

Computing Progression Document

	Foundation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
E-safety	<p>The child can understand what to do if they see disturbing content online at home or at school.</p> <p>The child should know to close the laptop lid or turn the tablet over if they find content, such as inappropriate images, which might disturb them or other children. They should know to tell their teacher or their parents if this happens.</p>	<p>The child can keep themselves safe while using digital technology.</p> <p>The child can understand that they need to keep safe when using digital technology. E.g. They should know to use filtered SafeSearch when looking for images on the web and that they should close the lid of a laptop (or similar action) if they find inappropriate images.</p>	<p>The child can keep safe and show respect to others while using digital technology.</p> <p>The child should know that they need to keep themselves safe when using digital technology. E.g. They should know to use filtered SafeSearch when looking for images on the web and that they should close the lid of a laptop (or similar action) if they find inappropriate images. They should know to respect others' rights, including privacy and intellectual property when using computers, so should not look at someone else's work or copy it without permission and acknowledgement. They should</p>	<p>The child can use digital technology safely and show respect for others when working online.</p> <p>The child should know that they need to keep themselves safe when using digital technology. E.g. They should show respect for others when filming and should not normally post videos online. They should take care when using the Command prompt and should treat links and attachments in emails with caution. If responding to online surveys, they should do so anonymously, thinking carefully about information they give out.</p>	<p>The child can demonstrate that they can act responsibly when using computers.</p> <p>The child can act responsibly when using computers. E.g. They should act responsibly when developing computer games or prototype products. They should behave responsibly when using sampled music or creating a composition. They should show responsibility when creating or remixing online content, including observing copyright and any terms and conditions. They should contribute positively to a</p>	<p>The child can demonstrate that they can act responsibly when using the internet.</p> <p>The child can act responsibly when using the internet. E.g. They should act responsibly when participating in an online community, such as the Scratch community, if permitted to do so. They should demonstrate that they understand the importance of encrypted (HTTPS) connections when browsing the web and of using strong passwords to protect their identity online. They should act responsibly when creating, editing or</p>	<p>The child can show that they can think through the consequences of their actions when using digital technology.</p> <p>The child can discuss likely and potential consequences of their actions when using digital technology in a range of contexts. Contexts might include developing smartphone apps; using online project management tools; collecting information for market research; posting original content online.</p>

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			observe age restrictions on computer games.		shared wiki.	commenting on web pages or blog posts.	
	<p>The child can keep themselves safe while using digital technology.</p> <p>The child can understand that they need to keep safe when using digital technology. E.g. They should know to use filtered SafeSearch when looking for images on the web and that they should close the lid of a laptop (or similar action) if they find inappropriate images.</p>	<p>The child can understand that information on the internet can be seen by others.</p> <p>The child should be aware that information stored on the web or transmitted via the internet is available to other people. E.g. They should know that the images they find online can be found by others too, and that the queries they type in can be seen by those who run the search engine they use and the school's network.</p>	<p>The child can understand that they should not share personal information online.</p> <p>The child should understand that personal information should be kept private: it should not be posted online to a public audience and should only be shared privately with those who they (or their parents) would trust. E.g. The child should recognise that photos they take in school should not normally be posted to the open web. They should know that photos taken with smartphones often contain hidden information about where the photo was taken.</p>	<p>The child can recognise unacceptable behaviour when using digital technology.</p> <p>The child can identify what would be unacceptable or inappropriate behaviour when using digital technology in a range of contexts. E.g. They should know what would be unacceptable when using online communities, such as the Scratch website, or when shooting or publishing video. They should know what would be unacceptable use of the Command prompt, email or online survey tools.</p>	<p>The child can understand the difference between acceptable and unacceptable behaviours when using digital technology.</p> <p>The child can discuss the difference between acceptable and unacceptable behaviours when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; the use of others' original content, such as music samples or web pages; wikis, including Wikipedia.</p>	<p>The child can discuss the consequences of particular behaviours when using digital technology.</p> <p>The child can discuss the likely or possible consequences of particular behaviours when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; using cryptography and passwords; creating websites or writing blog posts.</p>	<p>The child can identify principles underpinning acceptable use of digital technologies.</p> <p>The child can identify some principles underpinning acceptable behaviour when using technologies in a range of contexts. Contexts could include smartphone or tablet use; the use of online project management tools; online surveys and recording of interviews; creating and sharing digital content.</p>

