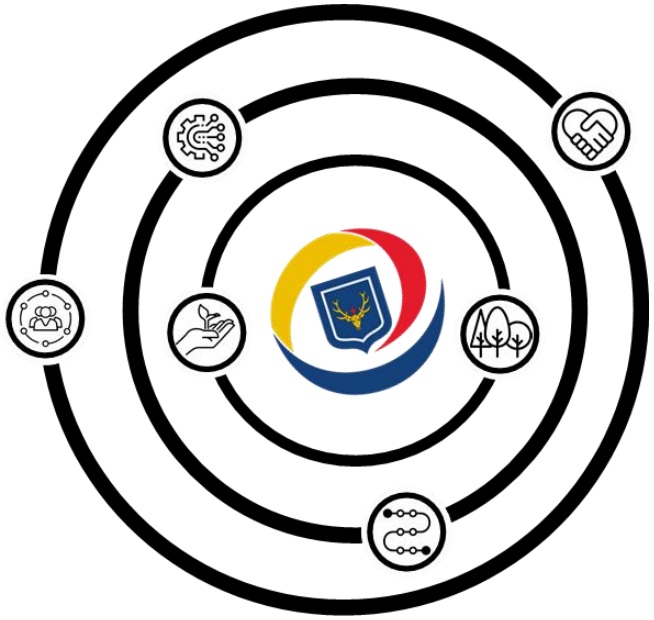
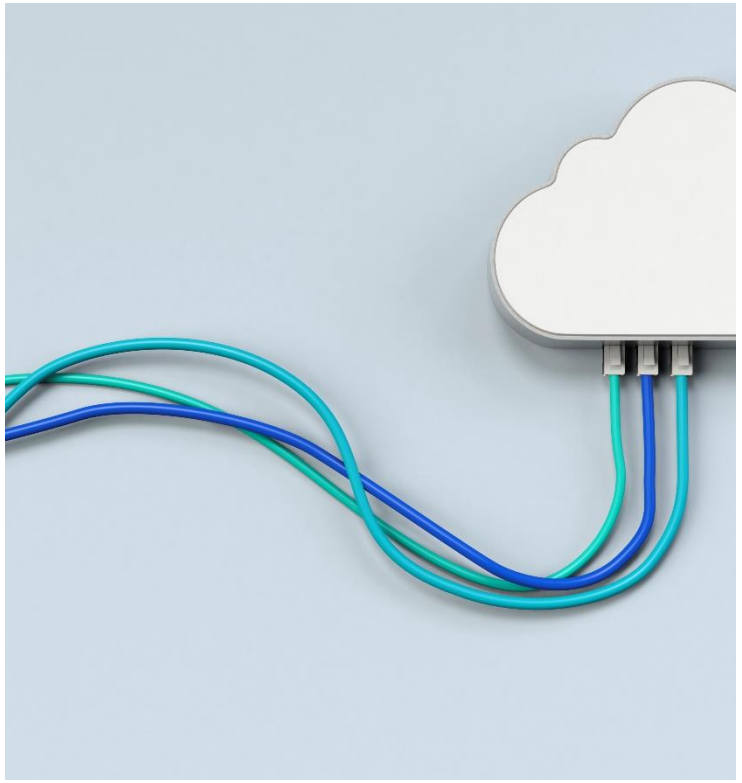
OUR LADY AND ST. HUBERT'S PRIMARY

Computing Knowledge and Skills Progression

Mastering technology to empower learning and solve problems (Adapted from MrPICT)





At Our Lady and St. Hubert's, home, school and parish work together, knowing that God is with us in all we do.

OUR LADY AND ST HUBERT'S CATHOLIC PRIMARY SCHOOL

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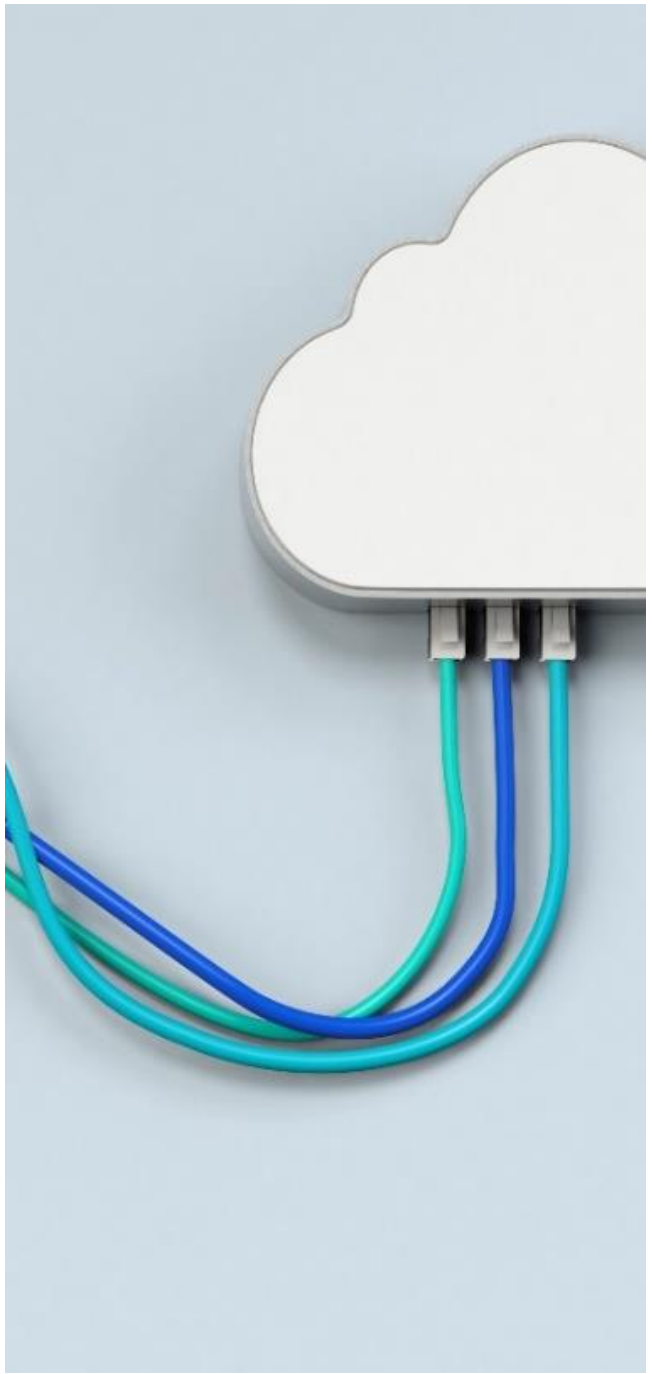

