Welton St Mary's Church of England Primary Academy

Computing Curriculum

'Whether you want to uncover the secrets of the universe, or you want to pursue a career in the 21st century, basic computer programming is an essential skill to learn'.

Stephen Hawking

Computing Intent

All pupils at Welton St Mary's Academy will be provided **opportunities** to engage in high quality learning experiences in the 3 core elements of computing: Information Technology, Computer Science and Online Safety. Technology plays an ever-increasingly important role in society and our lives. With this in mind, we aim to help children develop into digitally literate users of technology who are able to **flourish**, **creatively and safely** in this digital world. Learning about Information Technology will allow pupils to effectively use the functions of computers as well as to create a range of content and media. Through Computer Science, pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. **Through challenge and support**, we guide children through a progressive computer science programme of study in small steps, with the teacher often facilitating and supporting the learning as the children are encouraged to self-discover and find solutions to problem themselves. A consistent focus on online safety will ensure that children are equipped with the knowledge and skills to evaluate content and use technology in a kind, responsible and safe manner.

The progressive objectives within each core concept ensure a solid grounding for future learning and for the future workplace so that our children can be **agents of positive change** in an increasingly digital world.

Core Concepts

CONCEPT – Computer systems and networks

- Understand how networks can be used to retrieve and share information and come with associated risks
- What is a computer, how do it's constituent parts function together as a whole

CONCEPT – Computer Science (through our programming units)

- Understand and apply the fundamental principles and concepts of computer programming, including abstraction, logic, sequencing, algorithms and data representation
- Solve problems through creating and manipulating instructions for computers to follow

CONCEPT – Safety and Security (delivered through our 8 strands from the framework above)

- Are competent and confident in using computer technology both creatively and for a specified purpose
- Are able to identify and avoid risks in order to use communication technology safely, responsibly and effectively

CONCEPT – Creating Media

- Select and create a range of media including text, images, sounds, and video
- Use software tools to support computing work

CONCEPT – Data and Information

- Understand how data is stored, organised, and used to represent real-world artefacts and scenarios

Implementation

At Welton St Mary's computing will be taught using the nationally recognised Teach Computing curriculum, which is created on behalf of the National Centre for Computing Education (NCCE). All learning outcomes can be described through a high-level taxonomy of ten strands. Whilst all strands are present at all phases, they are not always taught explicitly. These strands are ordered alphabetically as follows:

- Algorithms
- Computer Networks
- Computer Systems
- Creating Media
- Data and Information
- Design and Development
- Effective Use of Tools
- Impact of Technology
- Programming
- Safety and Security

The units are based on a spiral curriculum. This means that each of the themes is revisited regularly (at least once in each year group), and pupils revisit each theme through a new unit that consolidates and builds on prior learning within that theme. This style of curriculum design reduces the amount of knowledge lost through forgetting, as topics are revisited yearly. Our curriculum is inclusive and ambitious and research-informed, with every aspect of the Teach Computing Curriculum being reviewed each year and changes made as necessary. Our curriculum covers all aspects of the National Curriculum Programmes of Study.

At Welton St Mary's, children have access to a computer suite and each year group is equipped with a set of iPads providing a well-resourced and inspiring learning environment to learn in. This ensures that all year groups have the opportunity to use a range of devices and programs for many purposes across the wider curriculum, as well as in discrete computing lessons. Employing cross-curricular links motivates pupils and supports them to apply the knowledge and skills, and to recall previous knowledge which they have learned.

