Computing Strand	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Problem Solving	Count confidently beyond 20, recognising the pattern of the counting system; Children **recognise** that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	The child can **recognise** 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. 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. The child can **program** floor turtles using **sequences** of instructions to implement an algorithm. 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.	The child can **recognise** and **speculate** algorithms as sequences of instructions or sets of rules in everyday contexts. 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. The child can **program** on screen using **sequences** of instructions to implement an algorithm. 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	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. There may be more than one sprite in the animation. The child can **explore** simulations of physical systems on screen. The child can **synthesise** and **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	The child can **design** and **write** a program using a block language to a given brief, including simple interaction. The child can **demonstrate understanding** by writing 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. The child can **develop their own simulation** of a simple physical system on screen. 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.	The child can **design**, **write** and **debug** a program using a block language based on their own ideas. 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 The child can **experiment** and **hypothesise** with computer control applications. The child can **apply** their knowledge to use simple computer control and/or sensors with products they make in design and technology.	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), such as TouchDevelop or App Inventor. The second language does not need to be text based, but Logo or Python could be used. The child can **evaluate, test** and **debug** their code, **explaining** and **critiquing** their programme by **identifying** what bugs they found and **evaluate** how they fixed these. The program need not be complex - a simple app would suffice. The child can **design**, **write** and **debug** their own computer control application.

			blocks and sprites in this case.	computer simulations. The child can discuss what they have learned from using the simulation.			The child can **apply their knowledge** by adding computer control and/or sensors to a smartphone app or to products they design and make in design and technology. The child can show evidence of **designing**, **writing** and **debugging** their program, ensuring that this functions correctly on the available hardware platform.
Programming		The child can give a **sequence** of instructions to a floor turtle. The child can **create** a Bee Bot 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.	The child can **create** a simple program on screen, correcting any errors. The child can **create** a simple program on screen (e.g. using the Blue Bot app, 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). The child can **debug** any errors in their own code.	The child can use **sequence i**n programs. In on-screen programming, the child can **explain** their program which should include a **sequence** of commands or blocks in an appropriate order. A typical program could be a simple scripted animation. The child's program might include multiple sprites; instructions could include movement, on-screen text, sound and/or costume changes.	The child can use **sequence** and **repetition** in programs. The child will **demonstrate understanding** by their programme being 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.	The child can use **sequence**, **selection** and **repetition** in programs. 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.	The child can use **sequence**, **selection**, **repetition** and variables in programs. 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 include a simple smartphone app.

Logical Thinking			The child can **reason** and **speculate** about what they think a program will do. The child can **describe** 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 child could use an audio recorder or video camera to capture their explanations.	The child can give logical explanations for what they think a program will do. The child can **compare and contrast** logical explanations of what a program will do under given circumstances, including some attempt at **describing** 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	The child can **explain** a simple, sequence-based algorithm in their own words. The child can **summarise** and give an explanation for a simple 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.	The child can **explain** an algorithm using sequence and repetition in their own words. The child can **demonstrate understanding** by being 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.	The child can **explain** and **make reasoned judgements** about a rule-based algorithm in their own words. 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.	The child can give clear and precise logical **explanations** of a number of algorithms reaching **informed conlusions**. 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.
INFORMATION TECHNOLOGY								
Creating Content			The child can **recognise** and use digital technology to store and retrieve content. The child can **observe** and **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.	The child can **recognise** how to store, organise and retrieve content on digital devices for a given purpose. With a given purpose, the child can **identify** and **recognise** how to use a range of digital technologies to retrieve, organise and store digital content. Technologies will typically include laptop computers, tablets and smartphones with	The child can **use** and **summarise** a range of programs on a computer. The child can **recognise** and **explain** how to 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,	The child can **summarise** and combine a range of programs on a computer. The child can **demonstrate understanding** by using multiple programs on laptop or tablet computers to achieve particular goals. The child can **design** and create content on a computer in response to a given goal.	The child can **apply** their knowledge to use and combine a range of programs on multiple devices. The child can **apply** their knowledge to 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. The child can **design** and **create**	The child can **select**, **apply** and **combine** a range of programs on multiple devices, justifying their choices. The child can **select** for themselves from a range of available programs on laptops, tablets or cloud-based services to achieve particular goals. The child can **design** and **create** systems in response to a given goal.

		The child can **create** original content using digital technology. The child can **select** and **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 in this work.	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 photography, searching for images online and creating image-based presentation slides. The child can **create** and **edit** original content for a given purpose using digital technology. 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 photography, creating image-based presentation slides, composing an email and	spreadsheets and presentation software. The child can **synthesise** 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 independence. The child can **design** and **create** content on a computer. 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.	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. The child can **synthesise** and present data. The child can use computers to **collect** numerical data and present this to an audience.	programs on a computer in response to a given goal. 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. The child can analyse and **evaluate** information. Working with text, audio, images or video, the child can analyse and **critique** information, perhaps summarising this. They should **evaluate** the quality of the information, looking for bias or questioning assumptions that have been made.	The child can plan, design and implement a system with multiple, interrelated components with a given goal in mind and **evaluate** the end result. 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.

