



Hillbourne Primary School

Computing Progression of Knowledge



Intent

We want children leaving Hillbourne Primary school to be able to:

- Know how to stay safe online
- Know how to build code and debug programs using known software
- Know the functions and purposes of common software such as word processing and presentation software
- Understand how to use research tools effectively and safely
- Know how to collaborate online and offline
- Know the capabilities of common technological devices
- Know how to use and combine a variety of different software and hardware to fulfil a goal

Implementation

Our aim is to deliver a high-quality, progressive computing curriculum that equips pupils with the knowledge to prepare them to thrive within a constantly advancing and technological world. At Hillbourne, technology is used as an educational tool and therefore we aim to build children's understanding of how they can use technology efficiently and safely to do this.

E-safety is at the heart of the computing curriculum and a part of every lesson ensures that children are equipped with strategies that enable them to make confident and safe judgements about their online activity at school and at home. Throughout each year, children will build on their knowledge of how to stay safe which is divided into the following areas: self-image and identity; online relationships; online reputation; online bullying; managing online information; health, image and well-being; privacy and security; and copyright and ownership. This allows children to understand the potential online issues and the responsibilities of being online including the use of social media which is adapted and updated appropriately. Additional sessions are also taught to reflect the needs of the children and e-safety is celebrated through days such as Internet Safety Day.

The core of computing is Computer Science, in which pupils are taught the principles of how digital systems work and how to put this knowledge to use through programming. Children will build upon their understanding of what an algorithm is and how they can input these into computers. Building on this knowledge and understanding, pupils are equipped to create programs and use logical reasoning to debug them.

The computing curriculum is designed to ensure that pupils become digitally literate at a level suitable to prepare them for the next stage in their education, the future workplace, and as active participants in a digital world. This will enable them to express themselves and develop their ideas through information and communication technology.

Pupils in EYFS are exposed to a range of technology that gives them the opportunity to demonstrate that they recognise that technology is used both in school and out of school. This will develop children's understanding of how technology can be used for a range of purposes. Pupils within KS1 and KS2 experience lessons where they are able to learn and build on skills that progress from lesson to lesson, unit to unit and year group to year group. Each year, children have the opportunity to develop their knowledge of computer science, information technology and digital literacy which builds on their prior knowledge. Children have the chance to work with a range of devices and different software to build their understanding of the uses of technology and their purposes.

Key Threads

At Hillbourne, we have key threads that run through and across year groups. These will continually be revisited and explored across the academic journey of a child at Hillbourne. Each thread is underpinned by key vocabulary and knowledge that will be explicitly taught in Computing sessions. The key threads are:

Computing Systems and Networks	Programming	Creating Media	Data and Information	Online Safety
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Curriculum Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Creating Media – Digital Painting	Computing Systems and Networks – Technology Around Us	Programming A – Moving a Robot	Data and Information – Grouping Data	Creating Media – Digital Writing	Programming B – Introduction to Animation
Year 2	Creating Media – Digital Photography	Computer Systems and Networks – IT Around Us	Programming A – Robot Algorithms	Data Handling - Pictograms	Creating Media – Making Music	Programming B – Introduction to Quizzes
Year 3	Creating Media – Desktop Publishing	Computing Systems and Networks – Connecting Computers	Programming A – Sequence in Music	Data Handling – Branching Databases	Creating Media - Animation	Programming B – Events and Actions (maze)
Year 4	Creating Media – Photo Editing	Computing Systems and Networks – The Internet	Programming A – Repetition in Shapes	Data and Information – Data Logging	Creating Media – Audio Editing	Programming B – Repetition in Games
Year 5	Creating Media – Video Editing	Computing Systems and Networks – Sharing Information	Programming A – Selection in Physical Computing	Data and Information – Flat-File Databases	Creating Media – Vector Drawings	Programming B – Selection in Quizzes
Year 6	Creating media – Web Page Creation	Computing Systems and Networks – Communication	Programming A – Variables in Games	Data and Information - Spreadsheets	Creating Media – 3D Modelling	Programming B - Sensing

National Curriculum Alignment

Our curriculum fulfils the statutory requirements outlined in the National Curriculum (2014). The National Curriculum Programme of Study for Computing aims to ensure that all pupils:

★ Can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.