Computing Curriculum Intent

At Our Lady and St Huberts we want pupils to be *masters* of technology and not slaves to it. Technology is everywhere and will play a pivotal part in students' lives,. Therefore, we want to model and educate our pupils on how to use technology positively, responsibly and safely. We want our pupils to be creators not consumers and our broad curriculum encompassing computer science, information technology and digital literacy reflects this. We want our pupils to understand that there is always a choice with using technology and as a school we utilise technology to model positive use. We recognise that the best prevention for a lot of issues we currently see with technology/social media is through education. Building our knowledge in this subject will allow pupils to effectively demonstrate their learning through creative use of technology We recognise that technology can allow pupils to share their learning in creative ways. We also understand the accessibility opportunities technology can provide for our pupils. Our knowledge rich curriculum has to be balanced with the opportunity for pupils to apply their knowledge creatively which will in turn help our pupils become skilful computer scientists. We encourage staff to try and embed computing across the whole curriculum to make learning creative and accessible. We want our pupils to be fluent with a range of tools to best express their understanding and by Upper Key Stage 2, children have the independence and confidence to choose the best tool to fulfil the task and challenge set by teachers.

Implementation of the Computing Curriculum

Our knowledge progression for computing is ambitious. We recognise that to achieve our intent for computing,, this intent must be implemented using current academic research – often in cognitive science. The three strands of the *Computing National Curriculum* (Information Technology, Computer Science and Digital Literacy) have been broken down further into smaller 'golden strands' in which key knowledge has been identified and therefore taught in each year group. To develop a rich and varied schema in our children's brains, our progression has been developed so that learning is sequential, allowing knowledge and skills to be built upon. Key learning objectives are delivered to pupils in small steps, avoiding *cognitive overload* – allowing knowledge to enter long-term memory more readily – therefore allowing all children to know more and remember more. We also recognise that over time, this knowledge can be lost – best shown by *'The Ebbinghaus Curve'* and therefore it is important to continually review and retrieve this knowledge. Our curriculum is structured to allow for *spaced learning* and continual retrieval of taught information. Teachers actively plan for this within both their medium- and short-term planning. This process also develops fluency in computing. When children move from a process of decoding to being fluent, a greater depth of understanding can be developed of the concepts taught.

For the reasons identified above, we teach computing on a regular basis. We know that children engage more- and retain more- when they can make connections and links between their learning, so teachers will ensure that, where appropriate, the context of computing lessons will be linked to the half termly theme – *interleaving* that also develops schema. However, as previously mentioned, we also recognise that knowledge diminishes over time *(Ebbinghaus Curve)* and that some subjects or knowledge within subjects, does not fit into our themes. When this is the case in computing, computing will be taught in different ways. There may be stand-alone units of work - we recognise that not all of the National Curriculum will fit into our overall thematic progression and some knowledge has to be taught on its own – a 'unit' of computing work may be taught, resulting in a final outcome, such as a 'scratch' game. Computing objectives may also be explored alongside other areas of the curriculum - for example, children may create presentations (including aspects such as voice overs and animations) to demonstrate their understanding in geography or science.

We may also revisit previously taught knowledge and skills, checking for understanding and knowledge retention through individual lessons or practising previously taught skills – once again *interleaving* knowledge. *Interleaving* is a **method of teaching where students learn concepts in different ways at different times**. Each half term, children will use what they have learnt across the curriculum (not just in computing) and apply it to **their** real world, helping to deepen their understanding. This will often be directed by the children and focus on a key issue/area that they have studied and want to further their learning. Through this process, children will harness the skills that they have learnt to help them solve problems and communicate these solutions to others.

Underpinning our lessons will be our 6Cs - *'21st Century skills for effective learning'*, which will help to shape the lessons planned by our teachers, building on skills such as; communication, resilience, collaboration, critical thinking, creative problem solving and living as an active global citizen – all skills that can be demonstrated through our computing progression.

It is fundamentally important that children are educated to understand that the digital world in which they live, can open so many avenues in terms of their futures – it is so powerful. However, there are many risks to safety and security online. It is often not the internet and the things that we access that are dangerous – it is how we use it. At Our Lady and St Huberts, *digital literacy* has to be more than just one day in February (safer internet day), it has to become part of our children's understanding beyond this day - it has to be part of their everyday lives. Our *digital literacy* progression is broken down into the following areas: Self-image and identity; online relationships; online reputation; online bullying; managing online information; health, wellbeing and lifestyle; privacy and security; and copyright and ownership – in line with *'Education for a Connected World'*. Content will be delivered on a regular basis in not only computing lessons, but across the curriculum in order for our children to access content that empowers them for their future but in a way that lessens any potential negative impact.

Impact of the Computing Curriculum

Students will become confident users of technology, understanding how digital tools can empower them to work more effectively. They will be able to select and combine applications to help them realise their creative visions.
Students will be able to solve real-world problems by thinking about problems logically and designing, realising and testing solutions to these.
They will be able to navigate confidently online, knowing how to find and scrutinise information, share and collaborate, and protect themselves and others. Finding the right balance with technology is key to an effective education and a healthy life-style. We feel the way we implement computing helps children realise the need for the right balance and one they can continue to build on in their next stage of education and beyond. We encourage regular discussions between staff and pupils to best embed and understand this.

The National Curriculum for Computing

Main strands of learning- National Curriculum			
	Computer Science	Digital Literacy	Information Technology
Key Stage 1	• 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	• 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.	• use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school
Key Stage 2	• 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 • 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	• use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	• 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

Information Technology

This part of the curriculum is essentially most of the old ICT curriculum. Most of these objectives should be covered by using technology creatively across the rest of the curriculum, although it may be necessary to teach some discrete skills. Learners should know that technology is everywhere, be able to identify the technology they encounter and have a growing understanding of how it works. We have broken down this part of computing into activities for word processing, spreadsheets and data handling, presentation, ebook creation, web design, animation, video creation, photography and art, sound and AR & VR. When using these ideas to create content everything should link closely to digital literacy – awareness of audience and good design principles. Pupils should experience a range of different apps and software. Lower down the school, the teacher will select the programs to use but as pupils get older they should be encouraged to make their own choices. Learners also need to know how to store and organise their files online and locally so that it can easily be found again.

National Curriculum Objectives		
EYFS	KS1	KS2
Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	Use technology purposefully to create, organise, store, manipulate and retrieve 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.