				creating simple charts.			
Searching				The child can use a standard search engine and **summarise** how to find information. The child can use a common search engine (such as Google with safe search mode locked in place) effectively to **search f**or particular information on the web. The child can **understand** and **explain** that search engines rank pages according to relevance. The child can **demonstrate their understanding** that search engine results are ranked according to relevance.	The child can **use** a standard search engine to find information. 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 **explain** questions they identify in a research project. The child can understand and **synthesize** that search engines rank pages according to relevance. 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	The child can **apply** their knowledge of filters to make more effective use of a standard search engine. The child can **apply** their knowledge to 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. The child can **demonstrate** their **understanding** of how search engines use a cached copy of the crawled web to select and rank results. 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	The child can **apply** their knowledge of a range of search engines appropriate to finding information that is required. The child can **apply** their knowledge to 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). The child can **explain** and **justify** how search engines rank pages based on the number and quality of in-bound links. The child can **demonstrate understanding** 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

					them to reconsider their keywords rather than looking at further pages of results.	show an awareness of the Page Rank algorithm in which results are ranked according to the number and quality of in-bound links.	determined recursively through Page Rank.

DIGITAL LITERACY

E-Safety		The child can **recognise** how to keep themselves safe while using digital technology. The child can **identify** and understand that they need to keep safe when using digital technology. The child can **recall** that information on the internet can be seen by others. The child should be aware and **describe** that information stored on the web or transmitted via the internet is available to other people. The child can **recognise** what to do if they see disturbing content online at home or at school. The child should **recognise** 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.	The child can **reason and speculate** about keeping safe and show respect to others while using digital technology. The child should **identify** that they need to keep themselves safe when using digital technology. The child can **recall** and understand that they should not share personal information online. The child should **describe** why 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. The child can **recognise** and understand what to do if they have concerns about content or contact online.	The child can **explain** and use digital technology safely and show respect for others when working online. The child should know and **summarise** why they need to keep themselves safe when using digital technology. The child can **recognise** unacceptable behaviour when using digital technology. The child can **identify** what would be unacceptable or inappropriate behaviour when using digital technology in a range of contexts. Know who to talk to about concerns and inappropriate behaviour in school. Pupils should **identify** how to report inappropriate behaviour when using technology in school to their	The child can **explain** how to use technology safely and demonstrate that they can act responsibly when using computers. The child can **explain** why and act responsibly when using computers The child can **demonstrate understanding** of the difference between acceptable and unacceptable behaviours when using digital technology. The child can **discuss** and **explain** 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	The child can **apply** their knowledge and demonstrate that they can act responsibly when using the internet. The child can **explain** and **justify** the consequences of particular behaviours when using digital technology. The child can **explain** and **justify** 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. **Recall** and Know how to report concerns and inappropriate behaviour in a range of contexts. Pupils should reach **informed conlusions** allowing them to report inappropriate	The child can show that they can think through the consequences of their actions when using digital technology. The child can **discuss** and **evaluate** 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. The child can **identify** and **justify** principles underpinning acceptable use of digital technologies. The child can **identify** and **explain** some principles underpinning acceptable behaviour when

| | | | The child should **identify** and know how 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 **identify** how 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. | 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.

The child can **decide** whether a web page is relevant for a given purpose or question.

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.

The child can **use** email and videoconferencing in class.

When working as part of the class, the child can use email effectively and participate in a whole-class videoconference. | pages; wikis, including Wikipedia.

Explain who to talk to about concerns and inappropriate behaviour at home or in school.

Pupils should **identify** and 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.

The child can **decide** whether digital content is relevant for a given purpose or question.

The child can **form a judgement** about whether a web page, such as a Wikipedia article, or other digital content is | behaviour when using technology in school when necessary: 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.

The child can make **reasoned judgements** about whether digital content is reliable and unbiased.

The child can **evaluate** 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 content. | 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.

Recall and know how to access a range of ways to report concerns and inappropriate behaviour in a variety of contexts.

Pupils should **reach informed conclusions** about knowing 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 |

					appropriate for finding out the answer to a question they have or for a given purpose. The child can **demonstrate understanding** by working collaboratively with classmates on a shared wiki. 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.	The child can **work collaboratively** with classmates on a class website or blog. The child can work productively and positively with others when developing a shared website or contributing to a class blog.	use, and to ChildLine, CEOP or the police. Pupils should know that illegal content or activities can be reported to CEOP or the police. The child can form an opinion and **critique** about the effectiveness of digital content. Taking into account the intended audience and purpose of the content, the child can form an **informed 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 resources or marketing materials. The child can use online tools to plan and carry out a collaborative project. The child can **apply** knowledge of an online tool to plan and carry out a collaborative project (such as developing an app).
Using IT beyond school		The child can **recognise** and **show an awareness** of how IT is used for communication beyond school. The child can **recall** and **identify** some of the ways in which IT is used	The child can **recognise** and show an awareness of how IT is used for a range of purposes beyond school. The child can **identify** a number			

| | | to communicate beyond school. | of purposes for which IT is used beyond school.

The child can **reason and speculate** about how 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. | | | | |
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