

Progression of Skills for Computing

	Understanding technology	Digital Literacy	Programming	E-Safety
EYFS	<p>Understanding the World: Technology</p> <p>Children's experiences in this area should include exploring:</p> <p>30-50 months</p> <ul style="list-style-type: none"> To know how to operate simple equipment. To show an interest in technological toys with knobs or pulleys, or real objects. To show skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images. To know that information can be retrieved from computers. <p>40-60+ months</p> <ul style="list-style-type: none"> To complete a simple program on a computer. To interact with age-appropriate computer software. <p>ELG</p> <ul style="list-style-type: none"> Children have explored the technology they encounter at home and school and have had discussions around the use of these technologies. Children can explore how technology has changed over time and how can talk about how it differs across cultures Children can use technology in school such as iPads and computers. Children are starting to use a mouse and mouse pad with a PC to develop their control skills. Children are starting to log on and explore why we use a password (e-safety) <p>Links to Understanding the World: People and communities</p>	<ul style="list-style-type: none"> Can Interact with adults and their peers and explore their environment using multimedia equipment, including digital and video cameras, microscopes, webcams and visualisers to capture still and moving images. When supported, they will play back their captured recordings, demonstrating confidence and increasingly in control. Have explored ways of making and listening to sounds using simple programs, apps and devices, e.g., karaoke machines, music mats and age appropriate apps. <p>Links to:</p> <p>Expressive Art and Design: Exploring and using media and materials (ELG)</p> <p>Expressive Art and Design: Being imaginative (ELG)</p>	<p>Children can explore common uses of control technology through play.</p> <p>Additional experiences might also include:</p> <ul style="list-style-type: none"> Children can start to 'programme' friends by telling them how to move around like a robot or make a pretend sandwich Children can use control toys like remote control cars, Beebots or Early Years Roamer. <p>Links to:</p> <p>Communication and Language: Understanding (ELG)</p> <p>Physical Development: Moving and handling (ELG)</p>	<ul style="list-style-type: none"> Children understand the importance of e-safety. Children can talk and listen to each other about their online world. <p>Links to:</p> <p>ELG Self-confidence and self-awareness</p> <p>ELG Managing feelings and behaviour</p>

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2019/20	Algorithms	Programming & Development	Data & Data Representation	Hardware & Processing	Communications & Networks	Information Technology
Year 1	<ul style="list-style-type: none"> Understands what an algorithm is. When using algorithms, is able to express simple symbols to programme. Understands that computers need precise instructions. Demonstrates care and precision to avoid errors. 	<ul style="list-style-type: none"> Knows that users can develop their own programs. Can create a simple program in an environment that uses pictures to programme robots etc. With support, writes runs and thinks about programs in school. Understands that programs work by following precise instructions. 	<ul style="list-style-type: none"> Recognises that digital content can be represented in many forms. Distinguishes between some of these forms and can explain the different ways that they communicate information. 	<ul style="list-style-type: none"> Understands that computers have no intelligence and that computers can do nothing unless a program is executed. Recognises that all software executed on digital devices is programmed. 	<ul style="list-style-type: none"> Obtains content from the world wide web using a web browser. Understands the importance of communicating safely and respectfully online, and the need for keeping personal information private. Knows what to do when concerned about content or being contacted. 	<ul style="list-style-type: none"> Uses software under the control of the teacher to create, store and edit digital content using appropriate file and folder names. Understands that people interact with computers. Shares their use of technology in school. Knows common uses of information technology beyond the classroom. Talks about their work and makes changes to improve it. Can independently log onto the school computer system. Can independently use a mouse on a laptop pad. Can independently use a mouse and mouse mat.
Year 2	<ul style="list-style-type: none"> Understands that algorithms are part of a digital devices or software programs. Can create a simple algorithms including a loop, and include if statements. Can reason to predict outcomes. Detects and corrects errors i.e. debugging, in algorithms. 	<ul style="list-style-type: none"> Can programme too include numeric operations (+, -, x) and loops (repeat) Uses logical reasoning to predict the behaviour of programs e.g. what will happen if Detects and corrects simple semantic errors i.e. debugging, in programs. 	<ul style="list-style-type: none"> Recognises different types of data: text, number. Appreciates that programs can work with different types of data. Recognises that data can be structured in tables to make it useful. 	<ul style="list-style-type: none"> Recognises that a range of digital devices can be considered a computer Recognises and can use a range of input and output devices Understands how programs specify the function of a general purpose computer. 	<ul style="list-style-type: none"> Navigates the web and can carry out simple web searches to collect digital content. Demonstrates use of computers safely and responsibly, knowing a range of ways to report unacceptable content and contact when online. 	<ul style="list-style-type: none"> Uses technology with increasing independence to purposefully organise digital content. Shows an awareness for the quality of digital content collected. Uses a variety of software to manipulate and present digital content: data and information. Shares their experiences of technology in school and beyond the classroom. Talks about their work and makes improvements to solutions based on feedback received.