Word Processing and Typing		
Year	Vocabulary	Knowledge Statements
EYFS	Computer, Keyboard, Device, Tablet, Dictate, type	• I know how to play on a touch screen game and use computers/keyboards/mouse in role play • I know how to type letters with increasing confidence using a keyboard and tablet. • I know how to dictate short, clear sentences into a digital device.
Y1	Space Bar, Delete, Return Key, Enter, Mouse, Trackpad, arrow keys, cursor, select,	• I know how to confidently type words quickly and correctly on a digital device. • I know how to use the space bar to make space and delete to delete letters/ words • I know how to make a new line using enter/return • I know how to dictate into a digital device more accurately and with punctuation.
Y2	Cut, copy, paste. Caps Lock, Insert, Image, Save, clipboard, editing, header, highlight	• I know how to use the space bar only once between words and use touch to navigate to words letter to edit • I know how to copy and paste images and text • I know how to use caps locks for capital letters. • I know how to add images alongside text in a word-processed document. • I know how to dictate longer passages into a digital device with accurate punctuation.
Y3	Touch type. Edit, format, font, size, borders, shadows, duplicate, organise, undo, redo, autocorrect, clipart	• I know how to use index fingers on keyboard home keys (f/j), use left fingers for a/ s/d/f/g, and use right fingers for h/j/k/l • I know how to edit the style and effect of my text and images to make my document more engaging and eye-catching. For example, borders and shadows. • I know how to use cut, copy and paste to quickly duplicate and organise text.
Y4	Group, crop, source, object, posters, documents, eBooks, scripts, leaflets. CTRL, spell check, thesaurus, record	• I know how to combine digital images from different sources, objects, and text to make a final piece of a variety of tasks: posters, documents, eBooks, scripts, leaflets. • I know how to confidently and regularly use text shortcuts such as cut, copy and paste and delete to organise text • I know how to use font sizes appropriately for audience and purpose. Use spell check and thesaurus including through Siri and other AI technology
Y5	Import, export, hyperlinks, animate, build in, build out, italics, bold, arrange, bullets,	• I know how to apply other useful effects to my documents such as hyperlinks. • I know how to import sounds to accompany and enhance the text in my document. • I know how to organise and reorganise text on screen to suit a purpose
Y6	Alignment, application, tabs, toolbar, build order, layout, shift key, PDF, columns, graphics	• I know how to confidently choose the best application to demonstrate my learning. • I know how to format text to suit a purpose. • I know how to publish my documents online regularly and discuss the audience and purpose of my content.

Data Handling		
Year	Vocabulary	Knowledge Statements
EYFS	Chart, sort, data, count, list	• I know how to identify a chart. • I know how to sort physical objects, take a picture and discuss what I have done. • I know how to present simple data on a digital device.
Y1	Columns, category, tally chart, pictograms, explain,	• I know how to sort images or text into two or more categories on a digital device. • I know how to collect data on a topic. • I know how to create a tally chart and pictogram. • I know how to record myself explaining what I have done and what it shows me.
Y2	Venn diagrams, carroll diagrams, bar charts, database, table	• I know how to sort digital objects into a range of charts such as Venn diagrams, carroll diagrams and bar charts using different apps and software. • I know how to orally record myself explaining what the data shows me. • I know how to create a branching database using questions
Y3	Table, column, row, cell, spreadsheet, graph,	• I know how to create my own sorting diagram and complete a data handling activity with it using images and text. • I know how to start to input simple data into a spreadsheet. • I know how to create a feelings chart exploring a story or character's feelings.
Y4	Formatting, questionnaire, Active Cell, Autofit, multiple choice, checkbox,	• I know how to create my own online multiple choice questionnaire. • I know how to input data into a spreadsheet and export the data in a variety of ways: charts, bar charts, pie charts. • I understand how data is collected.
Y5	Formula bar, Autosum, Autofill, value	• I know how to create and publish my own online questionnaire and analyse the results. • I know how to use simple formulae to solve calculations including =sum and other statistical functions • I know how to edit and format difference cells in a spreadsheet.
Y6	Range, =, fill, conditional formatting,	• I know how to write spreadsheet formula to solve more challenging maths problems. • I know how to create and publish my own online quiz with a range of media (images and video)

Presentations, web design and ebook creation		
Year	Vocabulary	Knowledge Statements
EYFS	record, image, digital, collage, move, resize, pinch	• I know how to record my voice over a picture. • I know how to create a simple digital collage. • I know how to move and resize images with my fingers
Y1	Labels, order, storyboard, sequence, spider diagram, text box, style	• I know how to add labels to an image • I know how to order images to create a simple storyboard. • I know how to create a simple spider diagram. • I know how to sequence a series of pictures to explain my understanding of a topic
Y2	Voice labels, import, tag, add to, right click, layout, format,	• I know how to add voice labels to an image. • I know how to add a voice recording to a storyboard. • I know how to add speech bubbles to an image to show what a character thinks. • I know how to import images to a project from the web and camera roll • I know how to use some build in animations in presentation software
Y3	Media, interactive, audio, annotate, background, clip art, prototype, web page, timeline,	• I know how to create an interactive comic with sounds, formatted text and video. • I know how to annotate an image with videos • I know how to create a simple web page. • I know how to design a simple app prototype. • I know how to create a simple digital timeline/mindmap
Y4	Animation, design template, effects, multimedia, eBook, ePub, export, hyperlinks	• I know how to create an interactive quiz eBook introducing hyperlinks. • I know how to create an eBook with text, images and sound. • I know how to create a presentation demonstrating my understanding with a range of media. • I know how to create a digital timeline/mindmap and include different media - sound and video.
Y5	Blog, collaboration, share, , slide layout, slide show, transitions, embed, publish, instant alpha	• I know how to collaborate with peers using online tools, e.g. blogs, Google Drive, Office 365 • I know how to create and export an interactive presentation including a variety of media, animations, transitions and other effects. • I know how to create an interactive guide to a image by embedding digital content and publishing it online. • I know how to create a webpage and embed video.
Y6	Placeholder, dropdown, navigation, homepage, footer, sidebar, HTML, URL, design, application	• I know how to create a web site which includes a variety of media. • I know how to design an app prototype that links multimedia pages together with hyperlinks. • I know how to choose applications to communicate to a specific audience. • I know how to evaluate my own content and consider ways to improvements.

