The intention of the Computing curriculum

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The computing curriculum will: ● **equip pupils to use computational thinking and creativity to understand and change the world.** ● **make deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems.** ● **teach the principles of information and computation, how digital systems work and how to put this knowledge to use through programming.** ● **build on this knowledge and understanding to ensure pupils are equipped to use information technology to create programs, systems and a range of content.** **enable pupils to become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.**

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What are the key features of 'knowledge-rich' assessment for Computing?
At EYFS, the knowledge takes full account of the Early Years Framework main characteristics of: ❑ Personal, Social and Emotional Development ❑ Physical Development ❑ Understanding the World ❑ Expressive Arts and Design
At key stage 1, the sticky knowledge takes full account of the national curriculum's main characteristics of: ❑ Algorithms ❑ Creating Programs ❑ Reasoning Using Technology ❑ Uses of IT beyond school ❑ Being Safe
At key stage 2, the sticky knowledge takes full account of the national curriculum's main characteristics of: ❑ Creating programs ❑ Reasoning ❑ Search engines ❑ Developing programs ❑ Network ❑ Using Programs   ❑ Being Safe
There are relatively few assessment statements as these knowledge statements should be what pupils retain forever. In other words, this knowledge is within their long-term memory and will be retained.

Computing: Foundation Stage 2		
	Three and Four-Year-Olds	Reception	ELG

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Personal, Social and Emotional Development	• Remember rules without needing an adult to remind them.	• Show resilience and perseverance in the face of a challenge. • Know and talk about the different factors that support their overall health and wellbeing: -sensible amounts of 'screen time'	• Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. • Explain the reasons for rules, know right from wrong and try to behave accordingly.
Physical Development	• Match their developing physical skills to tasks and activities in the setting	• Develop their small motor skills so that they can use a range of tools competently, safely and confidently.	
Understanding the World	• Explore how things work		
Expressive Arts and Design		• Explore, use and refine a variety of artistic effects to express their ideas and feelings.	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Key Vocabulary	Choices, Internet, Website, Equipment, Buttons, Movement, Screen, Mouse, Images, Keyboard, Technology, Count, Organise, Collect		

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Iii Assessment	

Computing: Key Stage 1			
Computing	National Curriculum	**Year 1**	**Year 2**
Algorithms	*Pupils should be taught to understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions*	• Recognise what an **algorithm** is. • Verbally create one step and two step algorithms.	• Understand that algorithms are used on **digital devices** (computers and phones see Uses of IT outside of school section).
Key Vocabulary		• **Algorithm (instructions)** **Directions-** Forward, backwards, left and right.	Should be able to explain why these instructions need to be clear and concise. • Recap on recognising what an **algorithm** and command is. **digital devices**, **Algorithms** (instructions), **Directions**- Left, right, half a turn, quarter of a turn etc

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Iii Assessment		Coding – The children begin using software to create a simple algorithm that draws a square. Instruction (T2) Coding (T2) Programs (T2) Can you think of any jobs where using coding would be useful? How could you use coding to help in [situation]?	Coding – Children begin using software to create a more difficult algorithm that draws a triangle Instruction (T2) Coding (T2) Programs (T2) Can you think of any jobs where using coding would be useful? How could you use coding to help in [situation]?
Create programs	*Pupils should be taught to create and debug simple programs*	• Create one and two step **algorithms** to plan a journey for a programmable toy. • Write simple program by writing simple algorithms •	• Create a simple program using a block of instructions (Programmable toy and moving onto to writing algorithms in blocks). • Test the simple programme and **debug**.
Key Vocabulary		• **Command, algorithm** • When writing algorithms, children should write using arrows e.g.	• When writing algorithms, children should write using arrows with numbers to show block e.g. 2 4

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			• **Code** (Algorithm/ command), **Coder** (Someone who creates a programme), **Block** (Group of commands), **Bug** (an error in the algorithm), **Debug** (Fixing the error)
Iii Assessment		•	•
Reasoning	*Pupils should be taught to use logical reasoning to predict the behaviour of simple programs*		• **Predict** what the outcome of a simple program will be (logical reasoning).
Key Vocabulary			• Understand what **predict** means

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Using technology	*Pupils should be taught to use technology purposefully to create, organise, store, manipulate and retrieve digital content.*	• Use a range of digital devices confidently (laptop, iPad, chromebook etc) • Retrieve information from a **website** (Could be used to gather information for geography, history and writing). • Recognise the **save** symbol and be able to **save** work independently.	• Organise, **retrieve** and manipulate digital content, including the web to complete simple searches. • Save their work confidently, open it and edit it.
Key Vocabulary		• Should be able to find and open their saved document. • **Create** a drawing, painting or picture book. • **Create, save, search, google, website, internet, chrome**	• **Retrieve** an image and insert into their work (Clipart/ image from ipad or the internet). • Create a word/ piece of writing on a digital device. **Retrieve, google, internet, chrome, website**
Iii Assessment			
Uses of IT beyond school *To be taught just before algorithms*	• *Pupils should be taught to recognise common uses of information technology beyond school*	• Talk about some of the IT uses in their own home.	• Know how **technology** is used in school and outside of school