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		<p>The child can understand what to do if they see disturbing content online at home or at school.</p> <p>The child should know to close the laptop lid or turn the tablet over if they find content, such as inappropriate images, which might disturb them or other children. They should know to tell their teacher or their parents if this happens.</p>	<p>The child can understand what to do if they have concerns about content or contact online.</p> <p>The child should know to close the laptop lid or turn the tablet over if they find content, such as inappropriate images, which might disturb them or other children; if someone they don't trust contacts them online; if someone makes inappropriate contact online. They should know to tell their teacher or their parents if this happens, and be aware that they could talk to another trusted adult or to ChildLine about this.</p>	<p>Know who to talk to about concerns and inappropriate behaviour in school.</p> <p>Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the network manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school.</p>	<p>Know who to talk to about concerns and inappropriate behaviour at home or in school.</p> <p>Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the network manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school. They should also know that any concerns over, or inappropriate behaviour with, digital technology at home can be discussed with their parents, with you or with another trusted adult.</p>	<p>Know how to report concerns and inappropriate behaviour in a range of contexts.</p> <p>Pupils should know how to report inappropriate behaviour when using technology in school: preferably this will be to their teacher, the network manager or another trusted adult. They should know how to report any concerns over inappropriate behaviour with digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report</p>	<p>Know a range of ways to report concerns and inappropriate behaviour in a variety of contexts.</p> <p>Pupils should know how to report inappropriate behaviour when using technology in school: preferably this will be to their teacher, the network manager or another trusted adult. They should know how to report any concerns over, or inappropriate behaviour with, digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report</p>
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						<p>inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or to the police.</p>	<p>inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or the police. Pupils should know that illegal content or activities can be reported to CEOP or the police.</p>
				<p>The child can decide whether a web page is relevant for a given purpose or question.</p> <p>The child can form a judgement about whether a web page is appropriate for finding out the answer to a question they have or for a given purpose.</p>	<p>The child can decide whether digital content is relevant for a given purpose or question.</p> <p>The child can form a judgement about whether a web page, such as a Wikipedia article, or other digital content is appropriate for finding out the answer to a question they have or for a given purpose.</p>	<p>The child can decide whether digital content is reliable and unbiased.</p> <p>The child can discuss whether particular content (such as a web page, other children's pages or blog posts) is reliable and whether it has been written from a neutral point of view. They should be able to spot some examples of bias in digital</p>	<p>The child can form an opinion about the effectiveness of digital content.</p> <p>Taking into account the intended audience and purpose of the content, the child can form a judgement as to, and provide reasons for, the extent to which they consider digital content to be effective. The content might be an app, media</p>

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						content.	resources or marketing materials.
				<p>The child can use email and videoconferencing in class.</p> <p>When working as part of the class, the child can use email effectively and participate in a whole-class videoconference.</p>	<p>The child can work collaboratively with classmates on a shared wiki.</p> <p>The child can work collaboratively with their peers on a shared project, such as a class wiki, making useful contributions and providing feedback to others.</p>	<p>The child can work collaboratively with classmates on a class website or blog.</p> <p>The child can work productively and positively with others when developing a shared website or contributing to a class blog.</p>	<p>The child can use online tools to plan and carry out a collaborative project.</p> <p>The child can make use of an online tool to plan and carry out a collaborative project (such as developing an app).</p>

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Using IT beyond school	<p>The child can show an awareness of how IT is used for communication beyond school.</p> <p>The child can mention some of the ways in which IT is used to communicate beyond school. E.g. They might know that some people use social media such as Facebook, email, video calls or online greetings to say happy birthday to their friends.</p>	<p>The child can show an awareness of how IT is used for communication beyond school.</p> <p>The child can mention some of the ways in which IT is used to communicate beyond school. E.g. They might know that some people use social media such as Facebook, email, video calls or online greetings to say happy birthday to their friends.</p>	<p>The child can show an awareness of how IT is used for a range of purposes beyond school.</p> <p>The child can name a number of purposes for which IT is used beyond school. The child might know that adults can share work and discuss ideas in online communities; that photos can be taken, edited and shared easily using digital technology; that the web is made up of information shared by people and organisations; that people use email for a range of purposes and in a variety of contexts; that scientists use computers when</p>				