In an ever-changing digital world, ensuring pupils' safety online has never been more important. The Teach Computing curriculum that we follow teaches online safety as it is woven throughout the curriculum. However, due to its significance and the need for all 8 strands to be taught explicitly, we also supplement this with 8 online safety lessons per year group (progressive across the school) using the National Online Safety resources. The 8 strands taught are as follows:

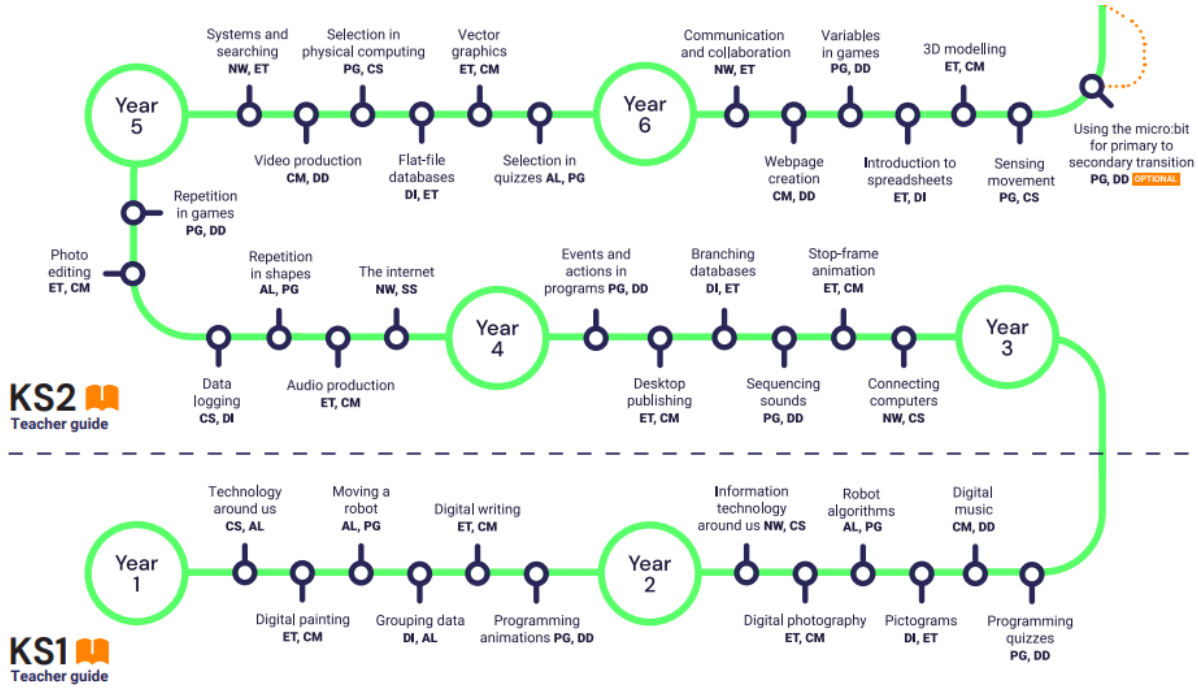
1) Self-Image and Identity
2) Online Relationships
3) Online Reputation
4) Online Bullying
5) Managing Online Information
6) Health and Wellbeing
7) Privacy and Security
8) Copyright and Ownership

The children also use Seesaw for their home learning, which is a digital learning platform allowing them to share their content, access learning and interact with the work of others in a safe, controlled environment.

Teach Computing Curriculum Journey

Key

AL Algorithms
CS Computing systems
CM Creating media
DI Data & information
DD Design & development
ET Effective use of tools
IT Impact of technology
NW Networks
PG Programming
SS Safety & security



Computing Overview

 This symbol shows where mouse and keyboard skills are explicitly taught or used greatly. All units using desktop computers will provide the opportunity for mouse skills to be practised and applied.

You will see on the document the software and hardware required to teach each unit of work. Online safety is woven throughout the curriculum and also taught explicitly (see online safety curriculum below for more detail).

On the overview, you will see where online safety links are made during each unit. Each number corresponds to the 8 **Education for a Connected World links** strands.

