Progression in Computing

Computing knowledge and skills across the School

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Computing knowledge and Skills – Progression across all year groups

		Computing Key Stage 1		
Category of knowledge	NC Statements	Reception	Year 1	Year 2
Computer science	Computer Science - 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	ELG Understanding: children follow instructions involving several ideas or actions. They answer 'how' and 'why' questions about their experiences and in response to stories or events. ELG Moving and handling: children show good control and co-ordination in large and small movements. They move confidently in a range of ways, safely negotiating space. Children in Early Years are already immersed in a programmed world. They experience it every day of their lives when: - The doors at the supermarket open automatically when they approach, - The hand drier starts when they place their hands underneath	-To explore a range of control toys and digital devices (BeeBots/microphones/laptops) - To follow instructions to move around to complete a simple task - To give a sequence of instructions to complete a simple task (ScratchJR) - To record instructions simply using pictures -To understand that instructions should be given clearly and in the correct order) -To talk about what will happen when instructions are given in a sequence -to navigate a sprite/BeeBot around a course (ScratchJR)	- Understand that programs use precise instructions to work - Create simple programs and find bugs in them. - Predict outcomes of their algorithms and programs - To know how to control a range of digital devices - To know that devices and actions on screen may be controlled by sequences of actions and instructions - To create a sequence of instructions to complete a simple task (move a BeeBot/create a simple shape) - To control a floor robot using appropriate buttons (BeeBots) -To make predictions about what will happen when a command is entered -To discuss how to improve/change their sequence of commands

		– The price of an item shows as you scan – The streetlights come on automatically when it gets dark. In the EYFS, continuous provision draws on these common uses of control technology for children to experience first-hand and to explore their uses through play. Additional experiences might also include: 'programming' friends by telling them how to move around like a robot or making jam sandwiches in maths, To use of control toys like remote control cars, BeeBots or apps on iPads		–To know the purpose of a range of digital devices: laptops/cameras/computers –To begin to answer 'What if' questions using a simulation (ScratchJr) to know the difference between input/output devices
Vocabulary	Tier 1	Equipment, Buttons, Movement	create organise store program	Organise, scripted sequence, software, store, predict, program
	Tier 2	Control, test	command, software, sequence	Retrieve reverse, command, execute, manipulate, sprite
	Tier 3	Problem solving	algorithm	algorithm, blocks, engineer debug
Information Technology	- Use technology purposefully to create, organise, store, manipulate and retrieve digital content - Recognise common uses of information	ELG People and communities: children talk about past and present events in their own lives and in the lives of family members. They know that other children don't always enjoy the same things and are sensitive to this. They know about similarities and differences between themselves and others, and among families, communities and	–To use a digital device to take a picture or record their work (digital camera) – To select or record a sound to add to their work (Scratch) – To be familiar with a keyboard	– To develop basic editing skills e.g. shift key for upper case, question marks, spaces after punctuation. – To know how to improve the presentation of a piece of work by changing the font size, colour and style – To use different layouts and templates for different purposes (e.g. story/newspaper /poster)

	technology beyond school	traditions. ELG Technology: children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.

Children's natural curiosity has always driven them to develop an understanding of the world around them and this is no different when it comes to understanding technology; both how it works and what it can do for us. From their first, early experiences with technology, pupils begin to make sense of how it works and the opportunities it can provide. Children's experiences in this area should include exploring:

– The technology they encounter at home and school (e.g. role play toys, photocopiers, iPads etc.)