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			collecting and analysing data .				
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Creating content	<p>The child can interact and explore their environment using a range of multimedia equipment, including digital cameras, video cameras, microscopes etc. This could also include the use of tablets e.g. iPad to capture still and moving images. Collect information, e.g., by taking photographs or collecting objects.</p>	<p>The child can use digital technology to store and retrieve content.</p> <p>The child can use a range of digital technologies to store and access digital content. These might include laptop computers, tablets, smartphones, digital cameras, video cameras and audio recorders. Projects might include videoing one another cooking, developing an e-book or an audio book, creating a greetings card.</p>	<p>The child can store, organise and retrieve content on digital devices for a given purpose.</p> <p>With a given purpose, the child can use a range of digital technologies to retrieve, organise and store digital content. Technologies will typically include laptop computers, tablets and smartphones with access to the internet, but the child might also be expected to use digital cameras, video cameras and audio recorders (or the equivalent apps on a tablet or smartphone). Projects might include digital</p>	<p>The child can use a range of programs on a computer.</p> <p>The child can use a range of software on laptop or tablet computers with some degree of independence. Software might include video editing, diagnostic tools, email clients, videoconferencing (with the teacher or another adult), survey design software, spreadsheets and presentation software.</p>	<p>The child can use and combine a range of programs on a computer.</p> <p>The child can use multiple programs on laptop or tablet computers to achieve particular goals. E.g. They might record audio and then use this as samples in a composition; create HTML content in a text editor and preview it in a browser; analyse data in a spreadsheet and then create a presentation to show the results of their analysis.</p>	<p>The child can use and combine a range of programs on multiple devices.</p> <p>The child can use multiple digital devices (such as tablets and laptops or digital cameras and laptops) to achieve particular goals. The devices might include web servers, allowing them to use cloud-based applications. E.g. They might use local media in conjunction with a cloud-based programming platform, such as Scratch; digital cameras and video cameras to capture content to use on an externally hosted website or blog; a digital camera to take photos</p>	<p>The child can select, use and combine a range of programs on multiple devices.</p> <p>The child can choose for themselves from a range of available programs on laptops, tablets or cloud-based services to achieve particular goals. E.g. They might choose which image editors and presentation software to use when making a presentation; which image and audio editors to use when creating media content for an app; which DTP, video editor and website tools to use when developing marking materials for an</p>

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			photography, searching for images online and creating image-based presentation slides.			they could import into 3D design software on a laptop.	app.
	The child can explore ways of listening to sounds using simple programs and devices.	<p>The child can create original content using digital technology.</p> <p>The child can create their own original digital content using a range of technologies. These might include laptop computers, tablets, smartphones, digital cameras, video cameras and audio recorders. Projects might include videoing one another cooking, developing an e-book or an audio book, creating a greetings card. Look for some indication of the child's creativity</p>	<p>The child can create and edit original content for a given purpose using digital technology.</p> <p>The child can create and edit their own original digital content using a range of technologies. Content-creation technology might include laptop computers, tablets, smartphones with network connections, digital cameras, video cameras and audio recorders, although editing is likely to take place on laptops or tablets. Projects might include digital</p>	<p>The child can design and create content on a computer.</p> <p>The child can plan and execute a project in which they use software on a laptop or tablet to create digital content with some degree of independence. E.g. They could plan and shoot a video, plan and create a presentation on a given topic or plan and then create an online survey.</p>	<p>The child can design and create content on a computer in response to a given goal.</p> <p>With a given goal, the child can plan and execute a project in which they use software on a laptop or tablet to create digital content with some degree of independence. E.g. They could plan and compose original music using sequencing software; plan and create a web page; plan how they could contribute to a shared wiki and then do so; plan and create a presentation</p>	<p>The child can design and create programs on a computer in response to a given goal.</p> <p>The child can design a program of their own in response to a given goal and write this in a block-based language such as Scratch. The program need not be complex - a simple game or a turtle graphics program would suffice, but it should be accomplished with a degree of independent working.</p>	<p>The child can design and create systems in response to a given goal.</p> <p>The child can plan, design and implement a system with multiple, interrelated components with a given goal in mind. E.g. They could develop a smartphone app, taking into account input, output and connectivity, the operating system, the algorithms, code and user interface of their own program.</p>