Key Vocabulary		**Vocabulary/Guidance notes:** ● Explore how **algorithms** are used in a range of digital devices and other **technologies** such as sat nav, robots and traffic lights etc **Technology, algorithms**	
Safe use *Recap start of each lesson and should be specifically taught across the year.*	• Pupils should be taught to 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	• Recognise what safe means. • Use technology safely • Keep **personal information private** (School, age, address and name).	• Know where to go for help if concerned (Teachers, Head teacher, online safety coordinator and carers). • Recognise what a **digital footprint** and understand that it never disappears, even when deleted.
Key Vocabulary		• Understand the dangers of talking to strangers (make link with games consoles). **Personal, information , private, login/logout, password**	• **Digital footprint**

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| Iii Assessment | | E-Safety – Children are able to explain what their personal information is and that it needs to be kept private.

Safety (T1)
Information (T2)
Identity (T2)

What must we never do when we are online playing games?
What must we do if we have any concerns about something we see or hear?
Who can you talk to about your concerns? | E-Safety – Children are able to explain why their personal information needs to be kept safe.

Safety (T1)
Information (T2)
Identity (T2)

What must we never do when we are online playing games?
What must we do if we have any concerns about something we see or hear?
Who can you talk to about your concerns? |

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Computing	National Curriculum	Year 3	Year 4
Computing: Key Stage 2			
Create programs	Pupils should be taught to design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	● Design a sequence of instructions and write programs that accomplish specific goals.	• Design a sequence of instructions and write programs that accomplish specific goals.
Key Vocabulary		• Should start unplugged before moving onto Scratch. ● Use algorithms that include repetition and directional instructions including right angle turns, half a turn, three quarters of a turn etc. **Algorithms, code, sequence, repetition.**	● See Year 3 and use different forms of input (event blocks) and outputs (sound/pen etc) on Scratch **Algorithms, code, sequence, repetition, input and output.**
Iii Assessment		Coding – Children begin using software to create two algorithms that program the character to move with a flashing background. Coding (T2)	Coding – Children begin using software to create individual algorithms that allow each character to perform a different task. Coding (T2)

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		Debug (T3) Simulating (T3) How could you use coding to in other subjects? [topic]? What are the benefits and risks of using coding?	Debug (T3) Simulating (T3) How could you use coding to in other subjects? [topic]? What are the benefits and risks of using coding?
Develop programs	*Pupils should be taught to use sequence, selection, and repetition in programs; work with variables and various forms of input and output*	● design a sequence of instructions, including directional instructions and repetition.	● design a sequence of instructions, including directional instructions, inputs/ outputs and repetition. ● Begin to use variables.
Key Vocabulary		**Algorithms, code, sequence, repetition, input, motion, sprite, block**	**Algorithms, code, sequence, repetition, input and output, control, variable, sprite, block.**
Iii Assessment			

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Reasoning	*Pupils should be taught to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs*	• Detect and debug errors. Explain how a system works.	• Make an accurate prediction and explain. • Use reasoning to predict and explain how algorithms work.
Key Vocabulary		**Vocabulary/Guidance notes:** • *System*, e.g. algorithm to complete a task. • **Algorithm, bug, debug** • Use services such as email and recognise how they can provide opportunities for communication/ collaboration.	• **Algorithm, bug, debug** • Use keywords to effectively complete web searches.
Networks	*Pupils should be taught to understand computer networks incl the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration*	• Use services such as email and recognise how they can provide opportunities for communication/ collaboration.	• Use keywords to effectively complete web searches.
Key Vocabulary		• **Email, compose, communication, CC, address book, attachment, send.**	• **Search filtering, include, exclude, search engine, hardware, software, search results, copy/ paste.**

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Iii Assessment			
Search engines	*Pupils should be taught to use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content*		- collect and present information from a range of sources. - select and use software to accomplish given goals
Key Vocabulary			Use internet search facilities, copy and paste, combine hardware and software. **Search engine, hardware, software, search results**
Iii Assessment			
Using programs	Pupils should be taught to select, use and combine a variety of software (incl internet services) on a	- Select and use software. - Collect, present and evaluate information.	- See Year 3 - Explore different software to design and create software, including animation.

	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		• Present information from a range of sources. • Retrieve and manipulate digital images from the web into content.
Key Vocabulary		• Log in/out, don't save passwords, **Spreadsheet**, **data, software, cell, columns, rows, move cell, spin, < >, =. branching database, database.**	• Pupils should be making content effective for a specific purpose, thinking carefully about the use of font etc. • **Animation- stop-motion, frame, onion-skinning, video clip.** • **Spreadsheets- Average, charts, formula, timer, equals, random, formula wizard and See Y3**
Iii Assessment			
Safe use	Pupils should be taught to use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact	• use technology respectfully and responsibly Know different ways they can get help if concerned	• See Year 3. • recognise acceptable and unacceptable behaviour using technology
Key			**Acceptable, unacceptable, virus, cookies, SPAM, phishing, malware,**

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Vocabulary			
Iii Assessment		E-safety – Children are able to identify acceptable and unacceptable behaviour. Identity (T2) Responsibility (T3) Communication (T3) Why is it important to never share personal information over the internet to someone we do not know? What procedure must you take to report concerns? Why is it important to be respectful when online?	E-safety – Children are able to respond to a range of hypothetical situations, demonstrating respectful behaviour Identity (T2) Responsibility (T3) Communication (T3) Why is it important to never share personal information over the internet to someone we do not know? What procedure must you take to report concerns? Why is it important to be respectful when online?