Animation		
Year	Vocabulary	Knowledge Statements
EYFS	Animation, character, record	• I know how to animate a simple image to speak in role • I know how to create a simple animation to tell a story including more than one character.
Y1	Filters, stickers, scene	• I know how to add filters and stickers to enhance an animation of a character. • I know how to create an animation to tell a story with more than one scene. • I know how to add my own pictures to my story animation.
Y2	Stop motion, ghosting, timing, cartoon	• I know how to create multiple animations of an image and edit these together. • I know how to create a simple stop motion animation. • I know how to explain how an animation/flip book works
Y3	Frame, framerate, layout, onion skinning, trim	• I know how to create animations of faces to speak in role with more life-like realistic outcomes. • I know how to improve stop motion animation clips with techniques like onion skinning. • I know how to code a simple animation
Y4	3D, line draw, build in, build out, exposure, dynamic	• I know how to take multiple animations of a character I have created and edit them together for a longer video. • I know how to use software to create a 3D animated story. • I know how to create flip book animation using digital drawings and export as a GIF or video • I know how to use line draw tool to create animations.
Y5	Chroma Key, Flipbook, export, GIF, publish,	• I know how to record animations of different characters and edit them together to create an interview. • I know how to effectively use animation tools in presenting software to create animations. • I know how to add green screen effects to a stop motion animation.
Y6	Staging, aspect ratio, computer generated imagery (CGI) angles, overlay, claymation, cut scene	• I know how to mix animations and videos recordings of myself to create video interviews. • I know how to plan, script and create a 3D animation to explain a concept or tell a story. • I can make an animated talking GIF of a cartoon character. • I know how to choose and create different types of animations to best explain my learning.

Video Creation		
Year	Vocabulary	Knowledge Statements
EYFS	Photography, video, record, camera roll, play, pause, microphone	• I know the difference between a photography and video. • I know how to record a short film using the camera • I know how to record and play a film • I know how to watch films back
Y1	Voiceover, highlight, zoom, countdown, playback, delete, pause, rewind, fast forward.	• I know how to record a film using the camera app. • I know how to select images and record a voiceover. • I know how to highlight and zoom into images as I record.
Y2	Teleprompter, pace, rate, effects, titles, Greenscreen, layer, masking, drag	• I know how to write and record a script using a teleprompter tool. • I know how to use tools to add effects to a video • I know how to begin to use green screen techniques with support
Y3	Sequence, trim, cut, transition, trailer, close up, action shot, timeline	• I know how to sequence clips of mixed media in a timeline and record a voiceover • I know how to trim and cut film clips and add titles and transitions • I know how to independently create a green screen clip. • I know how to create my own movie trailer
Y4	Clips, media library, import, ken burns, subtitles, crop, overlay, adjust, playback, pan, tilt	• I know how to add music and sound effects to my films • I know how to add animated titles and transitions • I know how to add simple subtitles to a video clip. • I know how to use confidently use green screen adding animated backgrounds.
Y5	Split screen, cutaway, montage, fade,	• I know how to use cutaway and split screen tools in iMovie. • I know how to evaluate and improve the best video tools to best explain my understanding. • I know how to further improve green screen clips using crop and resize and explore more creative ways to use the tool - wearing green clothes and the masking tool.
Y6	Picture in Picture	• I know how to use the green screen masking tool with more than one character. • I know how to use picture in picture tools in iMovie. • I know how to add animated subtitles to my film to further enhance my creation. • I know how to create videos using a range of media - green screen, animations, film and image.

Photography and Digital Art		
Year	Vocabulary	Knowledge Statements
EYFS	Photograph, digital, paint, capture	• I know how to take a photograph • I know how to take a photograph and use it in an app • I know how to use a painting app and explore the paint and brush tools
Y1	Edit, drawing, cut, layer, mark up, erase,	• I know how to edit a photo with simple tools • I know how to use a paint/drawing app to create a digital image • I know how to begin to cut out an image to layer on another image.
Y2	Crop, filters, fill, export, JPEG, zoom, flash, undo	• I know how to edit a photo (crop, filters, mark up etc) • I know how to select and use tools to create digital imagery - controlling the pen and using the fill tool • I know how to cut images with accuracy to layer on other images.
Y3	Manipulate, brush size, transparent, instant alpha, PNG, framing,	• I know how to confidently take and manipulate photos • I know how to create a digital image using a range of tools, pens, brushes and effects • I know how to create transparent images with Instant Alpha
Y4	Brightness, contrast, resize, digital shapes, focus, artificial, natural, lighting	• I know how to enhance digital images and photographs using crop, brightness, contrast & resize • I know how to use shapes and drawing tools to create digital art. • I know how to draw a series of images and export as an animated GIF
Y5	Photoshop, landscape, portrait,	• I know how to make a digital photo using camera settings • I know how to enhance digital photos and images using crop, brightness and resize tools • I know how to link and explain how to photoshop images and how this is used in the media • I know how to manipulate shapes to create more detailed digital art.
Y6	Exposure	• I know how to edit a picture to remove items, add backgrounds, merge 2 photos • I know how to evaluate and discuss images explaining effects and filters that have been used to enhance the media. • I know how to use a 3D drawing app to create a realistic representation of world objects

Augmented Reality and Virtual Reality		
Year	Vocabulary	Knowledge Statements
EYFS	Scan, image, 360, digital image,	• I know how to scan a QR code. • I know how to explore a 360 image. • I know how to talk about AR objects in my class
Y1	Surroundings, objects, interact	• I know how to explore an interactive 360 image. • I know how to scan a trigger image to begin a AR experience. • I know how to pretend to interact with AR objects.
Y2	Markers, Augmented Reality, trigger	• I know how to draw my own 360 image and explore it in VR. • I know how to bring objects into my surroundings using Augmented Reality. • I know how to create my own QR code.
Y3	Field of view, Holograms, Virtual Reality, explore, slide size	• I know how to create my own digital 360 image and explore it in VR • I know how to create my own images and bring it into my surroundings
Y4	Target image, recognition, panoramic,	• I know how to create my own 360 video. • I know how to use the camera to create a 360 image. • I know how to add multiple objects into my surroundings through AR to explain a concept.
Y5	Markup	• I know how to create an animated object and bring it into my surroundings through AR • I know how to create an AR experience using objects I have created to explain a concept.
Y6	ARKit and ARCore	• I know how to create an interactive VR experience. • I know how to create an interactive poster using AR • I know how to explain how VR and AR works.

Sound		
Year	Vocabulary	Knowledge Statements
EYFS	Record, sound, microphone, echo	• I know how to record sounds with different resources • I know how to find ways to change your voice (tube, tin can, shouting to create an echo) • I know how to record sounds/voices in storytelling and explanations
Y1	Sequence, instruments, short, long, effects	• I know how to create a sequence of sounds (instruments, apps/software) • I know how to explore short and long sounds. • I know how to record my voice and add different effects.
Y2	Sound effects, loops	• I know how to create a musical composition using software • I know how to record my own sound effects. • I know how to record my voice over a compositions to perform a song.
Y3	Input, output, selection, mix	• I know how to create and edit purposeful compositions using music software to create mood or a certain style • I know how to experiment with live loops to create a song
Y4	Podcast, clipping, crossfade, fade, gain,	• I know how to edit sound effects for a purpose. • I know how to create a simple four chord song following the correct rhythm. • I know how to record a radio broadcast or audiobook.
Y5	Channel, feedback, chorus, compose	• I know how to add voice over and edit sound clips (volume, pitch, fade, effect) to create a podcast. • I know how to create a remix of a popular song.
Y6	Compression, reverb, BPM	• I know how to add voice over and edit sound clips (volume, pitch, fade, effect) to use in a film or radio broadcast (podcast) • I know how to compose a soundtrack that can be added to a film project.