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		in this work.	photography, creating image-based presentation slides, composing an email and creating simple charts. Look for some indication of the child's creativity in this work and evidence that they have edited content.		about the weather. They should evaluate how effectively they have met the requirements of the original goal.		
	With help the child can, play back captured still or moving images, becoming familiar with the control buttons, e.g., using play, stop and pause. Explore ways of making and listening to sounds using programs and devices.			The child can collect and present information. The child can use computers to collect information and present this to an audience. E.g. They could shoot and then show a video, read and respond to an email or conduct an online survey and present the results. They should be able to do this with a degree of	The child can collect and present data . The child can use computers to collect numerical data and present this to an audience. E.g. They could collect and present data about the weather over a period of time. They should be able to do this with a degree of independence.	The child can analyse and evaluate information. Working with text, audio, images or video, the child can analyse information, perhaps summarising this. They should evaluate the quality of the information, looking for bias or questioning assumptions that have been made. E.g. They could	The child can analyse and evaluate data . The child can evaluate the quality of numerical data , deciding the extent to which it is affected by systematic or random errors. They should analyse their data, perhaps producing summary statistics, looking for relationships, trends and exceptions. E.g.

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				independence.		work with information on e-safety , evaluating its quality and providing a clear and coherent summary.	They could conduct market research for a smartphone app, and analyse and evaluate the data they obtain.
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Searching	The child can use a shortcut such as an icon on the desktop to navigate to a specific website.			<p>The child can search for information within a single site.</p> <p>The child can use browser-specific tools (e.g. the Find command) and site-specific tools (such as the search tools for Wikipedia or YouTube) to locate particular information on a web page or within a website.</p>	<p>The child can use a standard search engine to find information.</p> <p>The child can use a common search engine (such as Google with safe search mode locked in place) effectively, to search for particular information on the web, such as answers to questions they identify in a research project.</p>	<p>The child can use filters to make more effective use of a standard search engine.</p> <p>The child can use a common search engine (such as Google with safe search mode locked in place) effectively, to search for particular information on the web, such as answers to questions they identify in a research project. They should use built-in search tools to filter their results, such as by time, location or reading level.</p>	<p>The child can make use of a range of search engines appropriate to finding information that is required.</p> <p>The child can show that they can use effectively a range of different search technologies, including alternatives to Google (such as Bing or Yahoo) and site-specific search engines (such as those for the App Store or Google Play). E.g. They could demonstrate how they would use a range of search engines when researching available smartphone apps for a particular purpose.</p>

