Bradfield Primary School – Computing Skills and Knowledge Progression Document

Big Idea	Aspect	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer Science	Problem Solving (Understand what algorithms are).	Technological toys need instructions to operate in a particular way. Errors in instructions can be checked and fixed. Input simple instructions to make technological toys operate, including floor robots and onscreen sprites.	The pupil can understand algorithms as sequences of instructions in everyday contexts. The pupil can take real-world problems and then plan a sequence of steps to solve these. The problems could be moving a Blue-Bot from one point to another, or making some simple food items like a sandwich, smoothie or overnight oats. 1.1: We are treasure hunters 1.2: We are TV chefs	The pupil can understand algorithms as sequences of instructions or sets of rules in everyday contexts. The pupil 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. 2.1: We are astronauts 2.2: We are games testers 2.3: We are photographers				

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Computer Science	Problem Solving (Understand how algorithms are implemented).	Technological toys need instructions to operate in a particular way. Errors in instructions can be checked and fixed. Input simple instructions to make technological toys operate, including floor robots and onscreen sprites.	The pupil can program floor turtles using sequences of instructions to implement an algorithm. The pupil can create a Blue-Bot (or similar) program using a number of steps in order before pressing the Go button. The length of the pupil's programs might increase over the year. 1.1: We are treasure hunters	The pupil can program on screen using sequences of instructions to implement an algorithm. The pupil can create programs as sequences of instructions when programming on screen. Their program could be written using simple programming apps (such as ScratchJr), perhaps using pre-prepared blocks and sprites. 2.1: We are astronauts 2.2: We are games testers				

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Computer Science	Programming (Create and debug simple programs).	Technological toys need instructions to operate in a particular way. Errors in instructions can be checked and fixed. Input simple instructions to make technological toys operate, including floor robots and onscreen sprites.	The pupil can give a sequence of instructions to a floor turtle. The pupil can create a Blue-Bot program using a sequence of instructions before running it using the Go button. The length of the pupil's programs might be expected to increase over the course of the year. 1.1: We are treasure hunters	The pupil can create a simple program on screen, correcting any errors. The pupil can create a simple program on screen (e.g. using ScratchJr) with a particular goal or purpose in mind (e.g. moving a sprite from one place to another). The pupil can debug any errors in their own code. 2.1: We are astronauts 2.2: We are games testers				

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Computer Science	Logical thinking (Use logical thinking to predict the behaviour of a program).	Technological toys need instructions to operate in a particular way. Errors in instructions can be checked and fixed. Input simple instructions to make technological toys operate, including floor robots and onscreen sprites.	The pupil can give explanations for what they think a program will do. The pupil can explain to the teacher, and to peers, what they 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 pupil could use an audio recorder or video camera to capture their explanations. 1.1: We are treasure hunters	The pupil can give logical explanations for what they think a program will do. The pupil can give logical explanations of what a program will do under given circumstances, including some attempt at explaining why it does what it does. The program could be one they have written or it could be a computer game or a familiar piece of software. The pupil could use an audio recorder or a video camera to record their explanations. 2.1: We are astronauts 2.2: We are games testers				

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Computer Science	Network (Understand computer networks including the Internet).				The pupil can understand that computer networks transmit information in a digital (binary) format. The pupil can explain that any information has to be converted to numbers before it can travel through computer networks. The pupil should understand that this conversion happens according to an agreed system or code. 3.5: We are co-authors 3.6: We are opinion pollsters	The pupil can understand that the Internet transmits information as packets of data. When working online, the pupil 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. 4.4: We are bloggers	The pupil can understand how data routing works on the Internet. The pupil 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. 5.2: We are cryptographers 5.4: We are web developers	The pupil can understand how mobile phone or other networks operate. The pupil can give an explanation of how networks operate: they should know that information is transmitted digitally, and have some understanding of the network topology involved. 6.3: We are publishers 6.4: We are connected

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Computer Science	Network (Understand how networks can provide multiple services, such as the World Wide Web).				The pupil can understand that email and videoconferencing are made possible through the Internet. The pupil should know that email messages are sent and received through servers connected to the Internet. The pupil should know that other systems also work through the Internet, but these services may be direct, peer-to-peer connections rather than via servers. 3.5: We are co-authors 3.6: We are opinion pollsters	The pupil can understand how the Internet makes the web possible. The pupil can give an explanation of how requests for web pages, and the HTML for those pages, are transmitted via the Internet 4.4: We are bloggers.	The pupil can understand how web pages are created and transmitted. The pupil can explain how HTML is used to create a web page and how it is transmitted as packets of digital data over the Internet. The pupil should have an awareness of simple HTML tags for marking up a web page. 5.2: We are cryptographers 5.4: We are web developers	The pupil can understand how domain names are converted into IP addresses on the Internet. The pupil can give some explanation of how a domain name is converted into an IP address using the distributed domain name system (DNS) using something similar to a set of phone books. The pupil 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. 6.3: We are publishers 6.4: We are connected