Computer Science

Computer science has been broken down into four strands:

- Computational Thinking
- Programming
- Computer Networks
- Artificial Intelligence

Computational Thinking is all about solving problems effectively with or without a computer. Computational thinking is about looking at a problem in a way in which a computer can help us to solve it. This is a two-step process: first, we think about the sequence of steps (an algorithm) needed to solve a problem. Then, we use our technical skills to get the computer working on the problem as we implement our algorithm as code. Many of these objectives can be applied across the curriculum.

Programming is one application of computational thinking. Learners will write algorithms and implement these as code. They also need to be able to find mistakes and fix them (debugging.) Once learners have created a program they need to learn to evaluate and look at different ways to achieve the same goal and which method is most appropriate. As learners get older the programs they write will become more complex using a range of constructs such as sequence, selection, repetition and variables in their programs. KS 2 pupils also require knowledge of *computer networks*, such as the Internet, work and how searches are performed. *Artificial Intelligence* will likely become a huge aspect of computing and so introducing, experimenting and even inputting data into machine learning is something we feel learners should know.

National Curriculum Objectives		
EYFS	**KS1**	**KS2**
Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	• 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	• 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 • 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

Computational Thinking		
Year	Vocabulary	Knowledge Statements
EYFS	Instruction, follow, first, next	• I begin to understand an algorithm is a sequence of instructions or set of rules to get things done. • I can follow a simple algorithm by responding to oral instructions. • I can begin to make my own simple algorithms by sequencing actions. • I can start to explain my thought process and justify my decisions. (Logical reasoning) • I can explain what is the same and what is different (Pattern)
Y1	Algorithm, sequence, order, bug, fix, precise	• I understand what algorithms are • I know how to write simple algorithms • I understand the sequence of algorithms is important • I know how to debug simple algorithms
Y2	Decomposition, debug, reason, detail, breakdown, task	• I know how to write algorithms for everyday tasks • I know how to use logical reasoning to predict the outcome of algorithms • I understand decomposition is breaking objects/processes down • I know how to debug algorithms
Y3	Abstraction, information, relevant, pattern, same, different, complex	• I know how to create algorithms for my programming projects • I know how to decompose projects (such as an animation) into steps to create an algorithm • I understand abstraction is focusing on important information • I know how to identify patterns in an algorithm
Y4	Logical reasoning, design, algorithmic thinking, selection, repeat	• I know how to use abstraction to focus on what's important in my design • I know how to write more precise algorithms for use when programming • I know how to use simple selection and repetition in algorithms • I know how to use logical reasoning to detect and correct errors in programs
Y5	Evaluation, effectiveness, complexity, data, prediction, condition	• I know how to solve problems by decomposing them into smaller parts • I know how to use selection in algorithms • I know how to use logical reasoning to explain how a variety of algorithms work • I know how to evaluate the effectiveness of algorithms
Y6	Generalisation, pattern, reuse, modify, remix, critical	• I know how to decompose a design or code to focus on specific parts • I know how to use abstraction to hide complexity in my design or code • I know how to recognise and make use of patterns in my design and code • I know how to critically evaluate my work and suggest improvements

Coding and Programming		
Year	Vocabulary	Knowledge Statements
EYFS	Mouse, touch screen, move, command, device	• I can learn how digital toys and apps work through exploration (Tinkering) • I can input more than one command into a programmable toy or simple app • I can input a sequence of commands into a programmable toy or simple app • I fix things through trial and error (Debugging) • I can fix things and explain my approach
Y1	Digital, program, follow, code, bugs, fix, order, ScratchJr	• I know how to create a simple program on a digital device e.g. Bee Bot or tablet • I know how to use sequence in programs • I know how to locate and fix bugs in my program
Y2	Precise, logical reasoning, prediction, debug, sequence	• I understand programs follow precise instructions • I know how to create programs using different digital devices E.g. Bee Bot or ScratchJr on a tablet • I know how to debug programs of increasing complexity • I know how to use logical reasoning to predict the outcome of simple programs
Y3	Sequence, inputs, outputs, code, design, programming language, Scratch	• I know how to design a program • I know how to create a program using a design • I know how to create a sequence of code • I know how to work with a variety of inputs and outputs • I know how to evaluate my program
Y4	Repetition, loop, forever loop, count controlled loop, selection, condition, systematic	• I know how to use repetition in programs • I know how to use simple selection in programs • I know how to work with a variety of inputs and outputs • I know how to use logical reasoning to systematically detect and correct errors in programs
Y5	Data, memory, variables, value, initialisation, control, simulate, physical system	• I know how to create programs by decomposing them into smaller parts • I know how to use a variety of selection commands in programs • I know how to use conditions in repetition commands • I know how to work with variables • I know how to create programs that control or simulate physical systems • I know how to evaluate my work and identify errors
Y6	Procedure, abstraction, conditional loop, logic, operator, implement	• I know how to use a range of sequence, selection and repetition commands to implement my design • I know how to identify the need for, and work with, variables • I know how to create procedures to hide complexity in programs • I know how to critically evaluate my work and suggest improvements

Computer Networks		
Year	Vocabulary	Knowledge Statements
EYFS		
Y1		
Y2		
Y3	Network, server, client, LAN (Local Area Network), switch	• I understand that the computers in a school are connected together in a network • I understand why computers are networked
Y4	Internet, router, data, web page, submarine cable	• I understand that servers on the Internet are located across the planet • I understand the difference between the Internet and WWW • I understand how web pages are viewed across the internet
Y5	Search engine, spiders, index, ranked, ranking algorithm, keyword	• I know how to use search technologies effectively • I understand that web spiders index the web for search engines • I appreciate how pages are ranked in a search engine
Y6	HTML (HyperText Markup Language), opening tag, closing tag, code	• I understand what HTML is and recognize HTML tags • I know a range of HTML tags and can remix a web page • I know how to create a webpage using HTML