★ Can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems.

Computer Science

★ Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.

Information Technology

★ Are responsible, competent, confident and creative users of information and communication technology.

Digital Literacy

Key Areas

We have categorised our lessons into the five key areas below, which we return to in each year group making it clear to see prior and future learning for your pupils and how what you are teaching fits into their wider learning journey. E-Safety is taught discretely (see separate E-Safety curriculum).



Curriculum Design

Our curriculum has been designed as a spiral curriculum with the following key principles in mind:

- ✓ Cyclical: Pupils revisit the five key areas throughout KS1 and KS2
- ✓ Increasing depth: Each time a key area is revisited, it is covered with greater complexity
- ✓ Prior knowledge: Upon returning to each key area, prior knowledge is utilised so pupils can build on previous foundations, rather than starting again







Knowledge Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer Systems and Networks	<p>Technology around us To identify technology To identify a computer and its main parts To use a mouse in different ways To use a keyboard to type To use the keyboard to edit text To create rules for using technology responsibly</p>	<p>Information technology around us To recognise the uses and features of information technology To identify information technology in the home To identify information technology beyond school To explain how information technology benefits us To show how to use information technology safely To recognise that choices are made when using information technology</p>	<p>Connecting computers To explain how digital devices function To identify input and output devices To recognise how digital devices can change the way we work To explain how a computer network can be used to share information To explore how digital devices can be connected To recognise the physical components of a network</p>	<p>The internet To describe how networks physically connect to other networks To recognise how networked devices make up the internet To outline how websites can be shared via the World Wide Web To describe how content can be added and accessed on the World Wide Web To recognise how the content of the WWW is created by people To evaluate the consequences of unreliable content</p>	<p>Sharing information To explain that computers can be connected together to form systems To recognise the role of computer systems in our lives To recognise how information is transferred over the internet To explain how sharing information online lets people in different places work together To contribute to a shared project online To evaluate different ways of working together online</p>	<p>Communication To identify how to use a search engine To describe how search engines select results To describe how search engines select results To explain how search results are ranked To recognise why the order of results is important, and to whom To recognise how we communicate using technology To evaluate different methods of online communication</p>
Creating Media	<p>Digital painting To describe what different freehand tools do To use the shape tool and the line tools To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer on my own to paint a picture To compare painting a picture on a computer and on paper</p> <p>Digital writing To use a computer to write To add and remove text on a computer To identify that the look of text can be changed on a computer To make careful choices when changing text To explain why I used the tools that I chose To compare writing on a computer with writing on paper</p>	<p>Digital photography To know what devices can be used to take photographs To use a digital device to take a photograph To describe what makes a good photograph To decide how photographs can be improved To use tools to change an image To recognise that images can be changed</p> <p>Making music To say how music can make us feel To identify that there are patterns in music To describe how music can be used in different ways To show how music is made from a series of notes To create music for a purpose To review and refine our computer work</p>	<p>Stop-frame animation To explain that animation is a sequence of drawings or photographs To relate animated movement with a sequence of images To plan an animation To identify the need to work consistently and carefully To review and improve an animation To evaluate the impact of adding other media to an animation</p> <p>Desktop publishing To recognise how text and images convey information To recognise that text and layout can be edited To choose appropriate page settings To add content to a desktop publishing publication To consider how different layouts can suit different purposes To consider the benefits of desktop publishing</p>	<p>Audio editing To identify that sound can be digitally recorded To use a digital device to record sound To explain that a digital recording is stored as a file To explain that audio can be changed through editing To show that different types of audio can be combined and played together To evaluate editing choices made</p> <p>Photo editing To explain that digital images can be changed To change the composition of an image To describe how images can be changed for different uses To make good choices when selecting different tools To recognise that not all images are real To evaluate how changes can improve an image</p>	<p>Video editing To recognise video as moving pictures, which can include audio To identify digital devices that can record video To capture video using a digital device To recognise the features of an effective video To identify that video can be improved through reshooting and editing To consider the impact of the choices made when making and sharing a video</p> <p>Vector drawing To identify that drawing tools can be used to produce different outcomes To create a vector drawing by combining shapes To use tools to achieve a desired effect To recognise that vector drawings consist of layers To group objects to make them easier to work with To evaluate my vector drawing</p>	<p>Web page creation To review an existing website and consider its structure To plan the features of a web page To consider the ownership and use of images (copyright) To recognise the need to preview pages To outline the need for a navigation path To recognise the implications of linking to content owned by other people</p> <p>3D modelling To use a computer to create and manipulate three-dimensional (3D) digital objects To compare working digitally with 2D and 3D graphics To construct a digital 3D model of a physical object To identify that physical objects can be broken down into a collection of 3D shapes To design a digital model by combining 3D objects To develop and improve a digital 3D model</p>