– How technology has changed over time and how it differs across cultures by sharing artefacts, photos and videos, and asking others. (Links to history). | – To select images on a computer/laptop

– To begin to type sentences (with support using capital letters, full stops and other punctuation

– To use a paint package to a create a picture (paint)

– To use pre=defined layouts or templates for presentation

– To know other uses for ICT outside of school

– To discuss examples of other ICT uses. | – To understand that folders are used to organise files on a computer

– To organise files and folders by creating, renaming, moving, copying and deleting

– To combine graphics, text and sound to enhance their text (PPT/Word)

– To use a sound recording tool to record voice for a specific purpose (Scratch/PPT)

– To create a simple animation to illustrate a story or idea (Scratch/ScratchJr)

– To upload an image |
| Vocabulary | - Tier one | computer, video, pictures | computer network | computer network |

	- Tier Two	digital	digital content, digital devices	digital content, digital devices
	- Tier Three	network, system	Secure, source	Secure, source
digital literacy	- 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	ELG Exploring and using media and materials: children sing songs, make music and dance, and experiment with ways of changing them. They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. ELG Being imaginative: children use what they have learnt about media and materials in original ways, thinking about uses and purposes. They represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role-play and stories. Practitioners will need to support the youngest children as they explore digital apparatus with discussion about what it does, how it works and how to use it safely. Children in Early Years will explore mark making programs on screens, tablets or interactive whiteboard to experiment and communicate their ideas. They will Interact with adults and their peers and explore their environment using multimedia equipment, including cameras.	- To know that we can communicate online (email/text) - To contribute ideas to a class email or respond to a message - To create a story to combine words, pictures, sounds and animations (ppt) - Use simple writing tools to create their own content (office/purple mash) - Follow age-appropriate links provided by the teacher to research information - With support, use sound recording tools to convey a simple message - To sort objects into groups according to the criteria	- To compare the different ways that messages can be sent e.g email/text /telephone/letter and start to consider their advantages and disadvantages - To contribute and respond to an email (with support from teacher) - To look and talk about other people's contributions online (padlet/prezi/Scratch) - To consider who can see their contributions on scratch/padlet - To know that stories can be shared in different ways (photos/video/animation) - To create/use own pictograms/graphs (purple mash) - To create QR codes (goo.gl) - To access websites and documents using QR codes - To enter/save and retrieve pictures and text

		microscopes, iPads and visualisers to capture still and moving images With help, they will play back their captured recordings, demonstrating confidence and increasingly in control. They will be encouraged to explore ways of making and listening to sounds using simple programs, apps and devices, e.g talking postcards and age appropriate apps		
Vocabulary	Tier one	Safe, unsafe	Safe, unsafe, Password, world wide web, trust	password, world wide web, rules, safe, unsafe
	Tier two	password	Personal information	personal information , private
	Tier three	stranger	safe adults, stranger	appropriate , inappropriate, app

Computing in Key Stage 2					
Category of knowledge	NC Statements	Year 3	Year 4	Year 5	Year 6
Computer Science	- Design, write and debug programs that accomplish specific goals, including controlling or simulating	- To develop an understanding of how technology works and how computers process	– To understand that ICT allows for situations to be modelled which it would be	– To begin to develop understanding of how technology works; how computers process instructions	– To continue develop understanding of how technology works; how computers process

	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	instructions and commands - To create/edit and refine more complex sequences of instructions for a variety of programmable devices e.g using the repeat command - To use a computer to create basic applications, investigating how different variables can be changed and the effect this has - To understand that computer simulations can represent real life situations. - To use simulations to represent real life situation - To navigate a programming app - To control a character by dragging commands - To write a simple program/create a simple animation	impractical to try out in real life - To investigate the effects of changing variables in these simulations - To develop their understanding of how technology works and how computers process instructions and commands - To create a program which can be controlled by external inputs (Scratch) e.g to program their character to navigate their 3D world with an input using control device - To change algorithms/conditional statements and investigate the effect this has e.g use of 'if' and 'then'	and commands, including the use of coding languages. - To experience a selection of coding environments (Scratch, Code.org) - To design their own game including sprites, backgrounds scoring and/or timers - To use conditional statements to create unique algorithms - Begin to understand the history of Computer Science - Use variables to add variation to algorithms - To program start and ends to games involving wins, losses and draws - To create variable interaction in quizzes and games using a combination of selection, conditional statements and variables (Data blocks in scratch) - To evaluate the effectiveness of their algorithms	instructions and commands, including the use of coding languages. - To experience a variety of coding environments (Scratch, Code.org) - To show an understanding of the history of computing and computer science. - To design their own game including sprites, backgrounds, scoring and/or timers - To use conditional statements to create unique algorithms - Use variables to add variation to algorithms - To program start and ends to games involving wins, losses and draws - To create variable interaction in quizzes and games using a

