Henbury View First School

Computing Progression of Knowledge

Intent

'Every child deserves to take part in creating the technology that will change our world' *Malala Yousafzai*

Computing at Henbury View First School intends to develop 'thinkers of the future' through a modern, ambitious and relevant education in computing. We want to equip pupils to use computational thinking and creativity that will enable them to become active participants in the digital world. It is important to us that the children understand how to use the ever-changing technology to express themselves, as tools for learning and as a means to drive their generation forward into the future.

Whilst ensuring they understand the advantages and disadvantages associated with online experiences, we want children to develop as respectful, responsible and confident users of technology, aware of measures that can be taken to keep themselves and others safe online. Our aim is to provide a computing curriculum that is designed to balance acquiring a broad and deep knowledge alongside opportunities to apply skills in various digital contexts. Beyond teaching computing discreetly, we will give pupils the opportunity to apply and develop what they have learnt across wider learning in the curriculum. Through our curriculum, we intent for pupils not only to be digitally competent and have a range of transferable skills at a suitable level for the future workplace, but also to be responsible online citizens.

Implementation

To ensure our curriculum covers the national curriculum, it is designed into 3 strands: computer science, information technology and digital literacy. Our curriculum is organised into 5 key areas, creating a cyclical route through which pupils can develop their computing knowledge and skills by revisiting and building on previous learning: computer systems and networks, programming, creating media, data handling and online safety.

The implementation of our curriculum ensures a broad and balanced coverage of the national curriculum requirements, with suitable opportunities built in to learn and apply transferable skills. Where meaningful, units have been created to have cross-curricular links to enable the development if further transferable skills. Lessons incorporate a range of teaching strategies from independent tasks, paired and group work as well as unplugged and digital activities. This variety means that lessons are engaging and appeal to those with varied learning styles. Differentiated guidance is used by teachers to ensure lessons can be accessed by all pupils and opportunities to stretch pupils' learning are carefully planned for. Knowledge organisers for each unit support pupils in building a foundation of factual knowledge by encouraging recall of key facts and vocabulary.

Key Threads

At Henbury View, 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 Henbury. 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 Handling	Online Safety

