that when played back, it will give the illusion of motion.	interesting way using the medium of audio recordings shared online.		space, to simultaneously work on a document or project
HT3	- When programming, there are four levels that can help describe a project, known as 'levels of abstraction'. Research suggests that this structure can support learners in understanding how to create a program and how it works: Task — what is needed Design — what it should do Code — how it is done Running the code — what it does	-following and then predicting the outcomes of a sequence of commands -'decomposition' is understood in terms of breaking down a task into chunks and create algorithms for each chunk in turn	-When programming, there are four levels which can help describe a project (known as levels of abstraction). Research suggests that this structure can support learners in understanding how to create a program and how it works: <ul style="list-style-type: none"> • Task - what is needed • Design - what it should do • Code - how it is done • Running the code - what it does 	-tools are required to speed up the coding process – loops and call procedures act to avoid continuous use of coding script.	-selection - Part of a program where if a condition is met, then a set of commands is run	-When programming, there are four levels that help to describe the stages of a project, known as levels of abstraction. Research suggests that this structure can support learners in understanding how to create a program and how it works. <ul style="list-style-type: none"> • Task — this is what is needed • Design — this is what it should do • Code — this is how it is done • Running the code — this is what it does
HT4	-the term 'object' is used to describe anything that can be labelled with properties, e.g. animals, pencils, or trees. A label is a property used to describe an object, e.g.	-data relates to a letter, word, number etc. that has been collected for a purpose, but stored without context, whereas an attribute is word or a phrase that	- be familiar with the term 'attributes'. An attribute includes its name and a value. For example, a ball will have a colour, which might be red. 'Colour' is the	-A data logger is a digital device that can collect data over time and store it. Data loggers designed for education will usually have built-in sensors for	-A database is composed of 'records', which are sets of data on a particular object. Records are formed from one or more 'fields' of data. A field is one	-Understanding that a data set is a collection of related data that can be modified using a computer

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	<p>'green'. This is the data that is collected about the object.</p>	<p>can be used to describe an object such as its colour, size, or price</p>	<p>attribute name, and 'red' is the attribute value. Learners may be familiar with the term 'property' introduced in Year 1 – 'Grouping data'. The terms 'property' and 'attribute' are interchangeable; however, 'property' has been used in resources designed for younger children to make them more accessible.</p>	<p>light, temperature, and sound, as well as the option to connect external sensors.</p>	<p>specific piece of data in a database record. For example, a record all about a country could have fields such as 'country name' and 'country population'. The value within the record is the 'answer' to each field, e.g. Mexico is the value in the 'country name' field and '126.2 million' is the value in the 'country population' field.</p>	
HT5	<p>-the term input relates to information delivered from a person to a digital device</p>	<p>-Digital studios have developed on digital devices meaning they can store thousands of hours of recorded music and be used to supplement music through adding pre-recorded instruments, which can be changed through tempo, rhythm, volume and pitch.</p>	<p>-information delivery to people needs to be presented in creative and interesting ways to grab the attention of the intended audience or deliver you intended message in the most interesting way</p>	<p>- Copyright law protects the rights of the individual or company who first produce a digital image, any alterations to images should seek the approval of the original owner of the image. Abuse of copyright law can lead to fines and or prison in extreme cases.</p>	<p>-vector drawings are created using shapes and lines. In vector drawings, all these shapes and lines are called objects. Within vector drawings, each object is created using a new layer. These can be rearranged using the menu tool, which allows the objects to be sent backwards and forwards (one at a time) or sent to the back or front. Objects within these programs can be grouped, which enables the objects to be treated as though they are a</p>	<p>-the design of innovative products requires collaboration, multiple attempts and efficient tools. CAD provides a digital solution that meets these requirements.</p>