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Computer Science	E-Safety (use technology safely and respectfully).	Ask to use digital devices to create work in a safe and responsible way. People use digital devices for many reasons, including playing games, communicating, finding information and watching videos. Talk about things that people do on digital devices, such as playing games, communicating with others and watching online videos.	The pupil can keep themselves safe while using digital technology. The pupil can understand that they need to keep safe when using digital technology. For example, they should know to use filtered Safe Search when looking for images on the web and that they should close the lid of a laptop (or turn over a tablet) and alert an adult if they come across unsuitable content. 1.3: We are digital artists 1.4: We are publishers	The pupil can keep safe and show respect to others while using digital technology. The pupil 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 observe age restrictions on computer games. 2.2: We are games testers 2.3: We are photographers 2.4: We are safe researchers	The pupil can use digital technology safely and show respect for others when working online. The pupil should know that they need to keep themselves safe when using digital technology. For example, they should show respect for others when filming and should not normally post videos online. If responding to online surveys, they should do so anonymously, thinking carefully about information they give out. 3.3: We are presenters 3.4: We are who we are 3.5: We are co-authors 3.6: We are opinion pollsters	The pupil can demonstrate that they can act responsibly when using computers. The pupil can act responsibly when using computers. For example, 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 shared wiki. 4.3: We are musicians 4.4: We are bloggers	The pupil can demonstrate that they can act responsibly when using the Internet. The pupil can act responsibly when using the Internet. For example, 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 commenting on web pages or blog posts. 5.2: We are cryptographers 5.4: We are web developers 5.5: We are adventure gamers	The pupil can show that they can think through the consequences of their actions when using digital technology. The pupil 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. 6.3: We are publishers 6.4: We are connected 6.5: We are advertisers

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Digital Literacy	E-Safety (Keeping personal information private).		The pupil can understand that information on the Internet can be seen by others. The pupil 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. 1.2: We are TV chefs 1.3: We are digital artists 1.4: We are publishers 1.6: We are detectives	The pupil can understand that they should not share personal information online. The pupil 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 pupil 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. 2.2: We are games testers 2.4: We are safe researchers 2.6: We are zoologists	The pupil can recognise unacceptable behaviour when using digital technology. The pupil can identify what would be unacceptable or inappropriate behaviour when using digital technology in a range of contexts. For example, 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. 3.5: We are co-authors 3.6: We are opinion pollsters	The pupil can understand the difference between acceptable and unacceptable behaviours when using digital technology. The pupil 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. 4.3: We are musicians 4.4: We are bloggers	The pupil can discuss the consequences of particular behaviours when using digital technology. The pupil 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. 5.2: We are cryptographers 5.4: We are web developers	The pupil can identify principles underpinning acceptable use of digital technologies. The pupil 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. 6.4: We are connected 6.5: We are advertisers

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Digital Literacy	E-Safety (Identify where to go for help and support).	Know that if they see something online that makes that sad, scared or worried, they should tell an adult straight away. Describe what they would do if they saw something online that made them sad, scared or worried.	The pupil can understand what to do if they see disturbing content online at home or at school. The pupil should know to close their laptop lid or turn their tablet over if they find content, such as inappropriate images, which might disturb them or other pupils. They should know to tell their teacher or their parents/carers if this happens. 1.3: We are digital artists 1.4: We are publishers	The pupil can understand what to do if they have concerns about content or contact online. The pupil should know to close their laptop lid or turn their tablet over if they find content, such as inappropriate images, which might disturb them or other pupils; 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/carers if this happens, and be aware that they could talk to another trusted adult or to Childline about this. 2.1: We are astronauts 2.2: We are games testers 2.4: We are safe researchers	Know who to talk to about concerns and inappropriate behaviour in school. 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. 3.5: We are co-authors 3.6: We are opinion pollsters	Know who to talk to about concerns and inappropriate behaviour at home or in school. 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. 4.3: We are musicians 4.4: We are bloggers	Know how to report concerns and inappropriate behaviour in a range of contexts. 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 inappropriate behaviour to those running websites which they regularly use, and to Childline, CEOP or to the police. 5.2: We are cryptographers 5.4: We are web developers	Know a range of ways to report concerns and inappropriate behaviour in a variety of contexts. 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 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. 6.4: We are connected 6.5: We are advertisers

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Digital Literacy	Using IT beyond school (Recognise common uses of IT beyond school).	Digital technology is used in all parts of everyday life. Some technology is used to communicate with others. Explain that digital technology is used in the home and at school for communication. Marvellous machines	The pupil can show an awareness of how IT is used for communication beyond school. The pupil 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. 1.2: We are TV chefs 1.3: We are digital artists 1.4: We are publishers 1.5: We are rhythmic 1.6: We are detectives	The pupil can show an awareness of how IT is used for a range of purposes beyond school. The pupil can name a number of purposes for which IT is used beyond school. The pupil 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 collecting and analysing data. 2.1: We are astronauts 2.2: We are games testers 2.3: We are photographers 2.4: We are safe researchers 2.5: We are animators				

