Willow Lane Computing Curriculum

Our intent

Computing equips children to use computational thinking and creativity to understand and change the world' (DfE Computing curriculum). By engaging critically with how to use the internet and technology safely, and by teaching digital citizenship, children at Willow Lane are given the skills necessary to navigate an ever-changing digital world. Through the use of software to program apps, games and animations on iPads, children are taught how to resolve errors, find solutions and refine their choices. Computing lessons cover both how to safely use the internet and the fundamental programming principles that underpin computing. Importantly, Computing at Willow Lane is also interwoven through other subjects, whether that is using databases in science, publishing written work, making movie trailers of stories or using Green Screen technology to present news reports from space. This combination of skills and learning opportunities enables children to master essential computing skills, preparing them for computing in the 21st century.

Implementation

Our computing curriculum is broken into 4 strands:

- Understanding Technology (UT)
- Programming
- Information and Communication Technology (ICT)
- Online Safety

These strands may be taught independently or through other areas of the curriculum. They may also be interwoven to support children in developing a deep understanding of how the concepts and knowledge are linked and apply in different contexts. Our programming lessons are primarily supported by Discovery Coding. This introduces children to a wide range of coding and programming principles and gives them opportunities to create games and applications. We focus initially on block coding, but also explore HTML coding for children who are ready for more of a challenge. We also use other resources and applications to teach coding, including website design and Scratch Jnr. ICT lessons are frequently taught through cross-curricular contexts to provide children with purposeful learning experiences. This may include using internet browsers to research for history lessons; creating presentations using Keynote app; data handling in science using Numbers app; or combing writing and images in Book Creator. Online safety is taught explicitly at the beginning of each year, in each year group. We use Project Evolve and Scarf resources to support high quality teaching and learning of online safety knowledge. We also regularly revisit this learning throughout ICT and HRE lessons as required to meet the needs of each class.

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Implementation

The strands are often interconnected and so they are often taught alongside each other. For example, Understanding Technology knowledge may be taught within lessons focused on programming. E-safety is regularly revisited during ICT focused lessons.

It is also important that children engage with purposeful tasks in order to motivate our learners and ensure that they understand how technology can be a powerful tool for their learning and in the wider world. As such, many of our computing lessons, particularly those from the ICT strand, are incorporated within other areas of the curriculum. Children will develop their research skills by collecting and researching information on significant individuals from history or recording data from science experiments. They will certainly use a range of digital media and presentation software to communicate their learning to an audience.

However, we are also aware of the risks of cognitive overload for novice learners and understand that getting to grips with a new app can easily prevent children from their intended learning (in history, for example). As such, we provide children with dedicated ‘tinkering’ sessions. These are lessons in which children are encouraged to explore new software and technology. In these sessions, children are taught specific skills by their teacher, but are also encouraged to try things out and learn from one another. This means that children have mastered the basics of a technology before applying it to another area of their learning. In this way, they are able to focus on the content of their presentations and enhance the communication of their learning through technology, rather than be distracted by the technology.

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Computing Progression: Online Safety

