









## Computer Science and Information Technology Overview

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Nursery	Technology in everyday items. Exploring MiniMash. Finding things out on the web.					
Reception	Using a range of apps in MiniMash. Using a keyboard. Controlling a floor robot. Finding information on the Internet. Communication using technology.					
Y1	Technology around us	Creating -Digital painting, internet and email.	Programming A Moving a robot	Data and information grouping and sorting, pictograms, spreadsheets	Creating -Digital writing and animation	Programming B Program using code blocks
Y2	Information technology around us	Creating - images, photographs & presenting ideas	Programming A - Robot algorithms	Presenting and searching data	Creating – 1 digital music 2 spreadsheets	Programming B – Programming code blocks
Y3	Networks and Communication	Programming A block coding Designing, timers, repeat.	Modelling 1 Simulations 2 Spreadsheets	Databases	Creating - Stop-frame animation	Programming B – Logo / Floor robots – repeats and variables
Y4	Networks - The Internet, World Wide Web and search engines	Creating Media – Word processing	Programming A - block code if	Creating and Manipulating Media – sound and images	Data and information - Spreadsheets  Programming B – Logo	Programming C - Control
Y5	Flat-file databases – soring, searching, presenting	Programming A block coding efficiency, decomposition, and abstraction	Data and Information Spreadsheets	Creating graphics 1) 2D vector graphics 2) 3D designs	Creating media – desktop publishing and slide shows	Programming B Control - selection, outcome user input, if then else
Y6	Programming A block coding Designing and creating	Data and modelling - Spreadsheets	Webpage creation	Computing systems and networks - Communication and collaboration, Effective Searching	Creating media – video	Programming B Control and Sensors

## Digital Literacy and Citizenship

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
	<p><b>Self-image and identity</b></p>  <p><b>Copyright and ownership</b></p> 	<p><b>Online relationships</b></p> 	<p><b>Online Bullying</b></p>  <p><b>Online reputation</b></p> 	<p><b>Health, well-being and lifestyle</b></p> 	<p><b>Privacy and security</b></p> 	<p><b>Managing online information</b></p> 
PSHE & RSE	<i>N Being Me R-Y6 Respecting ourselves and others</i>	<i>N Being Me R-Y6 Relationships</i>	<i>N Relationships and me R-Y6 Sex and Relationship Education</i>	<i>N Changing Me R-Y6 Physical and Mental Wellbeing</i>	<i>N Changing Me R, Y2 Y4 Y6 Identity, society and equality Y1, Y3, Y5 Careers, Money and economic wellbeing</i>	<i>N Healthy and safe Me R-Y6 Keeping ourselves Safe</i>
<b>Related content</b>			<b>Safer Internet Day</b>			
<b>Digital Literacy and citizenship explanation of the strands</b>	<p><b>Self-image and identity</b> This strand explores the differences between online and offline identity beginning with self-awareness, shaping online identities and media influence in propagating stereotypes. It identifies effective routes for reporting and support and explores the impact of online technologies on self-image and behaviour. <b>Copyright and ownership</b> This strand explores the concept of ownership of online content. It explores strategies for protecting personal content and crediting the rights of others as well as addressing potential consequences of illegal access, download and distribution</p>	<p><b>Online relationships</b> This strand explores how technology shapes communication styles and identifies strategies for positive relationships in online communities. It offers opportunities to discuss relationships, respecting, giving and denying consent and behaviours that may lead to harm and how positive online interaction can empower and amplify voice.</p>	<p><b>Online Bullying</b> This strand explores bullying and other online aggression and how technology impacts those issues. It offers strategies for effective reporting and intervention and considers how bullying and other aggressive behaviour relates to legislation <b>Online reputation</b> This strand explores the concept of reputation and how others may use online information to make judgements. It offers opportunities to develop strategies to manage personal digital content effectively and capitalise on technology's capacity to create effective positive profiles..</p>	<p><b>Health, well-being and lifestyle</b> This strand explores the impact that technology has on health, well-being and lifestyle e.g. mood, sleep, body health and relationships. It also includes understanding negative behaviours and issues amplified and sustained by online technologies and the strategies for dealing with them.</p>	<p><b>Privacy and security</b> This strand explores how personal online information can be used, stored, processed and shared. It offers both behavioural and technical strategies to limit impact on privacy and protect data and systems against compromise.</p>	<p><b>Managing online information</b> This strand explores how online information is found, viewed and interpreted. It offers strategies for effective searching, critical evaluation of data, the recognition of risks and the management of online threats and challenges. It explores how online threats can pose risks to our physical safety as well as online safety. It also covers learning relevant to ethical publishing.</p>

