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| **National curriculum Strand (YEAR 1)** | **What to Look for** |
| **COMPUTER SCIENCE**  Understand what algorithms are. | The child can understand algorithms as sequences of instructions in everyday contexts. The child can take real-world problems and then plan a sequence of steps to solve these. Recognise a set of directions on a bee bot as an algorithm and the steps of a recipe as an algorithm, then realise that there are algorithms for grouping or sorting things. |
| **COMPUTER SCIENCE**  Understand how algorithms are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions. | The child can use sequences of instructions to implement an algorithm. The child can create a sequence in Scratch (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. |
| **COMPUTER SCIENCE**  Create and debug simple programs. | The child can create a Scratch program using a sequence of instructions before running it using the Go button. The length of the child's programs might be expected to increase over the course of the year. |
| **COMPUTER SCIENCE**  Use logical reasoning to predict the behaviour of simple programs. | The child can give explanations to the teacher and 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 child could use an audio recorder or video camera to capture their explanations. |
| **INFORMATION TECHNOLOGY**  Use technology purposefully to organise, store and retrieve digital content. | The child can use a range of digital technologies to store, retrieve 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, retrieving previous work, importing further illustrations and saving their work. It can also include recording audio, importing it to the computer and saving their work. |
| **INFORMATION TECHNOLOGY**  Use technology purposefully to create and manipulate digital content. | 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 typing their own text. Look for some indication of the child's creativity in this work. |
| **DIGITAL LITERACY**  Recognise common uses of information technology beyond school. | The child can mention and show awareness of 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 instead of cards. |
| **DIGITAL LITERACY**  Use technology safely and respectfully. | 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) and tell a teacher if they find inappropriate images. |
| **DIGITAL LITERACY**  Keeping personal information private. | The child should be aware that information stored on the web or transmitted via the internet is available to and can be seen by 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. |
| **DIGITAL LITERACY**  Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies | The child can understand what to do if they see disturbing content online at home or at school. 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. |

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| **National curriculum Strands (YEAR 2)** | **What to Look for** |
| **COMPUTER SCIENCE**  Understand what algorithms are. | The child can understand algorithms as sequences of instructions or sets of rules in everyday contexts. Examples could include recipes or sets of directions, but might also be procedures or rules in class, spelling rules, simple arithmetic operations or number patterns. |
| **COMPUTER SCIENCE**  The child can understand how algorithms are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions | The child can program on screen using sequences of instructions to implement an algorithm. 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. |
| **COMPUTER SCIENCE**  Create and debug simple programs. | The child can create a simple program on screen (using the Blue Bot app, ScratchJr or with prepared sprites and blocks in Scratch) correcting any errors with a particular goal or purpose in mind (e.g. drawing a shape or moving a sprite from one place to another). The child can debug any errors in their own code. |
| **COMPUTER SCIENCE**  Use logical reasoning to predict the behaviour of simple programs. | The child 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 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. |
| **INFORMATION TECHNOLOGY**  Use technology purposefully to organise, store and retrieve digital content. | The child can store, organise and retrieve content on digital devices for a given purpose. Technologies will typically include laptop computers, tablets and smartphones with access to the internet, but the child might also 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. |
| **INFORMATION TECHNOLOGY**  Use technology purposefully to create and manipulate digital content. | The child can create and edit original content for a given purpose using a range of digital technology. 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 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. |
| **DIGITAL LITERACY**  Recognise common uses of information technology beyond school. | The child can show an awareness of how IT is used for a range of purposes 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 collecting and analysing data. |
| **DIGITAL LITERACY**  Use technology safely and respectfully. | The child can keep safe and show respect to others while using digital technology. 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 observe age restrictions on computer games in and out of school. |
| **DIGITAL LITERACY**  Keeping personal information private. | 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 and that photos taken with smartphones often contain hidden information about where the photo was taken. |
| **DIGITAL LITERACY**  Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies | The child can understand what to do if they have concerns about content or contact online. 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 or 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. |

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| **National curriculum Strands (YEAR 3)** | **What to Look for** |
| **COMPUTER SCIENCE**  Design, write and debug programs that accomplish specific goals. | The child can design and write a program using a block language, without user interaction. 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. |