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum	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 safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour; identify a range of ways to report concerns about content and contact.			
Pupil Knowledge	Pupils are becoming increasingly aware of content, contact and conduct benefits and risks, how to manage them safely and where to go for help and support when they have concerns or feel unsafe, worried or upset. They are beginning to develop a better understanding of their own and others' 'identity' (including online), the importance of keeping personal information private and of seeking permission before sharing. They check with an adult before clicking on pop ups, notifications or dialogue boxes. They increasingly use a range of digital devices to communicate safely and respectfully online, making links to positive behaviour in the physical world.		Pupils are able to identify a range of content, contact and conduct benefits and risks, describe how to manage them safely and respectfully and know where to go for help and support when they have concerns. They can explain what is meant by 'identity', how this might be represented differently in different situations and why others might mis-represent their identity. They develop their understanding of 'trust' and the importance of being careful about what is shared online and of giving and gaining consent. Pupils can describe positive and negative effects of online activity / behaviours and begin to understand how to make safer and healthier decisions, including considering the appropriateness of games and online content for different ages. Pupils can describe positive ways for someone to interact with others online and understand how this will positively impact on how others perceive them.	Pupils identify and manage the benefits and risks of a range of online activities in terms of content, contact and conduct to ensure they are safe, respectful and responsible online. They know how to report concerns, seek support for themselves and others and persist until they get the help they need. Pupils make responsible choices about their own online identity and consider the potential impact of this on their digital footprint. They understand that online identities can be copied or modified and some of the possible implications of this. They can describe times when they might responsibly share personal information (including payment details), the importance of seeking permission and the need for strong passwords. They can describe ways technology may impact their own and others' physical and mental wellbeing (positively and negatively), understand their responsibilities in regard to this and can suggest a range of positive strategies to limit the negative impact of technology and online behaviours.	
	The above online safety statements have been created with reference to previous Cambridgeshire statements, the Cambridgeshire PSHE Digital Lifestyles curriculum (2020) and Education for a Connected World. For schools looking for more detailed outcomes for individual year groups, please refer to Education for a Connected World and Cambridgeshire's phase overview documents.					

Computing Progression: Understanding Technology

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum	Recognise common uses of information technology beyond school		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			
Pupil Knowledge	Pupils recognise and can give examples of common uses of information technology they encounter in their daily routine.	Pupils recognise common uses of information technology beyond school, including those which they don't frequently encounter in their daily routine. Pupils understand that computers are not intelligent but can appear to be when following algorithms. They can share examples of this.	Pupils understand that computers (in various forms) generally accept inputs and produce outputs and can give examples of this. Pupils recognise - and can describe - some of the services offered by the Internet, especially those used for communication and collaboration.	Pupils develop a basic understanding of how computers can be linked to form a local network such as those found in schools. Pupils recognise that there is a difference between the Internet and the World Wide Web. They can recognise and describe some of the services offered by the Internet, especially those used for communication and collaboration.	Pupils know that there is a difference between the Internet and the World Wide Web and understand that the web is just one of the services offered by the Internet (as well as, e.g. email and VoIP services such as Skype). They appreciate how search results are ranked, including an understanding of the use of different algorithms to prioritise results. Pupils understand that the highest ranking search results may not always be the most relevant. They appraise search results based on their relevance and trustworthiness, and can explain what is meant by 'fake news'	Pupils understand and can explain how computer networks work, including the Internet. They begin to understand how data travels across networks in packets and how these can be broken up and reconstructed. When accessing information online, pupils recognise that opinions may be presented as facts. They can describe why an opinion may easily become popular online but they understand that this doesn't necessarily make it true. They understand that some online content may be commercially sponsored such as adverts in search results or content presented by social media influencers.
	More specific guidance for individual year group teachers can be found in the phase overviews at www.theictservice.org.uk/primary-computing					

Computing Progression: Programming

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum	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			
Pupil Knowledge	Learn that programs execute by following clear instructions. **Understand that programs respond to inputs to do different things.** Learn to combine start and input events to create more advanced apps and programs using precise language.	**Learn that programs respond to different sorts of inputs, and that the keyboard can be used to control objects on screen, not just by clicking on the directly.** Learn that one object can be used to control another object e.g. writing code so clicking a button gives an instruction to make a lorry move.	**Learn to make things happen in a sequence, creating simple animations and simulations.** Learn to code with 'if statements', which select different pieces of code to execute depending on what happens to other objects.	Learn how computers use variables to count things and keep track of what is going on, then create simple games that use a score variable. **Learn how computers use repetition and loops to do things over and over again.**	**Learn how computers use numbers to represent things, such as how fast things are moving, and where they are.** Learn how computers can generate random numbers and how these can be used in simulations.	**Learn how computers use numbers to represent things, such as how fast things are moving, and where they are.** Learn how computers can generate random numbers and how these can be used in simulations.
	More specific guidance for individual year group teachers can be found in the phase overviews at https://coding-app.discoveryeducation.co.uk/?locale=en-gb					