Artificial Intelligence		
Year	Vocabulary	Knowledge Statements
EYFS	Machine, Computer, Robot,	• I know that machines and computers can be used to perform tasks. • I know interact with simple AI such as Siri and dictation.
Y1	Program, algorithm, data, AI, technology, voice assistant, text, recognise	• I know how to use simple AI technology and can talk about what it does • I know that data is used by computers to store and process information.
Y2	Input, output, artificial intelligence, voice assistant, text, recognise	• I can explain some advantages and disadvantages of using simple AI technology • I know that artificial intelligence can be used to simulate human-like abilities in a computer.
Y3	Machine learning, expert system, bias, data, class, pattern	• I understand data is used to train AI technology • I know the basics of machine learning and how computers can be trained to perform tasks using data and algorithms.
Y4	Neural network, deep learning, big data, data, train, model, image, class, pattern	• I can train an AI model and investigate how more data can make it more accurate • I know about big data and how it can be used to inform decision-making and improve machine learning algorithms.
Y5	Cloud computing, cognitive computing, robotics	• I can create and train an AI invention using image recognition • I know about computer vision and how computers can be trained to recognize and interpret images.
Y6	Internet of Things (IoT), chatbot, computer vision, voice recognition, pattern, selection, condition	• I can train an AI model and use it within a program • I know about chatbots and how they can be used to simulate conversation with a computer

Digital Literacy

All of the statements from this document have been taken from the Education for a Connected World Document.

Today's children and young people are growing up in a digital world. As they grow older, it is crucial that they learn to balance the benefits offered by technology with a critical awareness of their own and other's online behaviour and develop effective strategies for staying safe and making a positive contribution online. This framework describes the skills and understanding that children and young people should have the opportunity to develop at different ages and stages. It highlights what a child should know in terms of current online technology, its influence on behaviour and development, and what skills they need to be able to navigate it safely.

National Curriculum Objectives		
EYFS	KS1	KS2
• Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	• recognise common uses of information technology beyond school • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about material on the internet or other online technologies	• 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 • use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Key Vocabulary

At EYFS	At Y1	At Y2	At Y3	At Y4	At Y5	At Y6
Online, offline, communicate, internet, information, feelings, rules	Trust, permission, video call, kind, respect, trusted adult, search engines, Google, personal information, password, accounts,	Online gaming, sharing, pressure, accept, consent, bullying, home, forward, links, tabs, sections, Siri, untrue, wellbeing, private, AI, comments,	Identify, represent, avatar, likes, trusting, uncomfortable, cyberbullying, accurate, autocomplete, belief, opinion, fact, mood, engaged, age restrictions, data, copyright, digital footprint,	Interact, livestream, healthy, unhealthy online behaviours, analyse, fake news, inapp purchases, pop-ups, bots, distraction, screen time, geolocation, adware, cookies,	Copied, modified, altered, choices, responsible, emojis, memes, social media, perceive, childlike, block, abusive, sceptical, trustworthy, adverts, validity, reliability, scams, disinformation, echo chamber,	Inappropriate, stereotypes, gender, screen grabs, boundaries, unintended consequences, inappropriate images, anonymity, digital personality, URL, profile, ad targeting, persuasive design, phishing, terms and conditions, encryption

Self-Image and Identity	
Year	Knowledge Statements
EYFS	• I can recognise that I can say 'no' / 'please stop' / 'I'll tell' / 'I'll ask' to somebody who asks me to do something that makes me feel sad, embarrassed or upset. • I can explain how this could be either in real life or online.
Y1	• I can recognise that there may be people online who could make me feel sad, embarrassed or upset. • If something happens that makes me feel sad, worried, uncomfortable or frightened I can give examples of when and how to speak to an adult I can trust.
Y2	• I can explain how other people may look and act differently online and offline. • I can give examples of issues online that might make someone feel sad, worried, uncomfortable or frightened; I can give examples of how they might get help
Y3	• I can explain what is meant by the term 'identity'. • I can explain how people can represent themselves in different ways online • I can explain ways in which someone might change their identity depending on what they are doing online (e.g. gaming; using an avatar; social media) and why
Y4	• I can explain how my online identity can be different to my offline identity. • I can describe positive ways for someone to interact with others online and understand how this will positively impact on how others perceive them. • I can explain that others online can pretend to be someone else, including my friends, and can suggest reasons why they might do this.
Y5	• I can explain how identity online can be copied, modified or altered. • I can demonstrate responsible choices about my online identity, depending on context.
Y6	• I can identify and critically evaluate online content relating to gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online. • I can describe issues online that could make anyone feel sad, worried, uncomfortable or frightened. I know and can give examples of how to get help, both on and offline. I can explain the importance of asking until I get the help needed.

Online Relationships	
Year	Knowledge Statements
EYFS	• I can recognise some ways in which the internet can be used to communicate. • I can give examples of how I (might) use technology to communicate with people I know.
Y1	• I can give examples of when I should ask permission to do something online and explain why this is important • I can use the internet with adult support to communicate with people I know (e.g. video call apps or services). • I can explain why it is important to be considerate and kind to people online and to respect their choices. • I can explain why things one person finds funny or sad online may not always be seen in the same way by others.
Y2	• I can give examples of how someone might use technology to communicate with others they don't also know offline and explain why this might be risky. (e.g. email, online gaming, a pen-pal in another school / country). • I can explain who I should ask before sharing things about myself or others online. • I can describe different ways to ask for, give, or deny my permission online and can identify who can help me if I am not sure. • I can explain why I have a right to say 'no' or 'I will have to ask someone'. • I can explain who can help me if I feel under pressure to agree to something I am unsure about or don't want to do. • I can identify who can help me if something happens online without my consent. • I can explain how it may make others feel if I do not ask their permission or ignore their answers before sharing something about them online. • I can explain why I should always ask a trusted adult before clicking 'yes', 'agree' or 'accept' online
Y3	• I can describe ways people who have similar likes and interests can get together online. • I can explain what it means to 'know someone' online and why this might be different from knowing someone offline. • I can explain what is meant by 'trusting someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online including what information and content they are trusted with. • I can explain why someone may change their mind about trusting anyone with something if they feel nervous, uncomfortable or worried. • I can explain how someone's feelings can be hurt by what is said or written online. • I can explain the importance of giving and gaining permission before sharing things online; how the principles of sharing online is the same as sharing offline e.g. sharing images and videos.
Y4	• I can describe strategies for safe and fun experiences in a range of online social environments (e.g. livestreaming, gaming platforms). • I can give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours. • I can explain how content shared online may feel unimportant to one person but may be important to other people's thoughts feelings and beliefs.