## Computing Disciplinary Knowledge Overview

<b>Planning and designing</b>	Plans ideas, outlines and representations using their knowledge. Applies knowledge to designing to achieve specific outcomes, purposes and designs and to suit audiences.
<b>Logical Reasoning</b>	Applies prior experience and knowledge, including the known parameters of the program/context to predict, reason and infer conclusions
<b>Experimentation</b>	Applies knowledge to try out new ideas, methods, activities., models and test. Works carefully, methodically, consistently.
<b>Creating</b>	Creates for different purposes. Creates purposeful digital content
<b>Reviewing &amp; Evaluating</b>	Reviews work for errors. Debugs code. Makes improvements Evaluates design, code, content.
<b>Computational thinking</b>	<u>decomposition</u> - breaking down a complex problem or system into smaller, more manageable parts <u>pattern recognition</u> – looking for similarities among and within problems <u>abstraction</u> – focusing on the important information only, ignoring irrelevant detail. Ensures efficiency without extraneous data/code. <u>algorithms</u> - developing a step-by-step solution to the problem, or the rules to follow to solve the problem
<b>Collecting and organising</b>	Collects and organises digital data to produce a specific outcome within and across programs. Pupils use and apply different data representations. They ensure data entry is correct and appreciate unreliable inputs or data give unreliable results.
<b>Manipulating</b>	Makes changes to digital content to suit audience, purpose and design.
<b>Researching and retrieving</b>	Use search technologies effectively
<b>Communication and collaboration</b>	Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration
<b>Analyse and critically evaluate information</b>	Appreciates how results are selected and ranked, and be discerning in evaluating digital content
<b>Human Computer Interaction</b>	Uses hardware and software, safely, correctly and respectfully.
<b>Use technology safely and respectfully</b>	Pupils should be aware of the main risks associated with the internet. They should understand and respect copyright.
<b>Privacy &amp; Security</b>	Recognises that they should not share certain types of personal information online
<b>Getting help and support</b>	Pupils have a clear understanding of what to do if they have concerns about inappropriate online behaviour