				– To continually debug code to identify and correct errors exceptions and exploits	combination of selection, conditional statements and variables (Data blocks in scratch) – To evaluate the effectiveness of their algorithms – To continually debug code to identify and correct errors, exceptions and exploits
Vocabulary	Tier one	organise, program, repetition, scripted, software, store, program, repetition, retrieve, reverse sequence	manipulate, organise, program, repetition, scripted, selection, sequence, software, store, program, physical system, repetition, retrieve, reverse	execute, manipulate, organise, program, repetition, scripted, selection sequence, simulation, software, store program , physical system, repetition, retrieve	execute, manipulate, organise, program, repetition, scripted, selection sequence, simulation, software, store program , physical system, repetition, retrieve
	Tier two	algorithm, block language, command, debug, execute, manipulate, simulation sprite, , Test + improve	algorithm, block language, command, collaboration, debug, encrypted, execute, simulation, sprite, packets of data.	algorithm, block language, command, control, collaboration, debug, decomposition, sprite, packets of data, encrypted	algorithm, block language, command, control, collaboration, debug, decomposition, sprite, packets of data, encrypted
	Tier three	input, output, loops, engineer, physical system	HTTP, input, output loops, engineer, URL, , Error, Type + edit	HTTP, input output loops, reverse engineer, URL	HTTP, input output loops, reverse engineer, URL, hardware, IP address,

| Information technology | - 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 | - To use still and digital cameras

- To know what makes a good photo (hold the camera steady/point at people's faces/to discuss the quality of their image and make decisions (e.g. delete a blurred / bad image)

- To download images and video

-To select suitable sounds (including recording with a microphone)

- To recognise and use key features of layout and design such as text boxes, columns, borders, WordArt

- Explore and begin to use more advanced features in a paint package, eg colour picker, colour replacer
Save images and use them as part of other multimedia/ desktop publishing work | - To evaluate a range of digital media, appropriate to task e.g websites

- To plan structure and layout of document/presentation

- To improve presentation of a document by laying it out effectively

- To select and import images from digital cameras and graphics packages

- Select and import sounds (e.g own recording) and video/ visual effects

- Through peer assessment and selfevaluation, evaluate work both during and after completion, and make suitable improvements

- To develop an increasing awareness of intended audience. | - To use presentation software and skills to present work or information relating to their learning.

- To evaluate a range of digital media, appropriate to task e.g website, prezi, blog, pdfs and recognise key features of layout and design, and relate to other curriculum areas (Reading/Writing/Topic)

- To select software to support structure and layout of document/presentation

- To improve presentation of a document by considering its target audience

- To select and import graphics from digital cameras, graphics packages and online sources

- To select and import sounds (e.g own recording, free online sources) video/visual effects

- Through self-evaluation, evaluate projects both during | (Building on Yr5 work)

- Through peer assessment and self evaluation, evaluate projects both during and after completion, and make suitable improvements

- To continue to produce and add to a portfolio of written and visual work and projects for sharing with other children inside and out of school

- To engage in a range of online activities including, publishing and sharing work for evaluation and evaluating the work of others |