	Autumn term 1	Autumn term 2	Spring term 1	Spring term 2	Summer term 1	Summer term 2
Year 1	**Computer systems and networks**  **Technology around us**	**Data and information** **Grouping data**	**Programming A** **Moving a robot (off screen)**	**Online Safety** 	**Creating media**  **Digital writing**	**Programming B** **Programming animations (on screen)**
Cross curricular links			Maths – measure and geometry	PSHE	English - writing	Maths – measure and geometry
Software and Hardware required	paintz.app Desktop computers	Laptops or desktop computers	Bee-bots		Microsoft Word Laptops or desktop computers	Scratch Jr iPads
Online Safety strands	1, 5, 6, 8	5		1, 2, 3, 4, 6, 7		
Year 2	**Computer systems and networks** IT around us	**Online Safety** 	**Programming A** Robot algorithms	**Data and information** Pictograms	**Creating Media** Digital music	**Programming B** Programming Quizzes

Cross curricular links			Maths – measure and geometry	Maths – data inc pictograms, tally charts, block diagrams and simple tables	Music – The Planets by Gustav Holst	Maths – measure and geometry
Software and Hardware required	Microsoft PowerPoint Computers		Bee-bots	j2e pictogram and j2e chart iPads or Computers	Chrome Music Lab and Microsoft Word Computers	Scratch Jr iPads
Online Safety strands	6	1, 2, 3, 4, 7, 8		5		
Year 3	**Computing systems and networks** Connecting computers	**Online Safety** 	**Programming A** Sequencing sounds	**Data and information** Branching databases	**Creating media**  Desktop publishing	**Programming B** Events and actions in programs
Cross curricular links				Maths – statistics Science - gathering, recording, classifying and presenting data	English - writing	
Software and Hardware required	paintz.app (or Microsoft Paint) Desktop computers in the ICT suite		Scratch Desktop computers or laptops	https://www.j2e.com/jit5#branch	https://www.canva.com/ Desktop computers	Scratch
Online Safety strands	7	1, 2, 3, 4, 6, 7			5, 8	
Year 4	**Computing systems and networks** The Internet	**Online Safety** 	**Programming A** Repetition in shapes	**Data and information** Data logging	**Creating media** Photo editing	**Programming B** Repetition in games
Cross curricular links				Science - taking measurements using data loggers. Maths - statistics		
Software and Hardware required	Chrome Music Lab iPads or Computers		FMSLogo or Turtle Academy on iPads Computers/iPads	Data Harvest Vu+ data logger and the EasySense2 App	Paint.net: https://www.getpaint.net/download.html Computers	Scratch

Online Safety strands	2, 5	2, 3, 4, 6, 7, 8			1	
Year 5	**Computing systems and networks** Systems and searching	**Creating media** Video production	**Online Safety** 	**Data and information** Flat-file databases	**Creating media** Introduction to vector graphics	**Programming B** Selection in quizzes
Cross curricular links				Maths - statistics	Art and design	
Software and Hardware required	iPads or computers	iMovie iPads		https://www.j2e.com/database/ Any device	Google Drawings and PowerPoint Computers	Scratch
Online Safety strands	5, 7	2	1, 2, 3, 4, 6, 8			
Year 6	**Computing systems and networks** Communication and collaboration	**Creating media** Web page creation	**Programming A** Variables in games	**Data and information** Introduction to Spreadsheets	**Online Safety** 	**Programming B** Sensing movement (using the micro:bit)
Cross curricular links				Maths - statistics		
Software and Hardware required	Google Slides or PowerPoint Any device	Microsoft Sway or PowerPoint	Scratch Computers	Excel Desktop computers		Micro:bits Desktop computers
Online Safety strands	1,2,5	8		5	1, 2, 3, 4, 6, 7	

Please see the links below for a curriculum map which details a progression of skills for each strand with links to the National Curriculum identified:

KS1 TCC Curriculum map_v1.2

KS2 TCC Curriculum map_1.2

Assessment

Concept: Computer systems and networks • Understand how networks can be used to retrieve and share information and come with associated risks • What is a computer, how do it's constituent parts function together as a whole			
	By the end of Y2	By the end of Y4	By the end of Y6
Expected	• I can explain what technology and computers are, why we use them and how they help us. • I can identify and use examples of technology and IT in school and at home. • I can use a computer to type, click, drag, save, and open my work. • I can choose and use IT for different activities and purposes. • I can explain how different IT devices can work together. • I can follow rules to stay safe and healthy when using technology.	• I can explain how digital devices work, including their inputs, processes, and outputs. • I can classify and design digital devices and recognise how they are similar or different to non-digital tools. • I can describe how devices are connected in a network and how information is shared between them. • I can explain the internet as a network of networks and how it provides services like websites and online content. • I can describe how to access, create, and share content online safely and responsibly. • I can recognise that not all information online is true, accurate, or owned by me, and I can explain why we need to protect networks and content.	• I can explain how computer systems work, including their inputs, processes, outputs, and human elements. • I can describe how computer systems communicate with each other and transfer data across networks using data packets. • I can search effectively online, refine my searches, and explain how search engines work and rank results. • I can recognise the benefits and limitations of computer systems and search tools. • I can explain how the internet allows media to be shared and how to access and send information online. • I can communicate and collaborate online safely, choosing the right tools and understanding when information is public or private.

Concept: Computer Science (through our programming units) • Understand and apply the fundamental principles and concepts of computer programming, including abstraction, logic, sequencing, algorithms and data representation • Solve problems through creating and manipulating instructions for computers to follow			
	By the end of Y2	By the end of Y4	By the end of Y6

Expected	• I can explain what a command or instruction will do. • I can plan and create a sequence of commands to make a program work. • I can predict what will happen when I change the order of instructions. • I can combine commands to solve problems and find more than one solution. • I can use my algorithm to create and debug a program. • I can explain that a program can have pictures or characters as well as instructions. • I can design, change, and improve my own project.	• I can identify and choose objects (sprites, backdrops) and blocks to create a program. • I can plan, create, and follow a sequence of commands to make my design work. • I can use events to control actions and predict how programs will behave. • I can use loops (count-controlled and infinite) and procedures to repeat actions and simplify my code. • I can test, modify, and debug my program to make it work as planned. • I can make design choices for my project, including artwork, actions, and keys, and explain them. • I can evaluate my program, including the use of repetition and sequences, and improve it.	• I can plan and design programs using algorithms and flowcharts. • I can use selection ('if… then… else…') to create different outcomes in a program. • I can identify, create, and change variables to store numbers or text and use them in my programs. • I can test, debug, and improve my programs using a design or plan. • I can choose and create the artwork, names, and inputs for my project. • I can explain how program flow and conditions affect what happens in a program. • I can transfer programs to new environments or devices and use events and inputs to control them.

Concept: Safety and Security (delivered through our 8 strands from the framework above)

- Are competent and confident in using computer technology both creatively and for a specified purpose
- Are able to identify and avoid risks in order to use communication technology safely, responsibly and effectively

	By the end of Y2	By the end of Y4	By the end of Y6
Expected	• I can talk about how I feel online and tell a trusted adult if I feel sad, worried, or unsafe. • I can be kind online and know what unkind or bullying behaviour looks like. • I can explain that what I share online can be seen by others. • I can ask permission before using, sharing, or posting anything online. • I can keep my personal information private online. • I can follow rules to stay healthy and safe when using technology. • I can explain that not everything we see online is true.	• I can explain how my online identity can change and choose safe and appropriate usernames. • I can behave respectfully online and report unkind or hurtful behaviour. • I can ask for help when I am unsure about something online or if something worries me. • I can explain that some information online is untrue, and I can search safely to check facts. • I can follow age ratings and choose positive, healthy activities online. • I can block, report, and get support when something online is not okay. • I can explain that websites and apps collect data, and	• I can explain the positives and negatives of being online, and how to stay healthy while using technology. • I can recognise bullying online and offline, including jokes that go too far, and I know how to report it. • I can make safe choices when communicating with people online, including strangers and communities. • I can explain how my online identity, photos, avatars, and posts can affect how others see me. • I can judge whether online information is real or fake, and search safely for information. • I can protect my privacy online, including my data,

	• I can say when something belongs to me or to someone else.	I can give or refuse consent. • I can explain that ideas, images, and work belong to someone, and copying without permission is wrong.	spending, and digital footprint. • I can create a positive online presence and understand the impact of my actions online. • I can explain that online content belongs to people, and I must use, copy, and share it legally and respectfully.