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	<p>The child can explore a teacher-selected website to find a desired page, using hyperlinks and navigation buttons.</p>			<p>The child can understand that search engines select pages according to keywords found in the content.</p> <p>When using search engines, the child should demonstrate their understanding that the pages shown include the keywords they have specified. The child can use this knowledge by thinking of good keywords appropriate for what they are searching.</p>	<p>The child can understand that search engines rank pages according to relevance.</p> <p>The child can demonstrate their understanding that search engine results are ranked according to relevance, and that normally the top results on the first page are likely to be those most relevant to their query. If the child is unable to find good results on the first page, expect them to reconsider their keywords rather than looking at further pages of results.</p>	<p>The child can understand that search engines use a cached copy of the crawled web to select and rank results.</p> <p>The child can explain how a search engine creates an index from a cached copy of the web and uses this to select and rank results. The child might also show an awareness of the Page Rank algorithm in which results are ranked according to the number and quality of in-bound links.</p>	<p>The child can appreciate that search engines rank pages based on the number and quality of in-bound links.</p> <p>The child can demonstrate some awareness of the Page Rank algorithm, explaining that the quality of a page is determined largely on the basis of the number and quality of links pointing to that page in the engine's cached copy of the web, and that quality is itself determined recursively through Page Rank.</p>
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		<p>The child can understand algorithms as sequences of instructions in everyday contexts.</p> <p>The child can take real-world problems and then plan a sequence of steps to solve these. The problems could be moving a Bee Bot from one point to another, or making some simple food items like a sandwich, smoothie or pizza.</p>	<p>The child can understand algorithms as sequences of instructions or sets of rules in everyday contexts.</p> <p>The child can recognise that common sequences of instructions or sets of rules can be thought of as algorithms. Examples could include recipes, but might also be procedures or rules in class, spelling rules, simple arithmetic operations or number patterns.</p>	<p>The child can design and write a program using a block language, without user interaction.</p> <p>A typical program might be a scripted animation for a joke, part of a story, or linked to another area of the curriculum. Programs could use pre-built sprites or ones designed by the child. Expect programs to include movement and dialogue; they may also include sound effects and some use of costumes to allow for animated movement. There may be more than one sprite in the animation.</p>	<p>The child can design and write a program using a block language to a given brief, including simple interaction.</p> <p>The child can write a program in Scratch (or similar) in which the user has to provide some input, perhaps as an answer to a question on screen, or by using key presses or the mouse. The program could be a simple game or a set of questions and typed responses.</p>	<p>The child can design, write and debug a program using a block language based on their own ideas.</p> <p>The child can design a program of their own and write this in a block-based language such as Scratch. The child can test and debug their code, explain what bugs they found and how they fixed them. The program need not be complex (a simple game or a turtle graphics program would suffice) but it should be accomplished with a degree of independent working.</p>	<p>The child can design, write and debug a program using a second programming language based on their own ideas.</p> <p>The child can design a program of their own and write this in a programming language other than Scratch (or whichever language has formed the focus for their programming in other years), such as TouchDevelop or App Inventor. The second language does not need to be text based, but Logo or Python could be used.</p> <p>The child can test and debug their code, explain what bugs they found</p>
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								and how they fixed these. The program need not be complex - a simple app would suffice.
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Problem solving	<p>The child can use ICT to sort and sequence objects on a screen or interactive whiteboard.</p>	<p>The child can program floor turtles using sequences of instructions to implement an algorithm.</p> <p>The child can create a Bee Bot (or similar) program using a number of steps in order before pressing the Go button. The length of the child's programs might increase over the year.</p>	<p>The child can program on screen using sequences of instructions to implement an algorithm.</p> <p>The child can create programs as sequences of instructions when programming on screen. Their program could be written using simple programming apps (such as Blue Bot or Lightbot), ScratchJr or Scratch, perhaps using pre-prepared blocks and sprites in this case.</p>	<p>The child can explore simulations of physical systems on screen.</p> <p>The child can experiment with some on-screen simulations of physical systems, perhaps linked to topics from other curriculum areas, e.g. a ball bouncing on a bat or a car moving around a track. Many computer games include elements of computer simulations. The child can discuss what they have learned from using the simulation.</p>	<p>The child can develop their own simulation of a simple physical system on screen.</p> <p>The child can create a Scratch (or similar) program to simulate a simple physical system. This could be in the form of a simple animation or an on-screen prototype for a product made in design and technology.</p>	<p>The child can experiment with computer control applications.</p> <p>The child can use simple computer control and/or sensors with products they make in design and technology, perhaps using Lego WeDo kits, MaKey MaKey or similar.</p>	<p>The child can design, write and debug their own computer control application.</p> <p>The child can add computer control and/or sensors to a smartphone app or to products they design and make in design and technology, perhaps using Lego WeDo kits, MaKey MaKey or similar. The child can show evidence of designing, writing and debugging their program, ensuring that this functions correctly on the available hardware platform.</p>
	<p>The child can explore toys that simulate control devices e.g., traffic lights, scanner,</p>			<p>The child can plan a project.</p> <p>Working with the teacher and, perhaps, other</p>	<p>The child can work with others to plan a project.</p> <p>Given a particular project,</p>	<p>The child can plan a solution to a problem using decomposition.</p> <p>The child can</p>	<p>The child can solve problems using decomposition, tackling each part separately.</p>