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Computing: Key Stage 2			
Computing	**National Curriculum**	**Year 5**	**Year 6**
Create programs	Pupils should be taught to design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	• Design, write and debug programs with specific goals. • Write programs that combines more than one attribute.	• Design, write and debug programs with specific goals. • Write a program that combines more than one attribute
Key Vocabulary		• Use of 2 way selection (if statements) and variables to create an algorithm **Algorithms, code, sequence, repetition, input and output**	• Use of 2 way selection (if statements), nested loops and variables to create an algorithm.
Iii Assessment		Coding – Children begin using software to create complex algorithms to control opposing sets of traffic lights in the correct sequence. Coding (T2) Debug (T3) Simulating (T3)	Coding – **Y6 -** Children use software to create multiple algorithms contained in one sequence with an input switch to control different parts. Coding (T2) Debug (T3) Simulating (T3)

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		How could you use coding to in other subjects? [topic]? What are the benefits and risks of using coding?	How could you use coding to in other subjects? [topic]? What are the benefits and risks of using coding?
Develop programs	*Pupils should be taught to use sequence, selection, and repetition in programs; work with variables and various forms of input and output*	• develop programs that have specific variables identified	• develop a sequenced program that has repetition and variables identified
Key Vocabulary		Creating an algorithm that includes repeats, selection (if, then else statements), variables and degree turns • **Repeats, selection, decomposition, variable, algorithm, block, sprite.**	• Creating an algorithm that includes variables, turns, repeats and loops, use of if statements. • loops = a repeat function inside of another repeat function. • **See Y5, nested loops (also known as iteration)**
Iii Assessment			

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Reasoning	*Pupils should be taught to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs*	● Debug and evaluate programs, reaching conclusions that help inform a variety of future programming.	● design algorithms that use repetition and 2-way selection, including if/then, else
Key Vocabulary		• **Algorithm, detect, bug, debug**	• Explain the choices of selection. • **2-way selection**
Networks	*Pupils should be taught to understand computer networks incl 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 filtering, e.g. use of "speech marks" for specific keywords. ● Use of + for must include, use of - for exclude. **Search filtering (recap), exclude/ include (recap) keywords**	**Internet, World Wide web, Network, router, network cables, wireless Local area network (LAN) Wide area network (WAN)**
Key Vocabulary		•	•
Iii Assessment		•	•

Search engines	*Pupils should be taught to use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content*	• understand how search results are selected and ranked • be aware that some search engines may provide misleading information	
Key Vocabulary		Understand search results e.g. adverts, popular pages rank higher.	
Iii Assessment			•

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Using programs	Pupils should be taught to select, use and combine a variety of software (incl 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	- Combine software on a digital device - Create, collect, analyse and evaluate data, information and programs that have a specific goal. - Choose appropriate program/ data for task. - present the data collected in a way that makes it easy for others to understand
Key Vocabulary		- Use software such as Excel/Sheets and other Microsoft programs. - Create data charts/graphs to present information. - Pupils should look at good examples, evaluate how information is presented to inform their own. **Software, data, cell, spreadsheet, average, formula, excel, SUM, * for division and multiplication (Freeze panes- Y6)** **Concept map- Concept, connection, mode, stage.**
Iii Assessment		•

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Safe use	Pupils should be taught to use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact	● Understand that they have to make choices when using technology and that not everything is true and/or safe ● Identify and minimize risks. ● Identify a range of ways to report concerns.	● See Year 5 ● Be increasingly aware of the potential dangers in using aspects of IT and know when to alert someone if feeling uncomfortable
Key Vocabulary		• **Online safety (recap), plagiarism (recap), identify theft, reference and encryption.**	• **Digital footprint (recap), spoof, phishing (recap), PEGI rating.**
Iii Assessment		E-safety – Children are able to identify a range of ways to report concerns about content and contact. Identity (T2) Responsibility (T3) Communication (T3) Why is it important to never share personal information over the internet to someone we do not know? What procedure must you take to report concerns? Why is it important to be respectful when online?	E-safety – **Y6 -** Children are able to demonstrate understanding of anti-viral software and ways to protect data and personal information. They know when to report concerns and the ways in which to do it **Mastery -** Children are confident in both personal and data security. They know a range of situations where information is at risk, and are able to demonstrate a range of skills to protect themselves and their data including use of cookies, password protection and malicious emails.

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			Identity (T2) Responsibility (T3) Communication (T3) Why is it important to never share personal information over the internet to someone we do not know? What procedure must you take to report concerns? Why is it important to be respectful when online?

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