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Information Technology	Creating content (Use technology purposefully to organise, store and retrieve digital content).	Use age-appropriate software to create images and record sounds and videos. Smartphones, tablets, laptops, computers and floor robots are all types of computing hardware. Explore how to use different computing hardware. Navigate to find digital content, in digital folders and online, with supervision.	The pupil can use digital technology to store and retrieve content. The pupil 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 eBook or an audiobook, creating a greetings card. 1.2: We are TV chefs 1.3: We are digital artists 1.4: We are publishers 1.5: We are rhythmic 1.6: We are detectives	The pupil can store, organise and retrieve content on digital devices for a given purpose. With a given purpose, the pupil 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 pupil 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 photography, searching for images online and creating image-based presentation slides. 2.3: We are photographers 2.4: We are safe researchers 2.5: We are animators 2.6: We are zoologists	The pupil can use a range of programs on a computer. The pupil 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. 3.3: We are presenters 3.4: We are who we are 3.6: We are opinion pollsters	The pupil can use and combine a range of programs on a computer. The pupil can use multiple programs on laptop or tablet computers to achieve particular goals. For example, 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. 4.3: We are musicians 4.5: We are artists 4.6: We are meteorologists	The pupil can use and combine a range of programs on multiple devices. The pupil 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. For example, 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 they could import into 3D design software on a laptop. 5.3: We are architects 5.4: We are web developers 5.6: We are VR designers	The pupil can select, use and combine a range of programs on multiple devices. The pupil can choose for themselves from a range of available programs on laptops, tablets or cloud-based services to achieve particular goals. For example, 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 app. 6.3: We are publishers 6.5: We are advertisers 6.6: We are AI developers

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Information Technology	Creating content (Design and create a range of programs, systems and content that accomplish given goals).	Software is the programs we use on computers and mobile devices. Use age-appropriate software independently. Me and my community Dangerous dinosaurs Marvellous machines Big, wide world Sunshine and sunflowers			The pupil can design and create content on a computer. The pupil 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. For example, they could plan and shoot a video, plan and create a presentation on a given topic or plan and then create an online survey. 3.3: We are presenters 3.4: We are who we are 3.6: We are opinion pollsters	The pupil can design and create content on a computer in response to a given goal. With a given goal, the pupil 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. For example, 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 about the weather. They should evaluate how effectively they have met the requirements of the original goal. 4.3: We are musicians 4.4: We are bloggers 4.5: We are artists 4.6: We are meteorologists	The pupil can design and create programs on a computer in response to a given goal. The pupil 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 would suffice, but it should be accomplished with a degree of independent working. 5.3: We are architects 5.4: We are web developers 5.5: We are adventure gamers 5.6: We are VR designers	The pupil can design and create systems in response to a given goal. The pupil can plan, design and implement a system with multiple, interrelated components with a given goal in mind. 6.3: We are publishers 6.5: We are advertisers 6.6: We are AI developers

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Information Technology	Creating content (Collecting, analysing, evaluating and presenting data and information).				The pupil can use computers to collect information and present this to an audience. For example, they could shoot and then show a video or conduct an online survey and present the results. They should be able to do this with a degree of independence. 3.3: We are presenters 3.4: We are who we are 3.6: We are opinion pollsters	The pupil can use computers to collect numerical data and present this to an audience. For example, 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. 4.4: We are bloggers 4.6: We are meteorologists	Working with text, audio, images or video, the pupil can analyse information, perhaps summarising this. They should evaluate the quality of the information, looking for bias or questioning assumptions that have been made. For example, they could work with information on e-safety, evaluating its quality and providing a clear and coherent summary. 5.3: We are architects 5.4: We are web developers 5.5: We are adventure gamers	The pupil 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. 6.3: We are publishers 6.5: We are advertisers 6.6: We are AI developers
	Searching (Use search technologies effectively).				The pupil can search for information within a single site. The pupil 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. 3.5: We are co-authors	The pupil can use a standard search engine to find information. The pupil 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. 4.6: We are meteorologists	The pupil can use filters to make more effective use of a standard search engine. The pupil 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. 5.3: We are architects 5.5: We are adventure gamers	The pupil can make use of a range of search engines appropriate to finding information that is required. The pupil 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. 6.3: We are publishers

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Information Technology	Search (Appreciate how search results are selected and ranked).				The pupil can understand that search engines select pages according to keywords found in the content. When using search engines, the pupil should demonstrate their understanding that the pages shown include the keywords they have specified. The pupil can use this knowledge by thinking of good keywords appropriate for what they are searching 3.5: We are co-authors	The pupil can understand that search engines rank pages according to relevance. The pupil 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 pupil is unable to find good results on the first page, expect them to reconsider their keywords rather than looking at further pages of results. 4.6: We are meteorologists	The pupil can understand that search engines use a cached copy of the crawled web to select and rank results. The pupil 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 pupil 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. 5.3: We are architects	The pupil can appreciate that search engines rank pages based on the number and quality of in-bound links. The pupil 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. 6.3: We are publishers 6.4: We are connected 6.5: We are advertisers