Y5	• I can give examples of technology specific forms of communication (e.g. emojis, memes and GIFs). • I can explain that there are some people I communicate with online who may want to do me or my friends harm. I can recognise that this is not my / our fault. • I can describe some of the ways people may be involved in online communities and describe how they might collaborate constructively with others and make positive contributions. (e.g. gaming communities or social media groups). • I can explain how someone can get help if they are having problems and identify when to tell a trusted adult. • I can demonstrate how to support others (including those who are having difficulties) online
Y6	• I can explain how sharing something online may have an impact either positively or negatively. • I can describe how to be kind and show respect for others online including the importance of respecting boundaries regarding what is shared about them online and how to support them if others do not. • I can describe how things shared privately online can have unintended consequences for others. e.g. screen-grabs. • I can explain that taking or sharing inappropriate images of someone (e.g. embarrassing images), even if they say it is okay, may have an impact for the sharer and others; and who can help if someone is worried

Online Reputation	
Year	Knowledge Statements
EYFS	• I can identify ways that I can put information on the internet.
Y1	• I can recognise that information can stay online and could be copied. • I can describe what information I should not put online without asking a trusted adult first
Y2	• I can explain how information put online about someone can last for a long time. • I can describe how anyone's online information could be seen by others. • I know who to talk to if something has been put online without consent or if it is incorrect.
Y3	• I can explain how to search for information about others online. • I can give examples of what anyone may or may not be willing to share about themselves online. • I can explain the need to be careful before sharing anything personal. • I can explain who someone can ask if they are unsure about putting something online
Y4	• I can describe how to find out information about others by searching online. • I can explain ways that some of the information about anyone online could have been created, copied or shared by others.

Y5	• I can search for information about an individual online and summarise the information found. • I can describe ways that information about anyone online can be used by others to make judgments about an individual and why these may be incorrect.
Y6	• I can explain the ways in which anyone can develop a positive online reputation. • I can explain strategies anyone can use to protect their 'digital personality' and online reputation, including degrees of anonymity.

Online Bullying	
Year	Knowledge Statements
EYFS	• I can describe ways that some people can be unkind online. • I can offer examples of how this can make others feel.
Y1	• I can describe how to behave online in ways that do not upset others and can give examples.
Y2	• I can explain what bullying is, how people may bully others and how bullying can make someone feel. • I can explain why anyone who experiences bullying is not to blame • I can talk about how anyone experiencing bullying can get help.
Y3	• I can describe appropriate ways to behave towards other people online and why this is important. • I can give examples of how bullying behaviour could appear online and how someone can get support.
Y4	• I can recognise when someone is upset, hurt or angry online. • I can describe ways people can be bullied through a range of media (e.g. image, video, text, chat). • I can explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation).
Y5	• I can recognise online bullying can be different to bullying in the physical world and can describe some of those differences. • I can describe how what one person perceives as playful joking and teasing (including 'banter') might be experienced by others as bullying. • I can explain how anyone can get help if they are being bullied online and identify when to tell a trusted adult • I can identify a range of ways to report concerns and access support both in school and at home about online bullying • I can explain how to block abusive users. • I can describe the helpline services which can help people experiencing bullying, and how to access them (e.g. Childline or The Mix).
Y6	• I can describe how to capture bullying content as evidence (e.g screen-grab, URL, profile) to share with others who can help me. • I can explain how someone would report online bullying in different contexts.

Managing Online Information	
Year	Knowledge Statements
EYFS	• I can talk about how to use the internet as a way of finding information online. • I can identify devices I could use to access information on the internet.
Y1	• I can give simple examples of how to find information using digital technologies, e.g. search engines, voice activated searching). • I know / understand that we can encounter a range of things online including things we like and don't like as well as things which are real or make believe / a joke. • I know how to get help from a trusted adult if we see content that makes us feel sad, uncomfortable worried or frightened
Y2	• I can use simple keywords in search engines. • I can demonstrate how to navigate a simple webpage to get to information I need (e.g. home, forward, back buttons; links, tabs and sections). • I can explain what voice activated searching is and how it might be used, and know it is not a real person (e.g. Alexa, Google Now, Siri). • I can explain the difference between things that are imaginary, 'made up' or 'make believe' and things that are 'true' or 'real'. • I can explain why some information I find online may not be real or true
Y3	• I can demonstrate how to use key phrases in search engines to gather accurate information online. • I can explain what autocomplete is and how to choose the best suggestion. • I can explain how the internet can be used to sell and buy things. • I can explain the difference between a 'belief', an 'opinion' and a 'fact. and can give examples of how and where they might be shared online, e.g. in videos, memes, posts, news stories etc. • I can explain that not all opinions shared may be accepted as true or fair by others (e.g. monsters under the bed). • I can describe and demonstrate how we can get help from a trusted adult if we see content that makes us feel sad, uncomfortable worried or frightened.
Y4	• I can analyse information to make a judgement about probable accuracy and I understand why it is important to make my own decisions regarding content and that my decisions are respected by others. • I can describe how to search for information within a wide group of technologies and make a judgement about the probable accuracy (e.g. social media, image sites, video sites). • I can describe some of the methods used to encourage people to buy things online (e.g. advertising offers; in-app purchases, pop-ups) and can recognise some of these when they appear online. • I can explain why lots of people sharing the same opinions or beliefs online do not make those opinions or beliefs true. • I can explain that technology can be designed to act like or impersonate living things (e.g. bots) and describe what the benefits and the risks might be. • I can explain what is meant by fake news e.g. why some people will create stories or alter photographs and put them online to pretend something is true when it isn't.

Y5	• I can explain the benefits and limitations of using different types of search technologies e.g. voice-activation search engine. I can explain how some technology can limit the information I aim presented with e.g. voice-activated searching giving one result. • I can explain what is meant by 'being sceptical'; I can give examples of when and why it is important to be 'sceptical'. • I can evaluate digital content and can explain how to make choices about what is trustworthy e.g. differentiating between adverts and search results. • I can explain key concepts including: information, reviews, fact, opinion, belief, validity, reliability and evidence • I can identify ways the internet can draw us to information for different agendas, e.g. website notifications, pop-ups, targeted ads. • I can describe ways of identifying when online content has been commercially sponsored or boosted, (e.g. by commercial companies or by vloggers, content creators, influencers). • I can explain what is meant by the term 'stereotype', how 'stereotypes' are amplified and reinforced online, and why accepting 'stereotypes' may influence how people think about others. • I can describe how fake news may affect someone's emotions and behaviour, and explain why this may be harmful. • I can explain what is meant by a 'hoax'. I can explain why someone would need to think carefully before they share.
Y6	• I can explain how search engines work and how results are selected and ranked. • I can explain how to use search technologies effectively. • I can describe how some online information can be opinion and can offer examples. • I can explain how and why some people may present 'opinions' as 'facts'; why the popularity of an opinion or the personalities of those promoting it does not necessarily make it true, fair or perhaps even legal. • I can define the terms 'influence', 'manipulation' and 'persuasion' and explain how someone might encounter these online (e.g. advertising and 'ad targeting' and targeting for fake news). • I understand the concept of persuasive design and how it can be used to influences peoples' choices. • I can demonstrate how to analyse and evaluate the validity of 'facts' and information and I can explain why using these strategies are important. • I can explain how companies and news providers target people with online news stories they are more likely to engage with and how to recognise this. • I can describe the difference between online misinformation and dis-information. • I can explain why information that is on a large number of sites may still be inaccurate or untrue. I can assess how this might happen (e.g. the sharing of misinformation or disinformation). • I can identify, flag and report inappropriate content.