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National Curriculum	Computing Content Focus Areas - Real life contexts / Why this is taught
<p>KS1 understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions create and debug simple programs use logical reasoning to predict the behaviour of simple programs recognise common uses of information technology beyond school</p> <p>KS2 design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts use sequence, selection, and repetition in programs; work with variables and various forms of input and output use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</p>	<p><b>Computer Science – coding &amp; algorithms</b></p> <ul style="list-style-type: none"> <li>Electronic, digital technologies are embedded throughout 21st century life e.g., smart phones, computers, cloud-based applications, robotic manufacturing, washing machines, TVs, even mixing paint at a DIY store.</li> <li>Children need to know that these devices are controlled by algorithms compiled into code.</li> <li>Developing logical reasoning and knowledge of algorithms and coding will ensure children are knowledgeable and skilled users of these technologies and are prepared to use future technologies through their understanding of the underlying principles.</li> </ul> <p><b>Computer Science –control &amp; simulations</b></p> <ul style="list-style-type: none"> <li>Real life systems are controlled by inputs and outputs that interface with mechanical and other devices. E.g., a central heating system, an app to control that system from a phone, traffic lights, traffic flow controls, washing machine, robot vacuum cleaner. Models of systems are used to predict and test e.g., weather, a new road network.</li> <li>Children need to know how to use inputs and outputs to measure data and program responses if this, then that.</li> <li>Developing this knowledge will ensure children understand the world around them and have the knowledge and skills to apply this to life and work.</li> <li>Computer models or simulations are used to explore real-life models to test hypotheses and predict e.g., weather, earthquakes, architecture, finances. They may also be used in the development of entertainment games where players use a model or simulation of a scenario e.g., building a new town, fighting an enemy.</li> </ul> <p><b>Computer Science –debugging programs</b></p> <ul style="list-style-type: none"> <li>Computers, even complex ones, are logical machines. Errors in inputs result in errors in output. Errors in algorithms and coding produce unexpected results or errors.</li> <li>Children need to know that algorithms need to be precise to obtain required results. Coding should be broken into chunks and not be more complex than needed.</li> <li>Developing this knowledge will ensure children can identify errors, problem solve and work systematically.</li> </ul> <p><b>Computer Science –predicting</b></p> <ul style="list-style-type: none"> <li>Users of technology know if we do... then... will happen and can predict to apply that to new contexts.</li> <li>Young children need to be taught to know how to predict by drawing on what they know.</li> </ul>
<p>KS2 understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration</p>	<p><b>Computer Science -networks, hardware and software</b></p> <ul style="list-style-type: none"> <li>Parts of computers/tablets/phones/ watches: screen, keyboard, touch screen/pad/mouse, inputs and outputs. Internet, World Wide Web, mobile, local area, wide area, networks, Wi-Fi, collaborative cloud working, video and conference calls are a major part of 21<sup>st</sup> century communication.</li> <li>Children need to know how these systems allow communication and collaboration for learning and communication now and in their future world of work.</li> <li>Children need to understand the components that make up the technology they use and the different between the physical hardware and the software programs compiled of algorithms and code. They need to understand how inputs, processors and outputs work together.</li> </ul>
<p>KS1 use technology purposefully to create, organise, store, manipulate and retrieve digital content recognise common uses of information technology beyond school</p> <p>KS2 use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</p>	<p><b>Information Technology - Skills</b></p> <ul style="list-style-type: none"> <li>Saving electronic work, efficient use of the keyboard, touchpad/mouse control and basic IT skills are essential for learning, play and future work.</li> </ul> <p><b>Information Technology - Word processing &amp; combined publishing</b></p> <ul style="list-style-type: none"> <li>Using apps to write a letter, make a poster, design a greeting card, make an effective slide show etc are core IT skills for learning and future work.</li> <li>Children need to know the correct way to process these documents, format them using current conventions, use a keyboard and style their work effectively for the audience.</li> </ul> <p><b>Information Technology – digital images, paint, drawing, design, images</b></p> <ul style="list-style-type: none"> <li>Manipulating images to enhance or distract from elements is often in the news, computer aided design for architecture and manufacturing, 3D building.</li> <li>Children need to know how images can be produced and manipulated digital and how they can be used to design in 3D. This will give them an understanding of unrealistic ‘role models’ and facilitate their use of images and design for work and pleasure.</li> </ul> <p><b>Information Technology – sound and video</b></p> <ul style="list-style-type: none"> <li>Voice memos, digital music, sound effects, audio tracks for film.</li> <li>Children need to know how digital sound and be created and manipulated. This will facilitate their use of it for work and pleasure.</li> </ul> <p><b>Information Technology – spreadsheets &amp; graphs &amp; graphical organisers</b></p> <ul style="list-style-type: none"> <li>Visual representations of data in graphs are often used alongside text for explanations, persuasion etc.</li> <li>Graphical organisers e.g., concept maps and hierarchies are used to analyse and sort information, explore relationships, as well as present it in a visually accessible format.</li> <li>Spreadsheets are used for accounting across the world of work.</li> <li>Children need to know how digital graphs are made and how to select the most appropriate one. They need to understand the principles of spreadsheets and basic functions. This will enable them to apply their knowledge at home and in future work.</li> </ul>