<p>Data and Information</p>	<p>Grouping data To label objects To identify that objects can be counted To describe objects in different ways To count objects with the same properties To compare groups of objects To answer questions about groups of objects</p>	<p>Pictograms To recognise that we can count and compare objects using tally charts To recognise that objects can be represented as pictures To create a pictogram To select objects by attribute and make comparisons To recognise that people can be described by attributes To explain that we can present information using a computer</p>	<p>Branching databases To create questions with yes/no answers To identify the object attributes needed to collect relevant data To create a branching database To identify objects using a branching database To explain why it is helpful for a database to be well structured To compare the information shown in a pictogram with a branching database</p>	<p>Data logging To explain that data gathered over time can be used to answer questions To use a digital device to collect data automatically To explain that a data logger collects 'data points' from sensors over time To use data collected over a long duration to find information To identify the data needed to answer questions To use collected data to answer questions</p>	<p>Flat-file databases To use a form to record information To compare paper and computer-based databases To outline how grouping and then sorting data allows us to answer questions To explain that tools can be used to select specific data To explain that computer programs can be used to compare data visually To apply my knowledge of a database to ask and answer real-world questions</p>	<p>Spreadsheets To identify questions which can be answered using data To explain that objects can be described using data To explain that formula can be used to produce calculated data To apply formulas to data, including duplicating To create a spreadsheet to plan an event To choose suitable ways to present data</p>
<p>Programming</p>	<p>Moving a robot To explain what a given command will do To act out a given word To combine forwards and backwards commands to make a sequence To combine four direction commands to make sequences To plan a simple program To find more than one solution to a problem</p> <p>Introduction to animation To choose a command for a given purpose To show that a series of commands can be joined together To identify the effect of changing a value To explain that each sprite has its own instructions To design the parts of a project To use my algorithm to create a program</p>	<p>Robot algorithms To describe a series of instructions as a sequence To explain what happens when we change the order of instructions To use logical reasoning to predict the outcome of a program (series of commands) To explain that programming projects can have code and artwork To design an algorithm To create and debug a program that I have written</p> <p>Introduction to quizzes To explain that a sequence of commands has a start To explain that a sequence of commands has an outcome To create a program using a given design To change a given design To create a program using my own design To decide how my project can be improved</p>	<p>Sequence in music To explore a new programming environment I can identify that each sprite is controlled by the commands I choose To explain that a program has a start To recognise that a sequence of commands can have an order To change the appearance of my project To create a project from a task description</p> <p>Events and actions To explain how a sprite moves in an existing project To create a program to move a sprite in four directions To adapt a program to a new context To develop my program by adding features To identify and fix bugs in a program To design and create a maze-based challenge</p>	<p>Repetition in shapes To identify that accuracy in programming is important To create a program in a text-based language To explain what 'repeat' means To modify a count-controlled loop to produce a given outcome To decompose a program into parts To create a program that uses count-controlled loops to produce a given outcome</p> <p>Repetition in games To develop the use of count-controlled loops in a different programming environment To explain that in programming there are infinite loops and count controlled loops To develop a design which includes two or more loops which run at the same time To modify an infinite loop in a given program To design a project that includes repetition To create a project that includes repetition</p>	<p>Selection in physical computing To control a simple circuit connected to a computer To write a program that includes count-controlled loops To explain that a loop can stop when a condition is met, eg number of times To conclude that a loop can be used to repeatedly check whether a condition has been met To design a physical project that includes selection To create a controllable system that includes selection</p> <p>Selection in games To explain how selection is used in computer programs To relate that a conditional statement connects a condition to an outcome To explain how selection directs the flow of a program To design a program which uses selection To create a program which uses selection To evaluate my program</p>	<p>Variables in games To define a 'variable' as something that is changeable To explain why a variable is used in a program To choose how to improve a game by using variables To design a project that builds on a given example To use my design to create a project To evaluate my project</p> <p>Sensing To create a program to run on a controllable device To explain that selection can control the flow of a program To update a variable with a user input To use an conditional statement to compare a variable to a value To design a project that uses inputs and outputs on a controllable device To develop a program to use inputs and outputs on a controllable device</p>