| **COMPUTER SCIENCE**  Controlling or simulating physical systems. | The child can explore and experiment with some on-screen simulations of physical systems on screen, 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. |
| **COMPUTER SCIENCE**  Solve problems by decomposing them into smaller parts | Working with the teacher and, perhaps, other 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. |
| **COMPUTER SCIENCE**  Use sequence, selection and repetition in programs; work with variables. | The child can use sequence in on-screen programming such as a sequence of commands or blocks in an appropriate 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. |
| **COMPUTER SCIENCE**  Work with various forms of input and output | The child can create a program that produces output on screen, such as moving sprites or displayed text, e.g. a simple animation program. |
| **COMPUTER SCIENCE**  Use logical reasoning to explain how some simple algorithms work. | The child can explain a simple, sequence based algorithm in their own words. 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. |
| **COMPUTER SCIENCE**  Use logical reasoning to detect and correct errors in algorithms and programs. | 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. |
| **COMPUTER SCIENCE**  Understand computer networks including the internet. | The child can understand that computer networks transmit information in a digital (binary) format. The child can explain that any information including email and videoconferencing 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. |
| **COMPUTER SCIENCE**  Understand how networks can provide multiple services, such as the world wide web. | The child can understand that email and videoconferencing are made possible 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. |
| **DIGITAL LITERACY**  Understand the opportunities networks offer for communication and collaboration. | When working as part of the class, the child can use email effectively and participate in a whole-class videoconference. |
| **INFORMATION TECHNOLOGY**  Use search technologies effectively. | The child can search for information within a single site. 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. |
| **INFORMATION TECHNOLOGY**  Appreciate how search results are selected and ranked. | The child can understand that search engines select pages according to keywords found in the content they have specified. The child can use this knowledge by thinking of good keywords appropriate for what they are searching. |
| **DIGITAL LITERACY**  Be discerning in evaluating digital content. | The child can form a judgement about whether a web page is appropriate and relevant for finding out the answer to a question they have or for a given purpose. |
| **INFORMATION TECHNOLOGY**  Select, use and combine a variety of software (including internet services) on a range of digital devices. | The child can use a range of programs and software on laptop or tablet computers with some degree of independence. Software might include video editing, diagnostic tools, email, videoconferencing (with the teacher or peer), survey design software, spreadsheets and presentation software. (E.g. Movie Maker, Outlook, Skype) |
| **INFORMATION TECHNOLOGY**  Design and create a range of programs, systems and content that accomplish given goals. | The child can plan and design 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. |
| **INFORMATION TECHNOLOGY**  Collecting, analysing, evaluating and presenting data and 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 independence. |
| **DIGITAL LITERACY**  Use technology safely, respectfully and responsibly.. | The child can use digital technology safely and show respect for others when working online, keeping 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. |
| **DIGITAL LITERACY**  Recognise acceptable/unacceptable behaviour. | 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. |
| **DIGITAL LITERACY**  Know a range of ways to report concerns and inappropriate behaviour. | The child should know who to report inappropriate behaviour to when using technology in school. E.G. 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. |

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| **National curriculum Strands (YEAR 4)** | **What to Look for** |
| **COMPUTER SCIENCE**  Design, write and debug programs that accomplish specific goals. | The child can design and write a program using a block language to a given brief, including simple interaction. E.g. The child can write a program in Scratch (or similar) in which the user has to provide some input by using key presses or the mouse. The program could be a simple game or a quiz with typed answers. |
| **COMPUTER SCIENCE**  Controlling or simulating physical systems. | The child can create their own Scratch (or similar) program to simulate a simple physical system on screen. This could be in the form of a simple animation or an on-screen prototype for a product made in design and technology. |
| **COMPUTER SCIENCE**  Solve problems by decomposing them into smaller parts | The child can plan or be given a particular project, then 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. |
| **COMPUTER SCIENCE**  Use sequence, selection and repetition in programs; work with variables. | The child's program, typically written in Scratch, or similar, should include sequences of commands or 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. E.g. create an interactive toy using sequences of instructions and repetition. |
| **COMPUTER SCIENCE**  Work with various forms of input and output | The child can write a program in Scratch (or similar), that displays a question and accepts keyboard input then produces an appropriate on-screen output. This might be used as the basis for a dialogue program or a simple maths game. |
| **COMPUTER SCIENCE**  Use logical reasoning to explain how some simple algorithms work. | Given an algorithm using both sequence 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. |
| **COMPUTER SCIENCE**  Use logical reasoning to detect and correct errors in algorithms and programs. | The child can give well-thought-through and logical reasons for errors they have detected in programs and explain how they have fixed these. They might also be able to 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. |