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					single object. It is important to recognise that although they act as though they are a single object, grouped objects are still a number of individual objects.	
HT6	-devices will only produce the output they have been programmed to run- they are not intelligent	-This unit focuses on developing learners' understanding of computer programming. It highlights that algorithms are a set of clear, precise, and ordered instructions, and that a computer program is the implementation of an algorithm on a digital device. The unit also introduces reading 'code' to predict what a program will do. Learners will engage in aspects of program design, including outlining the project task and creating algorithms.	-When programming, there are four levels that help to describe the stages of a project, known as levels of abstraction. Research suggests that this structure can support learners in understanding how to create a program and how it works. <ul style="list-style-type: none"> ● Task — this is what is needed ● Design — this is what it should do ● Code — this is how it is done ● Running the code — this is what it does 	-Programmed commands in a loop provide more efficient ways to code for a desired impact -it reduces the required block codes in scratch and saves time in the long run.	-selection - Part of a program where if a condition is met, then a set of commands is run	-When programming, there are four levels that help to describe the stages of a project, known as levels of abstraction. Research suggests that this structure can support learners in understanding how to create a program and how it works. <ul style="list-style-type: none"> ● Task — this is what is needed ● Design — this is what it should do ● Code — this is how it is done ● Running the code — this is what it does -selection - Part of a program where if a condition is met, then a set of commands is run



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Disciplinary Knowledge						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
HT1	- Technology speeds up day to day tasks and helps us communicate with other people quickly -We make choices about how we use technology	-devices are designed to work in connection (a network) with each other, with a computer at the heart of that connection.	-devices in a network are connected with one another and produce an IPO cycle	-to view a webpage requires data flowing across hub sites through packets of data sometimes from thousands of miles away from the device viewing the webpage.	-users need to use fast search engines to speed up processes but must be aware that search engines have limits and that companies can pay for their results to appear higher on a search result.	-data transferred over the internet follows physical rules like mail -location markers, size of the data and laws govern data transfer just like they would in the physical world for letters.
HT2	-art can be created using digital media	-digital photographs can be stored, edited and shared using a device	-animations are a series of still images stitched together to create a motion video	-a podcast needs to inform, entertain and interest the given audience.	-the skills associated with video production and editing have wide ranging usage across all workplace areas.	-Collaborative working allows for efficient and effective creation of documents and media
HT3	-devices respond to simple and complex programmed instructions	- algorithms are a set of clear, precise, and ordered instructions, and that a computer program is the implementation of an algorithm on a digital device. By reading 'code' you can predict what a program will do.	-programming involves designing and evaluating a sequence of commands to produce a given outcome	-pupils generate algorithms - a precise set of ordered instructions, which can be turned into code	-The programmer is responsible for the accuracy of their selection and effect it then has on an output device	-variables are a feature of programming required to carry out simple and complex coding
HT4	-information or data can be stored, classified and compared.	-digital devices enable us to display large quantities of data in a variety of formats	-data can be organised into subsets and groups	-answers to hypothesis or more questions can be generated from the data drawn from a data logger.	-The term 'database' means 'a collection of organised data that is stored on a computer'.	-spreadsheets enable fast and efficient interaction of large quantities of data that can be analysed for a given purpose
HT5	-inputs on a device can be shared and worked on with others-digital writing is created in a word processing application e.g. Microsoft word	-digital recording applications store digital sound recordings of a wide range of instruments	-Digital publishing companies use publishing software in their day-to-day business	-changing digital images has copyright implications	-digital images can be made using shapes and lines in a vector drawing or using pixels in a freehand paint program.	-Digital software provides an effective way to log, adapt and store ideas
HT6	-programming language becomes more complex	-debugging a program enables an individual to	-The output in programming is	-Programming software uses different languages –	-If, then, else structure is used across range of	-If, then, else structure is used across range of

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	but the starting point is block coding e.g. scratch application	correct errors and re-design for improvements.	dependent on the events and actions set by the programmer (the pupil)	scratch uses a block coding approach.	programming languages beginning to develop complexity.	programming languages to develop complexity.
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