Concept: Creating Media • Select and create a range of media including text, images, sounds, and video • Use software tools to support computing work			
	By the end of Y2	By the end of Y4	By the end of Y6
Expected	• I can use a keyboard to type letters, numbers, spaces, and capital letters, and correct my mistakes. • I can open a computer program, enter text, and change the style, font, or format. • I can select, edit, and review my text and decide if my changes improve my work. • I can explain the difference between typing and writing and say which I prefer. • I can listen to music, describe how it sounds, and say what I like or don't like. • I can create and play rhythm patterns using instruments or a computer. • I can connect sounds, images, or ideas to music and experiment with pitch and sequences of notes. • I can review, refine, and explain the changes I make to my music or digital work.	• I can use text and images to communicate messages clearly. • I can change fonts, colours, and layouts to suit a purpose. • I can create templates, choose page designs, and arrange content effectively. • I can compare digital work with hand-made work and explain why digital tools are useful. • I can edit and improve images using cropping, rotation, colour effects, and cloning. • I can combine text and images, review my work, and use feedback to make improvements.	• I can create and modify digital images using shapes, layers, alignment tools, and grouping to communicate a purpose. • I can plan, capture, and edit video using cameras, microphones, angles, and filming techniques to improve my work. • I can review, reshoot, and edit videos to make my final outcome better. • I can explore websites, understand layouts, and plan my own web page with suitable content. • I can add images, text, and hyperlinks to my web page and evaluate the user experience. • I can find and use copyright-free media and explain why it is important to do so.

Concept: Data and Information • Understand how data is stored, organised, and used to represent real-world artefacts and scenarios			
	By the end of Y2	By the end of Y4	By the end of Y6
Expected	• I can describe, count, and group objects using labels or properties.	• I can create yes/no questions to group and identify objects.	• I can collect, record, and organise data in a structured way.

	• I can collect and record data using tally charts and pictograms. • I can enter, organise, and present data on a computer. • I can read and explain data to answer questions like more/less or most/least. • I can share information safely and draw simple conclusions from it.	• I can arrange objects in a branching database and test it to see if it works. • I can compare and explain different branching database structures. • I can create a physical or digital branching database to reflect my plan. • I can choose and plan a data set to answer a question. • I can use sensors or data loggers to collect and record data over time. • I can view, sort, and interpret collected data to answer questions. • I can draw conclusions from data and explain the benefits of using data logging.	• I can use databases and spreadsheets to store, sort, group, and search data. • I can use multiple criteria to filter and refine data to answer questions. • I can use formulas in spreadsheets to calculate and update results. • I can select and create charts to present data clearly. • I can draw conclusions from data and present my findings.

Online Safety

Intent

At Welton St Mary's Primary Academy we believe that technology should be embraced as a way of improving and enriching the lives and learning of our pupils at school and beyond. However, we also recognise the risks posed by society's greater use of technology both to people in general and specifically for children. Online safety is about using technology in a responsible and respectful manner in order to stay safe and enjoy the benefits technology can bring to our lives. We believe that our school rules of being kind, safe and responsible must be applied to all areas of our lives, including our online activity.