Computing Progression: ICT

<table>
<tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th><th>Year 5</th><th>Year 6</th></tr>
<tr><td>National Curriculum</td><td colspan="2">Use technology purposefully to create, organise, store, manipulate and retrieve digital content</td><td colspan="4">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</td></tr>
<tr><td>Pupil Knowledge</td><td colspan="2">With adult guidance, pupils use a range of technology to enhance and present their learning. Within both specific computing lessons and cross curricular contexts, pupils are able to:

• enquire with purpose, accessing digital content such as text, still and moving images, video and audio

• collect data (e.g. numerical, research facts etc.) which they are able to retrieve, store and present as graphs, tables and charts

• present and communicate their learning to others in a variety of ways using text, still images, video and audio, including combining 2 or more of these mediums</td><td colspan="2">With increasing levels of autonomy, pupils are becoming confident and creative users of technology.

Within both specific computing lessons and cross curricular contexts, pupils are able to:

• follow and expand on agreed lines of enquiry, using key words and phrases to effectively access digital content such as text, still images, video and audio
• identify, collect and manipulate different types of data (e.g. numerical, research facts etc.) which they present as information, showing a greater awareness of purpose and audience.
• present and communicate their learning to others in a variety of ways using text, still images, video and audio. They combine digital tools to achieve specific goals and think carefully about the impact on their audience.</td><td colspan="2">Pupils are confident, capable and creative users of technology.

Within both specific computing lessons and cross curricular contexts, pupils are able to:

• create and effectively follow lines of enquiry to support their learning, and are discerning in evaluating digital content they encounter

• identify, collect and analyse different types of data (e.g. numerical, words, images, video etc.) which they manipulate and re-present as information for a variety of audiences and purposes.

• select and make effective use of digital tools to create digital artefacts both under instruction and of their own choosing;