		– To use music software to select/record/organise and reorganise sounds – To locate, record, save and retrieve sounds – To add sounds from different sources. – Sequence still images and use simple editing techniques to create a presentation	– To import a photograph and explore the effects which can be created – To select areas and manipulate to give different effects. – To capture video clips to communicate their ideas – To cut and reorganise digital video – To use a timeline to organise frames of video footage – To add text, sound effects and other graphic effects – To select from your best work to save and share (presentation, class folder) – To use at least two online communication methods in topic work (blogs/emails etc.) – To discuss advantages and disadvantages of these communication methods	and after completion, and make suitable improvements – To develop projects with an awareness of intended audience – To capture video clips to communicate ideas and information to specific audiences – To edit, reorganise and enhance digital video for a specific purpose or audience – To begin to produce a portfolio of written and visual work and projects for sharing with other children inside and out of school to use online communication methods to support topic work – To consider language, layout and format when communicating with different people online	

			-To start to think about the different styles of language layout and format of online communications sent to different people (eg. when it is appropriate to use "text language"). - To begin to experience forms of online discussion: such as blogs, wikis, - Start new threads and contribute to others relevant to the topic; consider relevance of contributions		
Vocabulary	- Tier one	data, network, search, technologies, software	collecting data, network, software, search technologies	collecting, data, evaluating, network search, technologies, software.	collecting data, digital, content, digital devices, evaluating, network, search, technologies,
	- Tier two	digital content, digital devices,	server, digital content, digital devices,	server, digital content, digital devices,	
	- Tier three	safe search mode	cached, safe search mode,	cached, safe search mode,	server software, safe search mode cached,
Digital Literacy	- Select, use and combine a variety of software (including internet services) on a range of digital	- To reply to an email independently - To evaluate a range of printed and electronic texts,	- To open/read, and reply to email (independently) - To collaborate to create a document, giving thought to	- Use technology to present their work, showing an increasing degree of skill and using advanced software	(Building on Yr5 work) - Use technology to present their work, showing a degree of skill

	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 - Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	appropriate to task e.g newspaper, poster, webpage and recognise key features of layout and design - To organise and present information for a specific audience - To begin to experience forms of online discussion: such as blogs, wikis, quizzes, surveys and google hangouts - To know that ICT enables access to a wider range of information and tools to help find specific information quickly - Produce work using a computer, using more advanced features of programs and tools (font sizes) - To work collaboratively to create documents, including presentations - To understand the basic structure of a database	its audience and including links/images/embedded media (PPT) - To understand that ICT allows us to make improvements to our work quickly and efficiently. - To continue to use technology to create graphs and present data in different ways -To design and create a basic database - To use a database to answer questions that have been constructed - To enter data into a spreadsheet - To change data and observe changes in results	- To use different filming techniques and camera angles e.g. zoom, panning, wide shot etc. to create different mood/perspective - To plan a video or animation by drawing a storyboard (Storyboard It) - To use a range of sound effects, music and voice-overs to create mood/ atmosphere - To select and edit sounds, text, movie clips and other effects to suit purpose and audience - Begin to recognise that the internet may contain material that is irrelevant, bias and inappropriate. - Begin to understand how issues of copyright apply to their own work - Begin to understand the different type of copyright pertaining to digital medias	and using advanced software - To use a range of sources to check validity and recognise different viewpoints and the impact of incorrect data - Understand how issues of copyright apply to their own work - Understand the different type of copyright pertaining to digital medias - Recognise that the internet may contain material that is irrelevant, bias and inappropriate - Save and use pictures, text and sound recognising copyright issues

			- To add data to a pre-made database - To use the data in a pre-made database to generate graphs and charts - To use technology to create graphs and charts - To answer questions by searching and sorting the database			
Vocabulary	Tier one	Command, Evaluating digital content.	Acceptable/unacceptable behaviours, password personal information	Acceptable/unacceptable behaviours, password personal information	Acceptable/unacceptable behaviours password personal information
	Tier two	Password personal information	command evaluating digital content	command, evaluating digital content	command, evaluating digital content,
	Tier three	World Wide Web, Private	Private, World Wide Web	Private, World Wide Web, encryption, Virus threats, Social media.	Private, World Wide Web, encryption, Virus threats, Social media, online communication.