'Safety and security' is one of our 5 key concepts in our computing curriculum at Welton St Mary's, and we view using technology safely as being pivotal to being digitally literate. As a result, we ensure that the children receive a progressive and explicit online safety curriculum which includes learning about 8 aspects of safety and security. These 8 aspects are set out in the UKCCIS Education for a Connected World Framework, and are as follows:

There are 8 strands to online safety (see above). This online safety unit includes 6 of these strands, with each one having a separate lesson dedicated to it. The other 2 strands are integrated into the rest of the computing curriculum. The strands explicitly taught can be seen below. These 6 lessons, along with the online safety strands incorporated into the main computing curriculum, ensures that all 8 strands are delivered in each year group. Teaching online safety is responsive and teachers will use the following elements to inform and adapt the lessons as set out so that learning is relevant for the pupils: their own professional judgement, knowledge of the outcomes of pupil and parent online safety surveys, knowledge and understanding of the needs of the year group through incidents or discussions that have arisen.

Artificial Intelligence

When you see this AI symbol, it means that the lesson will have a specific focus around AI.

We acknowledge that pupils benefit from a knowledge-rich curriculum that allows them to become well-informed users of technology and understand its impact on society. Strong foundational knowledge will ensure that pupils develop the right skills to make the best use of generative AI.

As part of our computing curriculum, children in Year 4-6 are taught explicitly about the potential benefits and limitations of using AI tools.

In Year 4, children will focus on understanding what AI is, how it helps us search online, and that AI-generated search results may not always be reliable.

In Year 5, children will explore AI in online searches more deeply, learning to check sources before using content suggested by AI and understanding that AI-generated suggestions do not automatically make content free to use.

In Year 6, children will learn how AI can create realistic images, videos, and text (such as deepfakes and chatbots), recognise that not everything online is real or trustworthy, and understand how AI and online platforms may collect or use personal data.

Year 1	**Self-Image and Identity** Feeling sad, uncomfortable, embarrassed or upset and trusted adults	**Online Bullying** Kind and unkind behaviour online	**Online Reputation** Sharing information online	**Online Relationships** Asking permission and communicating with technology	**Privacy and security** Mt private information	**Health and Wellbeing** Being healthy with technology and rules
Year 2	**Self-Image and Identity** What I want to look like online and risky situations online	**Online Bullying** What is bullying and how does it make someone feel. Getting support.	**Online Reputation** My profile and speaking to trusted adults. Knowing that not everything we see, read, or hear online is true.	**Online Relationships** How to ask permission and consent	**Privacy and security** Stronger passwords and the internet at home.	**Copyright and ownership** Does it belong to me/them?
Year 3	**Self-Image and Identity** Usernames and changing identity online	**Online Bullying** Appropriate behaviour online and getting support. Reporting any online worries.	**Online Reputation** Being unsure and seeking help	**Online Relationships** Hurtful situations online	**Health and Wellbeing** Age ratings and positive activities	**Privacy and security** Reporting and blocking *(specific to the apps the children are using)*
Year 4	**Health and Wellbeing** Taking care of your mind Our free time	**Online Bullying** Positive and negative comments	**Online Reputation** Tips for searching online Finding reliable information online. 	**Online Relationships** Healthy online behaviour and respect and privacy	**Privacy and security** Consent and data saved online	**Copyright and ownership** The impact of plagiarism and usage rights
Year 5	**Health and Wellbeing**	**Online Bullying**	**Online Reputation** The perfect profile	**Online Relationships**	**Self-Image and Identity**	**Copyright and ownership** Google SafeSearch

	Spending money in games Pros and cons of being online	Online and offline bullying Telling jokes/banter	Making judgements	Strangers online and our communities	Copy, modifying and altering avatars Photos online	Using online content 
Year 6	**Self-Image and Identity** Challenging stereotypes and managing online situations	**Online Bullying** Screengrabs and screen shots Impact of online bullying	**Online Reputation** Creating a positive online presence	**Health and Wellbeing** Pressure and technology including social media	**Privacy and security** Real or fake? 	**Online Relationships** To share or not to share? My digital footprint