• decide on the most appropriate way to present their learning - thinking about aesthetics, functionality and impact on the user, and responding appropriately.</td></tr>
<tr><td></td><td colspan="6">More specific guidance for individual year group teachers can be found in the phase overviews at www.ccc-computing.org.uk</td></tr>
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	Year 1/2	Year 3/4	Year 5/6
Research	Pupils explore and navigate around adult chosen / age appropriate website which includes text / images / sounds / video. Relate what they have found out. They begin to conduct specific key word searches using a child friendly search engine to locate exact information in text / images / sounds / video with the intention of answering simple / closed questions.	Pupils can navigate with purpose a small, chosen collection of age / interest appropriate texts and websites to read, discover and follow widening lines of enquiry. They conduct searches and compare results from child friendly search engines to locate precise facts and demonstrate comprehension. They identify suitable key words and phrases to use in own lines of enquiry.	Pupils select suitable search terms and use to follow own areas of interest filtering to show, access and garner information from a range of media sources. They start to cross-reference information. They question and seek to verify and determine accuracy including identification of source.
Data Handling	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. Ask and answer questions about totalling and comparing categorical data. Interpret and present data using bar charts, pictograms and tables Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. Solve comparison, sum and difference problems using information presented in a line graph. Complete, read and interpret information in tables, including timetables.	Interpret and construct pie charts and line graphs and use these to solve problems Calculate and interpret the mean as an average.
Presentations	Pupils use tools to mix together different media (such as text and images) to present what they have learned and plan and share their ideas with others. For example, they to create a photo slideshow of a recent school trip – adding text or sound to their photos and choosing transitions with an adult. They take their tablets with them on a school trip, recording images and sounds and then use a digital book creator to create a class book back in the classroom.	When presenting what they have learned, pupils use a wider range of tools: comic strips, desktop publishers, animation tools etc. to combine text, images, video and audio. For example, they use a digital book creator to make an e-book about the Ancient Romans, including their own artwork, text and a sound recording of an interview with a Roman soldier. They use a comic strip designer to record the stages in a science experiment or open-ended maths investigation and then use this to write their recount of the experience	They now use digital tools much more confidently, choosing just the right tool for the job. They can, for example, create a range of content using a video editor and then combine content using Augmented reality or multimedia tools. They create a village or school trail or use these tools to bring a historical event to life. They can confidently move between different apps and programs to create content.
Digital Media	Pupils progress from the approach in EYFS where they will be encouraged to **discover** and **explore what their fingers can do on, for example, a tablet,** showing enjoyment and ability to talk about what they have done. Pupils **experiment** with how to create a range of effects - **shades**, **patterns** and **results** using different **eTools**. Pupils learn how to **make simple audio equipment work**. They begin to **listen to and learn from sounds** embedded in audio books, websites, sound buttons and other tools. Pupils **make their own recordings** using digital devices (microphones, tablets, talking postcards etc.) and **use these recordings purposefully**.	Pupils **demonstrate** an expanding repertoire of experiments with digital tools exploring **shade, shape, pattern, screen effects, marks and lines.** They can use what they have learned to **respond to specific tasks**, such as creating firework picture. They make effective use of **known techniques** to **create an intended artefact**, **reflecting** on and **refining** their work as appropriate. Pupils **download, create and record sounds** and begin to **combine, edit and present** them. This includes learning to, for example, **delete unwanted sections of audio**, or **combine multiple recordings** to create one longer piece. They **begin to understand the impact** different types of music can have on an audience and think about what effect they want to achieve when recording or downloading music. For example, they use everyday objects to **create sound effects for a 'radio play'** or **record a percussion accompaniment for a short animation**. They learn to record and edit these in programs such as audio editing to create a finished product. Pupils can **edit sections of film (live or animated) together**, trimming and adding visual effects or transitions to create a desired effect.	Pupils **plan** and **develop**, in a **sustained** way, ideas with **shade, shape, pattern, screen effects, marks and lines** into some finished works of art. Show the **influence of screen drafts/ jottings** to ***tangible*** works of art. Pupils can **explain what works well digitally**, what doesn't and how technology can support artistic development. Pupils **confidently choose when to use audio to enhance their work or present their learning**. They learn how to **digitally manipulate audio** to create a desired effect, including **editing unwanted sections of a recording, copying and pasting sections and digitally manipulating volume**. They use a selection of apps / tools to **create and record their own music tracks and embed them** into other projects such as presentations or films. For example, pupils **combine voice and audio** when creating a 'river tour' **showing what they have learned about the structure of rivers**, or **create music to accompany a silent 'scary' film, thinking carefully about the impact on the audience.** They think carefully about the **intended effect** of their choices on their **audience** and reflect on whether the desired effect has been achieved, **refining their work** where appropriate. They **use editing techniques creatively** and can confidently use a combination of **visual and audio effects** in their films.

Willow Lane Computing Curriculum Overview

Year group	Autumn		Spring		Summer	
EYFS: Red	Busy Being Me	Celebrations	Magic Time Machine	When I Grow Up	Wet and Wild	Our Wonderful World
1. Orange	Online Safety ICT		Coding: On the Move ICT and Understanding Technology		Coding: Simple Inputs ICT and Understanding Technology	
2. Yellow	Online Safety ICT		Coding: Different Sorts of Inputs ICT and Understanding Technology		Coding: Buttons and Instructions ICT and Understanding Technology	
3. Green	Online Safety **ICT**		Coding: Sequence and Animation ICT and Understanding Technology		Coding: Conditional Events ICT and Understanding Technology	
4. Blue	Online Safety ICT		Coding: Introduction to Variables ICT and Understanding Technology		Coding: Repetition and Loops ICT and Understanding Technology	
5. Indigo	Online Safety ICT		Coding: Speed, Direction and Coordinates ICT and Understanding Technology		Coding: Random Numbers and Simulations ICT and Understanding Technology	
6. Violet	Online Safety ICT		Coding: More Complex Variables ICT and Understanding Technology		Coding: Object Properties ICT and Understanding Technology	