| **COMPUTER SCIENCE**  Understand computer networks including the internet. | 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. |
| **COMPUTER SCIENCE**  Understand how networks can provide multiple services, such as the world wide web. | The child can understand how the internet makes the web possible. The child can give an explanation of how requests for web pages, and the HTML for those pages, are transmitted via the internet. |
| **DIGITAL LITERACY**  Understand the opportunities networks offer for communication and collaboration. | 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. |
| **INFORMATION TECHNOLOGY**  Use search technologies effectively. | 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. |
| **INFORMATION TECHNOLOGY**  Appreciate how search results are selected and ranked. | 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 the 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. |
| **DIGITAL LITERACY**  Be discerning in evaluating digital content. | The child can form a judgement about whether a web page, such as a Wikipedia article, or other digital content is appropriate and helpful for finding out the answer to a question or research topic they have or for a given purpose. |
| **INFORMATION TECHNOLOGY**  Select, use and combine a variety of software (including internet services) on a range of digital devices. | The child can use and combine 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. |
| **INFORMATION TECHNOLOGY**  Design and create a range of programs, systems and content that accomplish given goals. | 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 about the weather. They should then evaluate how effectively they have met the requirements of the original goal. |
| **INFORMATION TECHNOLOGY**  Collecting, analysing, evaluating and presenting data and information. | The child can use computers to collect numerical data then present this to an audience and be able to do this with a degree of independence.. E.g. They could collect and present data about the weather over a period of time. |
| **DIGITAL LITERACY**  Use technology safely, respectfully and responsibly. | The child can demonstrate that they can act responsibly when using computers. They should behave responsibly when developing games, 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. |
| **DIGITAL LITERACY**  Recognise acceptable/unacceptable behaviour. | 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. |
| **DIGITAL LITERACY**  Know a range of ways to report concerns and inappropriate behaviour. | 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. |

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| **National curriculum Strands (YEAR 5)** | **What to Look for** |
| **COMPUTER SCIENCE**  Design, write and debug programs that accomplish specific goals. | The child can design and write a program using their own ideas and write this in a block-based language such as Scratch. The child can then 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. |
| **COMPUTER SCIENCE**  Controlling or simulating physical systems. | The child can experiment and use simple computer control applications and/or sensors with products they make in design and technology, perhaps using Lego WeDo kits, MaKey MaKey or similar. |
| **COMPUTER SCIENCE**  Solve problems by decomposing them into smaller parts | 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. Projects could include developing a computer game, creating a website or designing a building. |
| **COMPUTER SCIENCE**  Use sequence, selection and repetition in programs; work with variables. | The child's program, typically written in Scratch, or similar, should include sequences of 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. |
| **COMPUTER SCIENCE**  Work with various forms of input and output | The child can write a program that accepts keyboard and mouse input and produces output on screen and through speakers. 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 including narration or music. |
| **COMPUTER SCIENCE**  Use logical reasoning to explain how some simple algorithms work. | When provided with a rule-based algorithm (e.g. for a computer game), the child should be able to explain what it does and how it works, in their own words. |
| **COMPUTER SCIENCE**  Use logical reasoning to detect and correct errors in algorithms and programs. | 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. |
| **COMPUTER SCIENCE**  Understand computer networks including the internet. | The child can understand how data routing works on the internet. The child can give a coherent explanation of how data packets such as encrypted messages are routed from one computer to another on a separate network, which is also connected to the internet. |
| **COMPUTER SCIENCE**  Understand how networks can provide multiple services, such as the world wide web. | The child can understand how web pages are created and transmitted. The child 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 child should have an awareness of simple HTML tags for marking up a web page. |
| **DIGITAL LITERACY** Understand the opportunities networks offer for communication and collaboration. | The child can work productively and positively with others when developing a shared website or contributing to a class blog. |
| **INFORMATION TECHNOLOGY**  Use search technologies effectively. | 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 for more effective use. |
| **INFORMATION TECHNOLOGY**  Appreciate how search results are selected and ranked. | 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. E.g. Google uses a cached copy of the crawlable web to generate search results, using the links between the pages in the cache to determine the rank order results are displayed. |
| **DIGITAL LITERACY**  Be discerning in evaluating digital content. | 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 so is unbiased. They should be able to spot some examples of bias in digital content. |
| **INFORMATION TECHNOLOGY**  Select, use and combine a variety of software (including internet services) on a range of digital devices. | The child can use and combine a range of programs on multiple 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 they could import into 3D design software on a laptop. |