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	<p>microwave, cash tills, with the intention of finding out how it works.</p>			<p>children, the child can develop an outline plan for a project in computing, involving multiple steps and resources, e.g. creating an animation, filming a video or conducting a survey. In video work, the plan might include identifying a subject; storyboarding the video; sourcing media; recording video; filming; editing; exporting.</p>	<p>the child can work as part of a team to plan how to accomplish their goal, breaking the project down into a set of tasks. Examples of projects could include creating an educational game, developing a wiki or monitoring the weather.</p>	<p>take a complex problem, identify component parts, use decomposition to break this problem down and then plan how they can solve the problem by working through the elements they have identified. Projects could include developing a computer game, creating a website or designing a building.</p>	<p>The child can take a complex problem, identify component parts, use decomposition to break this problem down and then plan how they can solve the problem by working through the elements they have identified. they can then use their plan to solve the original problem. Projects can be extended, such as developing a smartphone app.</p>
	<p>The child can explore the commands needed to control a range of electronic toys</p>	<p>The child can give a sequence of instructions to a floor turtle.</p> <p>The child can create a Bee Bot program using a sequence of instructions before running it using the Go button. The</p>	<p>The child can create a simple program on screen, correcting any errors.</p> <p>The child can create a simple program on screen (e.g. using the Blue Bot app,</p>	<p>The child can use sequence in programs.</p> <p>In on-screen programming, the child's program should include a sequence of commands or blocks in an appropriate</p>	<p>The child can use sequence and repetition in programs.</p> <p>The child's program, typically written in Scratch, or similar, should include sequences of commands or</p>	<p>The child can use sequence, selection and repetition in programs.</p> <p>The child's program, typically written in Scratch, or similar, should include sequences of</p>	<p>The child can use sequence, selection, repetition and variables in programs.</p> <p>The child's program should include sequences of commands or blocks,</p>

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		<p>length of the child's programs might be expected to increase over the course of the year.</p>	<p>ScratchJr or with prepared sprites and blocks in Scratch) with a particular goal or purpose in mind (e.g. drawing a shape or moving a sprite from one place to another).</p> <p>The child can debug any errors in their own code.</p>	<p>order. A typical program could be a simple scripted animation, e.g. telling a joke, a story or explaining an idea taken from elsewhere on the curriculum. The child's program might include multiple sprites; instructions could include movement, on-screen text, sound and/or costume changes.</p>	<p>blocks and some repetition. Repetition would typically be for a fixed number of times, but might also include exit conditions (e.g. repeat...until...). Programs might include turtle graphics, simple music or a simple game.</p>	<p>commands or blocks, some repetition and selection. Repetition might include exit conditions (e.g. repeat...until...). Selection would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine repetition with selection. Programs might include a computer game or a turtle graphics design.</p>	<p>repetition, selection and variables. Repetition might include exit conditions (e.g. repeat...until...) and perhaps a counter-variable for iteration. Selection would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine repetition with selection and variables. Programs might include a simple smartphone app.</p>
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Programming				<p>The child can write a program to produce output on screen.</p> <p>The child can create a program that produces output on screen, such as moving sprites or displayed text, e.g. a simple animation program.</p>	<p>The child can write a program that accepts keyboard input and produces on-screen output.</p> <p>In Scratch (or similar), the child can write a program that displays a question, accepts typed input and responds in an appropriate way to what is typed. This might be used as the basis for a dialogue program or a simple maths game.</p>	<p>The child can write a program that accepts keyboard and mouse input and produces output on screen and through speakers.</p> <p>In Scratch (or similar), the child can create a computer game using the keyboard or mouse for input and the screen and speakers for output.</p>	<p>The child can write a program that accepts inputs other than keyboard and mouse and produces outputs other than screen or speakers.</p> <p>The child could create a smartphone app, using the touch screen and the GPS sensor or accelerometer for input, and the screen and speakers or headphones plus vibration motor or network connection for output.</p>
		<p>The child can give explanations for what they think a program will do.</p> <p>The child can explain to the teacher, and to peers, what they</p>	<p>The child can give logical explanations for what they think a program will do.</p> <p>The child can give logical explanations of what a program</p>	<p>The child can explain a simple, sequence-based algorithm in their own words.</p> <p>The child can give an explanation for a simple</p>	<p>The child can explain an algorithm using sequence and repetition in their own words.</p> <p>Given an algorithm using both sequence</p>	<p>The child can explain a rule-based algorithm in their own words.</p> <p>When provided with a rule-based algorithm (e.g.</p>	<p>The child can give clear and precise logical explanations of a number of algorithms.</p> <p>Given an algorithm, the child can</p>