E-Safety

Each half term has an overarching e-safety theme, and these are introduced through a key question. Each individual year group will then enquire into these key questions through differentiated and age-appropriate activities that support the teaching of the national curriculum. E-Safety is taught both discretely and in a cross curricular manner throughout both the core and foundation subjects.

Managing Online Information		What can we find out on the Internet?
Online Reputation, Copyright and Ownership		What do we like to do online?
Privacy and Security		How can we keep our information safe online?
Self-Image, Identity, Health, Well Being and Lifestyle		What are the positives and negatives of technology?
Online Relationships		How can we communicate online with others?
Online Bullying		How can we be kind online?

Through these 6 overarching themes, children will develop a strong understanding of how to stay safe online both at school and at home.

The Development Matters and National Curriculum states:

- **EYFS:** 'Understanding the World' Educational Programme- 'foster their understanding of our culturally, socially, technologically and ecologically diverse world'
- **KS1:** 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
- **KS2:** use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

The following statements have been taken from the 'Project Evolve' E-Safety program (<https://projectevolve.co.uk>) and each encompasses a starting question and subsequent lesson plan and resources. The statements have been carefully chosen to fit both the age and stage of the children but also the appropriateness for the children at Hillbourne and the challenges online that they specifically face.

	Foundation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Managing Online Information <i>Autumn 1</i>	<ul style="list-style-type: none"> I can talk about how to use the internet as a way of finding information online I can identify devices I can use to access information online 	<ul style="list-style-type: none"> I know and understand that we can encounter a range of things online including things we like and don't like as well as things which are real / not real or a joke 	<ul style="list-style-type: none"> I can demonstrate how to navigate a simple webpage to get to information I need (e.g. home, forward, back buttons; links, tabs, sections) 	<ul style="list-style-type: none"> I can demonstrate how to use key phrases in search engines to gather accurate information online Explain the difference between 'belief', 'opinion' and 'fact' and can give examples of how and where they might be shared online 	<ul style="list-style-type: none"> I can analyse information to make a judgement about probable accuracy 	<ul style="list-style-type: none"> I can evaluate digital content and can explain how to make choices about what is trustworthy 	<ul style="list-style-type: none"> I can explain how someone might encounter 'influence', 'manipulation' and 'persuasion' online (e.g. advertising or targeting for fake news)
Online Reputation, Copyright and Ownership <i>Autumn 2</i>	<ul style="list-style-type: none"> I understand that I can put information online for others to see I know that the work I create belongs to me 	<ul style="list-style-type: none"> I know that I should not share my personal information online I know that the work I create using technology belongs to me 	<ul style="list-style-type: none"> I can explain how information put online about someone can last for a long time I can describe why other people's work belongs to them 	<ul style="list-style-type: none"> I can explain the need to be careful before sharing anything personal online I can demonstrate how to use key phrases in search engines to gather accurate information online I can explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause 	<ul style="list-style-type: none"> I can explain ways that some of the information about anyone online could have been created, copied or shared by others 	<ul style="list-style-type: none"> I can describe ways that information about anyone online can be used by others to make judgements about an individual and why these may be incorrect I can assess and justify when it is acceptable to use the work of others 	<ul style="list-style-type: none"> I can demonstrate how to make references to and acknowledge sources I have used from the internet I can explain the ways in which anyone can develop a positive online reputation
Privacy and Security <i>Spring 1</i>	<ul style="list-style-type: none"> I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location) 	<ul style="list-style-type: none"> I can explain that passwords are used to protect information, accounts and devices I can recognise more detailed examples of information that is personal to someone (e.g. address) 	<ul style="list-style-type: none"> I can explain and give examples of what is meant by 'private' and 'keeping things private' 	<ul style="list-style-type: none"> I can describe how connected devices can collect and share anyone's information with others 	<ul style="list-style-type: none"> I can describe how some online services may seek consent to store information about me 	<ul style="list-style-type: none"> I can explain what a strong password is and demonstrate how to create one. I can explain what app permissions are and can give some examples 	<ul style="list-style-type: none"> I can describe effective ways people can manage passwords. I can explain what to do if a password is shared, lost or stolen.
Self-Image, Identity, Health, Well Being and Lifestyle <i>Spring 2</i>	<ul style="list-style-type: none"> I know that I can say 'no' / 'please stop' / 'I'll tell' / 'I'll ask' to somebody who asks me to do something that makes me feel sad, upset or embarrassed. I can identify rules that help keep us safe and healthy in and beyond 	<ul style="list-style-type: none"> If something happens online which makes me feel sad, worried, uncomfortable or frightened, I can give examples of when and how to speak to an adult I can trust and how they can help 	<ul style="list-style-type: none"> I can give examples of issues online that might make someone feel sad, worried, uncomfortable or frightened and give examples of how they might get help 	<ul style="list-style-type: none"> I can explain ways in which someone might change their identity depending on what they are doing online (e.g. gaming; using an avatar, social media) and why 	<ul style="list-style-type: none"> I can explain how my online identity can be different to my offline identity I can explain how using technology can be a distraction from other things, in both a positive and negative way 	<ul style="list-style-type: none"> I can explain how identity online can be copied, modified or altered I can describe ways technology can affect health and wellbeing both positively and negatively. 	<ul style="list-style-type: none"> I recognise and can discuss the pressures that technology can place on someone and how / when they could manage this I can identify and critically evaluate