Health, Wellbeing and Lifestyle	
Year	Knowledge Statements
EYFS	• I can identify rules that help keep us safe and healthy in and beyond the home when using technology. • I can give some simple examples of these rules.
Y1	• I can explain rules to keep myself safe when using technology both in and beyond the home.
Y2	• I can explain simple guidance for using technology in different environments and settings e.g. accessing online technologies in public places and the home environment. • I can say how those rules / guides can help anyone accessing online technologies.
Y3	• I can explain why spending too much time using technology can sometimes have a negative impact on anyone, e.g. mood, sleep, body, relationships; I can give some examples of both positive and negative activities where it is easy to spend a lot of time engaged (e.g. doing homework, games, films, videos). • I can explain why some online activities have age restrictions, why it is important to follow them and know who I can talk to if others pressure me to watch or do something online that makes me feel uncomfortable (e.g. age restricted gaming or web sites).
Y4	• I can explain how using technology can be a distraction from other things, in both a positive and negative way. • I can identify times or situations when someone may need to limit the amount of time they use technology e.g. I can suggest strategies to help with limiting this time.
Y5	• I can describe ways technology can affect health and well-being both positively (e.g. mindfulness apps) and negatively. • I can describe some strategies, tips or advice to promote health and wellbeing with regards to technology. • I recognise the benefits and risks of accessing information about health and well-being online and how we should balance this with talking to trusted adults and professionals. • I can explain how and why some apps and games may request or take payment for additional content (e.g. in-app purchases, lootboxes) and explain the importance of seeking permission from a trusted adult before purchasing.
Y6	• I can describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose. • I recognise and can discuss the pressures that technology can place on someone and how / when they could manage this. • I can recognise features of persuasive design and how they are used to keep users engaged (current and future use). • I can assess and action different strategies to limit the impact of technology on health (e.g. night-shift mode, regular breaks, correct posture, sleep, diet and exercise).

Privacy and Security	
Year	Knowledge Statements
EYFS	• I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location). • I can describe who would be trustworthy to share this information with; I can explain why they are trusted.
Y1	• I can explain that passwords are used to protect information, accounts and devices. • I can recognise more detailed examples of information that is personal to someone (e.g where someone lives and goes to school, family names). • I can explain why it is important to always ask a trusted adult before sharing any personal information online, belonging to myself or others.
Y2	• I can explain how passwords can be used to protect information, accounts and devices. • I can explain and give examples of what is meant by 'private' and 'keeping things private' • I can describe and explain some rules for keeping personal information private (e.g. creating and protecting passwords). • I can explain how some people may have devices in their homes connected to the internet and give examples (e.g. lights, fridges, toys, televisions).
Y3	• I can describe simple strategies for creating and keeping passwords private. • I can give reasons why someone should only share information with people they choose to and can trust. • I can explain that if they are not sure or feel pressured then they should tell a trusted adult. • I can describe how connected devices can collect and share anyone's information with others.
Y4	• I can describe strategies for keeping personal information private, depending on context. • I can explain that internet use is never fully private and is monitored, e.g. adult supervision. • I can describe how some online services may seek consent to store information about me; I know how to respond appropriately and who I can ask if I am not sure. • I know what the digital age of consent is and the impact this has on online services asking for consent.
Y5	• I can explain what a strong password is and demonstrate how to create one. • I can explain how many free apps or services may read and share private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others. I can explain what app permissions are and can give some examples.
Y6	• I can describe effective ways people can manage passwords (e.g. storing them securely or saving them in the browser). • I can explain what to do if a password is shared, lost or stolen. • I can describe how and why people should keep their software and apps up to date, e.g. auto updates. • I can describe simple ways to increase privacy on apps and services that provide privacy settings. • I can describe ways in which some online content targets people to gain money or information illegally; I can describe strategies to help me identify such content (e.g. scams, phishing). I know that online services have terms and conditions that govern their use.

Copyright and Ownership	
Year	Knowledge Statements
EYFS	• I know that work I create belongs to me. • I can name my work so that others know it belongs to me.
Y1	• I can explain why work I create using technology belongs to me. • I can say why it belongs to me (e.g. 'I designed it' or 'I filmed it"). • I can save my work under a suitable title / name so that others know it belongs to me (e.g. filename, name on content). • I understand that work created by others does not belong to me even if I save a copy.
Y2	• I can recognise that content on the internet may belong to other people. • I can describe why other people's work belongs to them.
Y3	• I can explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause.
Y4	• When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. • I can give some simple examples of content which I must not use without permission from the owner, e.g. videos, music, images.
Y5	• I can assess and justify when it is acceptable to use the work of others. • I can give examples of content that is permitted to be reused and know how this content can be found online.
Y6	• I can demonstrate the use of search tools to find and access online content which can be reused by others. • I can demonstrate how to make references to and acknowledge sources I have used from the internet.

The 6Cs and Computing

How our 6Cs will be evident through our computing curriculum

Character

Children will develop perseverance and resilience, solving real-world problems and debugging their solutions.

Citizenship

Children will learn to use technology safely and responsibly. They will use technology to learn about issues affecting their community and the wider world. They will design technological solutions to real-world problems.

Communication

Children will use IT to present and communicate their learning. They will use internet technologies to communicate, adapting their modes of communication appropriately.

Collaboration

Children will work collaboratively to solve problems and design digital artefacts. They will make use of communications technologies to collaborate more effectively.

Creativity

Children will be given lots of opportunities to identify problems, and then have chance to design and make programs and digital artefacts that solve them, incorporating their knowledge of algorithms and programming.

Critical thinking

Children will use the processes of Computational thinking to logically analyse and solve real-world problems. They will learn to evaluate the reliability of information they find online and analyse it critically.