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		<p>think a program will do. This could be a program they or their peers have written, or it could be a familiar piece of software (including computer games). The child could use an audio recorder or video camera to capture their explanations.</p>	<p>will do under given circumstances, including some attempt at explaining why it does what it does. The program could be one they themselves have written or it could be a computer game or a familiar piece of software. The child could use an audio recorder or a video camera to record their explanations.</p>	<p>algorithm based on a sequence of instructions. The algorithm could be one of their own, or a simple one with which they have been provided. The algorithms could be recorded graphically, e.g. as a storyboard.</p>	<p>and repetition, the child can give a coherent, logically reasoned explanation of what it does and how it works. Repetition is likely to be 'forever' or for a set number of times, although end conditions (e.g. repeat...until...) could be used.</p>	<p>for a computer game), the child should be able to explain what it does and how it works, in their own words.</p>	<p>describe what it does and, using logical reasoning, give precise explanations of how it works. Algorithms could be linked to programming projects, but might include a key algorithm such as binary search.</p>
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	Foundation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Logical thinking				<p>The child can use logical reasoning to detect errors in programs.</p> <p>The child can give well-thought-through reasons for errors they find in programs. Typically, the child can find errors by reasoning logically about the program code, but they might also be able to use logical reasoning to identify errors in programs when they are executed. The programs do not have to be written originally by the child.</p>	<p>The child can use logical reasoning to detect and correct errors in programs.</p> <p>The child can give well-thought-through reasons for errors they find in programs and explain how they have fixed these. The child can find and correct errors by reasoning logically about the program code; they might also be able to use logical reasoning to identify errors in programs when executed and confirm that they have fixed these by testing the new version of their program. The programs do not have to be written originally by the child.</p>	<p>The child can use logical reasoning to detect errors in algorithms.</p> <p>When given an algorithm for a particular purpose, e.g. a rule-based algorithm for a computer game or a sequence of steps to draw a geometric pattern, the child can use logical reasoning to identify possible errors in the algorithm, explaining why they believe the algorithm is incorrect.</p>	<p>The child can use logical reasoning to detect and correct errors in algorithms (and programs).</p> <p>When given an algorithm for a particular purpose, e.g. a rule-based algorithm for a smartphone app, the child can use logical reasoning to identify possible errors in the algorithm, explaining why they believe the algorithm is incorrect. The child can use logical reasoning to suggest possible corrections to the algorithm, explaining why these would correct the bug they identified.</p>

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				<p>The child can understand that computer networks transmit information in a digital (binary) format.</p> <p>The child can explain that any information has to be converted to numbers before it can travel through computer networks. The child should understand that this conversion happens according to an agreed system or code.</p>	<p>The child can understand that the internet transmits information as packets of data.</p> <p>When working online, the child can explain that the information they send and receive is automatically broken down into packets of data, and that these sometimes take different routes across the internet.</p>	<p>The child can understand how data routing works on the internet.</p> <p>The child can give a coherent explanation of how data packets are routed from one computer to another on a separate network, which is also connected to the internet.</p>	<p>The child can understand how mobile phone or other networks operate.</p> <p>The child can give an explanation of how mobile phone (or other) networks operate: they should know that information is transmitted digitally, and have some understanding of the network topology involved. In the case of mobile phone networks, the child should show some understanding of the interactions between a phone, cell transmitters/receivers and the network's control systems.</p>
				<p>The child can understand that email and videoconferencing are made possible through the internet.</p> <p>The child should know that email messages are</p>	<p>The child can understand how the internet makes the web possible.</p> <p>The child can give an explanation of how requests for web pages, and</p>	<p>The child can understand how web pages are created and transmitted.</p> <p>The child can explain how HTML is used to create a web page and how it</p>	<p>The child can understand how domain names are converted into IP addresses on the internet.</p> <p>The child can give some explanation of how a domain name is converted into an</p>

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				<p>sent and received through servers connected to the internet. The child should know that Skype and other videoconferencing systems also work through the internet, but these services may be direct, peer-to-peer connections rather than via servers.</p>	<p>the HTML for those pages, are transmitted via the internet.</p>	<p>is transmitted as packets of digital data over the internet. The child should have an awareness of simple HTML tags (such as <h1> and <p>) for marking up a web page.</p>	<p>IP address using the distributed domain name system (DNS) using something similar to a set of phone books. The child should show an awareness of the looked-up addresses (DNS records) being copied (cached), and that more local records are used in preference to more authoritative records in most circumstances.</p>
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