	<p>the home when using technology</p> <ul style="list-style-type: none"> I can name at least one trusted adult who can help me keep safe when using technology / internet. 	<ul style="list-style-type: none"> I can explain rules to keep myself safe when using technology both in and beyond the home 		<ul style="list-style-type: none"> I can explain why some online activities have age restrictions and why it is important to follow them 			<p>online content relating to gender, race, religion, disability, culture and other groups</p> <ul style="list-style-type: none"> I can explain why it is important to challenge and reject inappropriate representations online
<p>Online Relationships <i>Summer 1</i></p>	<ul style="list-style-type: none"> I can recognise someways in which the internet can be used to communicate 	<ul style="list-style-type: none"> I know why it is important to be considerate and kind to people online and to respect their choices 	<ul style="list-style-type: none"> I can give examples of how someone might use technology to communicate with other they don't also know offline and explain why this might be risky I can describe different ways to ask for, give, deny my permission online 	<ul style="list-style-type: none"> I can explain what is meant by 'trusting someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online 	<ul style="list-style-type: none"> I can describe strategies for safe and fun experiences in a range of online social environments I can give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours 	<ul style="list-style-type: none"> I can explain that there are some people I communicate with online who may want to do me or my friends harm 	<ul style="list-style-type: none"> I can describe how things shared privately online can have unintended consequences for others
<p>Online Bullying <i>Summer 2</i></p>	<ul style="list-style-type: none"> I can describe ways that some people can be unkind online. 	<ul style="list-style-type: none"> I can describe how to behave online in ways that do not upset others and can give examples 	<ul style="list-style-type: none"> I can talk about how anyone experiencing bullying can get help 	<ul style="list-style-type: none"> I can give examples of how bullying behaviour could appear online and how someone can get support 	<ul style="list-style-type: none"> I can explain why people need to think carefully about how content they post online might affect others, their feelings and how it may affect how others feel about them (their reputation) 	<ul style="list-style-type: none"> I can describe how what one person perceives as playful joking and teasing ('banter') might be experienced by others as bullying 	<ul style="list-style-type: none"> I can explain how someone would report online bullying in different contexts