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<p>Year 3</p>	<ul style="list-style-type: none"> • Designs solutions (algorithms) that use repetition and two-way selection i.e. if, then and else. • Uses diagrams to express solutions. • Uses logical reasoning to predict the outcomes of a programme and identify potential problems within it. 	<ul style="list-style-type: none"> • Creates programs that implement algorithms to achieve given goals. • Can explain what will happen in their programming before implementing it. • Can evaluate what happened in their programming. 	<ul style="list-style-type: none"> • Understands the difference between data and information. • Knows why sorting data in a flat file can improve searching for information. • Uses filters or can perform single criteria searches for information. 	<ul style="list-style-type: none"> • Knows that computers collect data from various input devices, including sensors and application software. • Understands the difference between hardware and application software, and their roles within a computer system. 	<ul style="list-style-type: none"> • Understands the difference between the internet and internet service e.g. world wide web. • Can use a range of internet services such as video calling etc. • Recognises what is acceptable and unacceptable behaviour when using technologies and online services 	<ul style="list-style-type: none"> • Collects, organises and presents data and information in digital content. • Creates digital content to achieve a given goal through combining software packages and internet services to communicate with a wider audience e.g. blogging. • Makes appropriate improvements to solutions based on feedback received, and can comment on the success of the solution
<p>Year 4</p>	<ul style="list-style-type: none"> • Understand when some tasks are best completed by humans not computers and vice versa • Designs solutions by decomposing a problem and creates a sub-solution for each of these parts. • Recognises that different solutions exist for the same problem. 	<ul style="list-style-type: none"> • Understands the difference between, and appropriately uses if I do this, then this will happen, statements. • Can explain how a programme will run to its completion • Designs, writes and debugs modular programs using procedures. • Can evaluate what happened in their programming and find a solution if needed 	<ul style="list-style-type: none"> • Performs more complex searches for information e.g. using Boolean and relational operators. • Analyses and evaluates data and information, and recognises that poor quality data leads to unreliable results, and inaccurate conclusions. 	<ul style="list-style-type: none"> • Understands why and when computers are used. • Understands the main functions of the operating system. • Knows the difference between physical, wireless and mobile networks. 	<ul style="list-style-type: none"> • Understands how to effectively use search engines, and knows how search results are selected, including that search engines use 'web crawler programs'. • Selects, combines and uses internet services. • Demonstrates responsible use of technologies and online services, and knows a range of ways to report concerns CEOP etc 	<ul style="list-style-type: none"> • Makes judgements about digital content when evaluating and repurposing it for a given audience. • Recognises the audience when designing and creating digital content. • Understands the potential of information technology for collaboration when computers are networked. • Uses criteria to evaluate the quality of solutions, can identify improvements making some refinements to the solution, and future solutions

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<p>Year 5</p>	<ul style="list-style-type: none"> Understands that iteration is the repetition of a process such as a loop. Recognises that different algorithms exist for the same problem. Represents solutions using a structured notation. Can identify similarities and differences in situations and can use these to solve problems (pattern recognition). 	<ul style="list-style-type: none"> Understands that programming bridges the gap between algorithmic solutions and computers. Has practical experience of a high-level textual language, including using standard libraries when programming. (understand the terminology) Uses a range of operators and expressions e.g. Boolean, and applies them in the context of program control. Selects the appropriate data types. 	<ul style="list-style-type: none"> Knows that digital computers use binary to represent all data. Understands how bit patterns represent numbers and images. Knows that computers transfer data in binary. Understands the relationship between binary and file size (uncompressed). Defines data types: real numbers and Boolean. Queries data on one table using a typical query language. 	<ul style="list-style-type: none"> Recognises and understands the function of the main internal parts of basic computer architecture (hard drive etc) Understands the concepts behind the fetch-execute cycle (how a computer uses a programme on its hard drive) Knows that there is a range of operating systems and application software for the same hardware (windows, IOS etc) 	<ul style="list-style-type: none"> Understands how search engines rank search results. Understands how to construct static web pages using HTML and CSS Understands data transmission between digital computers over networks, including the internet i.e. IP addresses and packet switching. (How computers and devices talk to one another) 	<ul style="list-style-type: none"> Evaluates the appropriateness of digital devices, internet services and application software to achieve given goals. Recognises ethical issues surrounding the application of information technology beyond school. Designs criteria to critically evaluate the quality of solutions, uses the criteria to identify improvements and can make appropriate refinements to the solution.
<p>Year 6</p>	<ul style="list-style-type: none"> Understands some solutions to a problem can also fix smaller similar problems. Recognises that some problems share the same characteristics the same algorithm can be used to solve both. Starts to produce more efficient algorithms. 	<ul style="list-style-type: none"> Uses nested selection statements. (Introduction to AI – providing computer with solutions to fix a problem itself) Appreciates the need for, and writes, custom functions including use of parameters. Knows the difference between, and uses appropriate, procedures and functions. Detects and corrects syntactical errors. 	<ul style="list-style-type: none"> Understands how numbers, images, sounds and character sets use the same bit patterns. Performs simple operations using bit patterns e.g. binary addition. Understands the relationship between resolution and colour depth, including the effect on file size. Distinguishes between data used in a simple program (a variable) and the storage structure for that data. 	<ul style="list-style-type: none"> Understands the von Neumann architecture in relation to the fetchexecute cycle, including how data is stored in memory. (how a computer works between its hardware and software) Understands the basic function and operation of location addressable memory. Understands how hard drives, portable and cloud based storage devices work. 	<ul style="list-style-type: none"> Knows the names of hardware e.g. hubs, routers, switches, and the names of protocols e.g. SMTP, iMAP, POP, FTP, TCP/ IP, associated with networking computer systems. Uses technologies and online services securely, and knows how to identify and report inappropriate conduct and to whom. 	<ul style="list-style-type: none"> Justifies the choice of and independently combines and uses multiple digital devices, internet services and application software to achieve given goals. Evaluates the trustworthiness of digital content and considers the usability of visual design features when designing and creating digital artifacts for a known audience. Identifies and explains how the use of technology can impact on society. Designs criteria for users to evaluate the quality of solutions, uses the feedback from the users to identify improvements and can make appropriate refinements to the solution.