National Curriculum	Computing Content Focus Areas - Real life contexts / Why this is taught
<p>understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration</p>	<p>Information Technology –databases, data, sorting, searching</p> <ul style="list-style-type: none"> <li>• Medical records, bank accounts, stock of on-line stores, insurance, car registry, criminals, utility companies al use databases to store and process data.</li> <li>• Children need to know how data is stored, how it can be searched, ordered and processed. They will know how their personal data is held and used. They will have the knowledge and skills to understand this in the context of their own lives and in the future work.</li> </ul>
	<p>Information Technology – Internet, World Wide Web &amp; Searches</p> <ul style="list-style-type: none"> <li>• The World Wide Web is the most used research repository, its use exceeds or has replaced other systems e.g. dictionaries, thesauruses, phone directories. Use of the WWW is rapidly gaining in other areas such as shopping.</li> <li>• Children need to know how to search effectively for the information they need and critically evaluate results. This is an essential life skill.</li> </ul>
	<p>Information Technology – communication</p> <ul style="list-style-type: none"> <li>• Email has almost replaced letters, communicating with sellers and suppliers, friendship groups, at school and at work. Email is also being replaced by online collaboration tools such as ‘Teams’ ‘Meet’, IM (<i>Instant Messaging</i>), website-based chat.</li> <li>• Children need to know how to email IM etc. and the correct form to use. An email IM etc. to a friend would be different to a business. This is an essential life skill.</li> <li>• Electronic forms (surveys) are used to enter and gather information.</li> </ul>
<p>KS1 use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies. KS2 use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</p>	<p>Digital Literacy &amp; Citizenship – technology</p> <ul style="list-style-type: none"> <li>• Computers, laptops, tablets, iPads, interactive whiteboards, TVs, phones, washing machines, heating systems, shop tills, microwaves, timetables digital display boards, traffic lights, puffin crossings,</li> <li>• Children need to recognise the wide range of devices that use technology.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – Privacy &amp; security</p> <ul style="list-style-type: none"> <li>• Bank accounts, email, phone, computer etc. Personal information is stored digitally. It can also be tracked, shared, hacked (stolen) and sold.</li> <li>• Malware, spyware, tracking cookies and viruses can be embedded in websites email, documents etc.</li> <li>• Children need to know how to keep their information and devices safe.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – health well-being and lifestyle</p> <ul style="list-style-type: none"> <li>• Digital devices are used across the worlds of work, school and home. It easy to spend work time using digital devices and ‘down time’ also using them. Digital content, like films has age guidance or restrictions.</li> <li>• Children need to know the importance of balancing the amount of time and when they use digital devices. Know about age restrictions for digital content.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – copyright and ownership</p> <ul style="list-style-type: none"> <li>• Digital content belongs to the creator ‘intellectual property’. This is usually shown by © or ‘All rights reserved.’ Using others work without the right to do so can be plagiarism or ‘copyright infringement’ penalties can include fines or imprisonment.</li> <li>• Children need to know they should not pass others work as their own. The should always cite their sources, which also allows for fact checking.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – self-image and identity</p> <ul style="list-style-type: none"> <li>• On-line profiles can be idealised versions of people or even complete false identities. Photographs, recounts, descriptions etc. can be modified, copied, altered, biased or fictional.</li> <li>• Children need to know how to present themselves safely on-line according to context.</li> <li>• They need to behave respectfully, adhering to British Values. They need to know the identity of others may not be what it seems.</li> <li>• These are essential life skills.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – online bullying</p> <ul style="list-style-type: none"> <li>• Cyberbullying, outing (doxing), cyberstalking, trickery, fraping, masquerading, dissing, trolling, flaming, excluding, sexting are all types of digital bullying. Any type of digital bullying can be used. It can result in depression or even suicide.</li> <li>• It is imperative for children’s well-being that they recognise digital bullying, know how to take action and do not engage in it.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – online relationships</p> <ul style="list-style-type: none"> <li>• Digital communication and collaboration are used extensively in the workplace and socially. The 2020 pandemic dramatically increased the use of these technologies for both work and pleasure. Communication and collaboration on line may include: email, IM (Instant Messaging), website based chat, ‘rooms’ blogs, vlogs, bulletin boards, on-line forums, social networks (Facebook etc.), social review sites (e.g. Trip Adviser), image sharing sites (e.g. Instagram, Snapchat), Video hosting sites (e.g. YouTube, Vimeo), community blogs, discussion sites, sharing economy networks (AirBnB, Rover) open and closed social groups, work groups (e.g. ‘Teams’ ‘Meet’ LinkedIn, video calls, video conferencing. (e.g. Messenger, ‘Meet’ ‘Zoom’)</li> <li>• Children need to know how to communicate and collaborate digitally, know some of the risks, how to keep themselves safe and how to behave responsibly in order to navigate this increasingly complex digital world.</li> </ul>
	<p>Digital Literacy &amp; Citizenship –online reputation</p>

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	<ul style="list-style-type: none"> <li>• Digital information is hard to erase, once it is in the public domain it can be copied, shared and distributed even if the original is removed. This information can remain for an indeterminate amount of time.</li> <li>• Children need to know that it is essential they make considered choices about what they share online in order to protect their reputation both now and in the future.</li> </ul>
	<p>Digital Literacy &amp; Citizenship – managing online information</p> <ul style="list-style-type: none"> <li>• Much information on the World Wide Web is useful and truthful, but not all. The WWW also includes bias, opinion, beliefs, false information, radicalisation, hoaxes, scams, phishing, and persuasion.</li> <li>• Children need to know how to navigate the WWW effectively, how search results can be ranked, how to verify facts, identify opinion, bias, persuasion, hoaxes etc.</li> <li>• This is essential knowledge for living in a digital world.</li> </ul>