| **INFORMATION TECHNOLOGY** Design and create a range of programs, systems and content that accomplish given goals. | The child can design and create 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. |
| **INFORMATION TECHNOLOGY**  Collecting, analysing, evaluating and presenting data and information. | Working with text, audio, images or video, the child can analyse information then evaluate the quality of the information, looking for bias or questioning assumptions that have been made. E.g. They could work with information on e-safety, evaluating its quality and providing a clear and coherent summary. |
| **DIGITAL LITERACY**  Use technology safely, respectfully and responsibly. | The child can act responsibly when using the internet such as the Scratch community, if permitted to do so and when creating, editing or commenting on web pages or blog posts. 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. |
| **DIGITAL LITERACY**  Recognise acceptable/unacceptable behaviour. | 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. |
| **DIGITAL LITERACY**  Know a range of ways to report concerns and inappropriate behaviour. | The child should 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 also 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. |

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| **National curriculum Strands (YEAR 6)** | **What to Look for** |
| **COMPUTER SCIENCE**  Design, write and debug programs that accomplish specific goals. | The child can design, write and debug a program using a second programming language based on their own ideas. 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). The second language does not need to be text based, but Logo or Python could be used. The child can test and debug their code, explain what bugs they found and how they fixed these. The program need not be complex - a simple app would suffice. |
| **COMPUTER SCIENCE**  Controlling or simulating physical systems. | The child can design, write and debug their own computer control application. 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. |
| **COMPUTER SCIENCE** Solve problems by decomposing them into smaller parts | 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. |
| **COMPUTER SCIENCE**  Use sequence, selection and repetition in programs; work with variables. | The child's program should include sequences of commands or blocks, 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 also include a simple smartphone app. |
| **COMPUTER SCIENCE**  Work with various forms of input and output | The child can write a program that accepts inputs other than keyboard and mouse and produces outputs other than screen or speakers. 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. |
| **COMPUTER SCIENCE**  Use logical reasoning to explain how some simple algorithms work. | Given an algorithm, the child can 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. |
| **COMPUTER SCIENCE**  Use logical reasoning to detect and correct errors in algorithms and programs. | 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. |
| **COMPUTER SCIENCE**  Understand computer networks including the internet. | 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, Bluetooth and the network's control systems. |
| **COMPUTER SCIENCE**  Understand how networks can provide multiple services, such as the world wide web. | The child 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 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. |
| **DIGITAL LITERACY**  Understand the opportunities networks offer for communication and collaboration. | The child can make use of an online tool to plan and carry out a collaborative project such as developing an app the use these tools to keep track of progress and share ideas. |
| **INFORMATION TECHNOLOGY**  Use search technologies effectively. | The child can show that they can use effectively a range of different 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) for finding information that is required. E.g. They could demonstrate how they would use a range of search engines when researching available smartphone apps for a particular purpose. |
| **INFORMATION TECHNOLOGY**  Appreciate how search results are selected and ranked. | The child can appreciate that search engines rank pages based on the number and quality of in-bound links. 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. |
| **DIGITAL LITERACY**  Be discerning in evaluating digital content. | The child can form an opinion and cast judgement as to the extent to which they consider digital content to be effective. They must give reasons for this and take into account the intended audience and purpose of the content. The content might be an app, media resources or marketing materials. |
| **INFORMATION TECHNOLOGY**  Select, use and combine a variety of software (including internet services) on a range of digital devices. | The child can choose for themselves from a range of available programs on multiple devices such as 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 app. |
| **INFORMATION TECHNOLOGY** Design and create a range of programs, systems and content that accomplish given goals. | 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. |
| **INFORMATION TECHNOLOGY**  Collecting, analysing, evaluating and presenting data and information. | 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. They could conduct market research for a smartphone app, and analyse and evaluate the data they obtain. |
| **DIGITAL LITERACY**  Use technology safely, respectfully and responsibly. | 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. They could consider the potential consequences of any apps they develop for themselves and their users, how they use online project management tools, consequences of collecting information in market research and posting content online. |
| **DIGITAL LITERACY**  Recognise acceptable/unacceptable behaviour. | 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. |
| **DIGITAL LITERACY**  Know a range of ways to report concerns and inappropriate behaviour. | 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. Know that concerns over the content of digital media can be reported to those hosting this content. |