Curriculum Overview

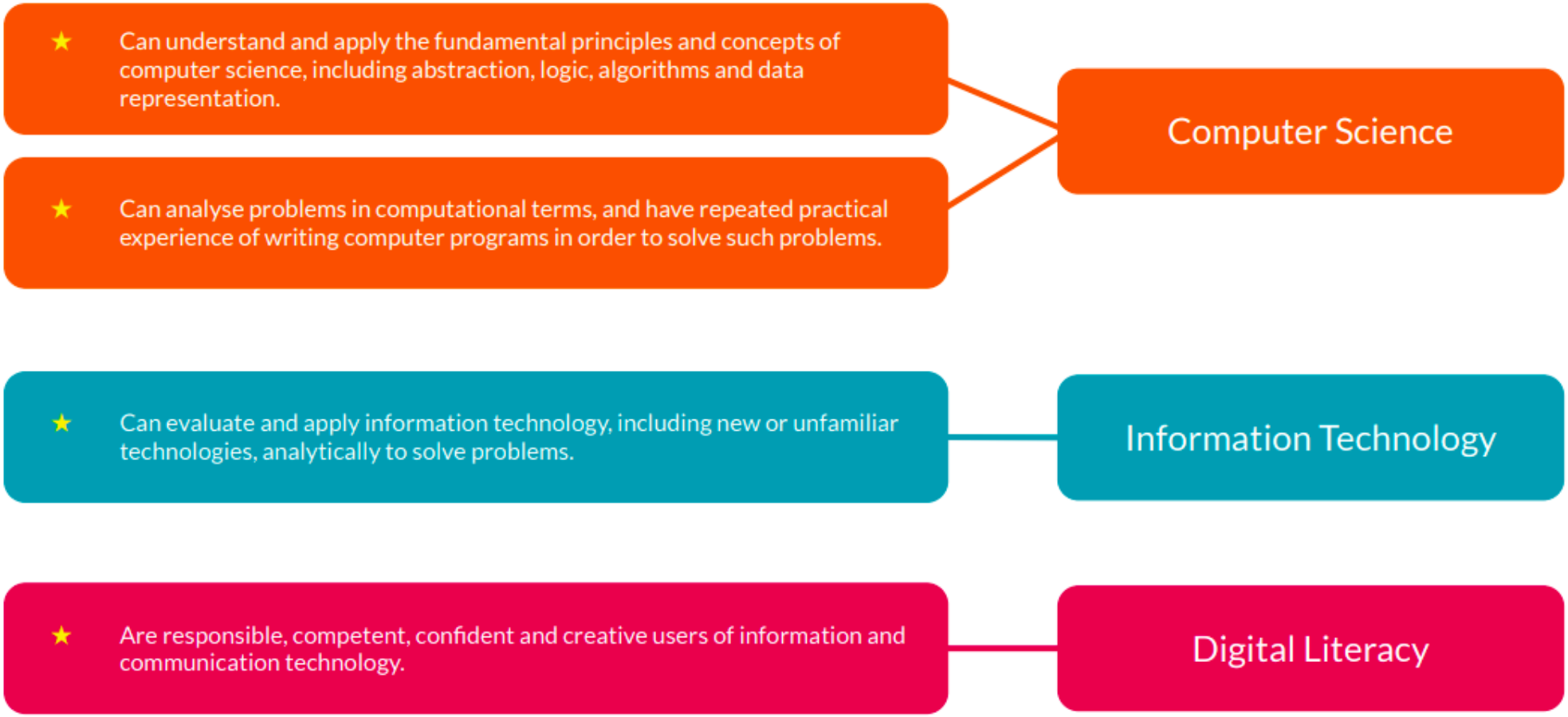
	Unit 1	Unit 2	Unit 3	Unit 4
Foundation	Computer Systems and Networks Using a Computer *Learning about the main parts of a computer and how to use the keyboard and mouse. Logging in and out*	Programming 1 All about instructions *The children learn to receive and give instructions and understand the importance of precise instructions*	Programming 2 Programming Bee-Bots *Children learn about directions, experiment with programming a Bee-bot/Blue-bot and tinker with hardware*	Data Handling Introduction to Data *Children sort and categorise data and are introduced to branching databases and pictograms*
Year 1	Computer Systems and Networks Improving Mouse Skills *Learning how to login and navigate around a computer, developing mouse skills, learning how to drag, drop, click and control a cursor to create works of art*	Programming 1 Algorithms unplugged *This unplugged unit requires no computers so that algorithms, decomposition and debugging are made relatable to familiar contexts*	Programming 2 Bee-Bots *Developing early programming skills using either the Beebots or virtual Beebot*	Data Handling Introduction to Data *Learn what data is and the different ways that it can be represented and developing an understanding of why data is useful, how it can be used and ways in which it can be gathered and recorded both by humans and computers*
Year 2	Computer Systems and Networks What is a computer? *When picturing a computer, thoughts are often of a screen, mouse and keyboard. This unit explores exactly what a computer is by identifying and learning how inputs and outputs work, how computers are used in the wider world and designing their own computerised invention*	Programming 1 Algorithms and Debugging *This combination of unplugged and plugged-in activities develop an understanding of; what algorithms are, how to program them and how they can be developed to be more efficient, introduction of loops*	Programming 2 Programming: ScratchJr *Explore what 'blocks' do, using the app 'ScratchJr,' by carrying out an informative cycle of predict > test > review, programme a familiar story and an animation of an animal, make their own musical instrument by creating buttons and recording sounds and follow an algorithm to record a joke*	Data Handling International Space Station *The International Space Station (ISS) is a fascinating real-world setting for teaching how data is collected, used and displayed as well as the scientific learning of the conditions needed for plants and animals, including humans, to survive*
Year 3	Computer Systems and Networks Networks and the Internet *Introduction to the concept of networks, learning how devices communicate. Identifying components, learning how information is shared and exploring examples of real-world networks*	Programming 1 Programming: Scratch *Building on the use of the 'ScratchJr' application in Year 2, progress to using the more advanced computer-based application called 'Scratch', learning to use repetition or 'loops' and building upon skills to program; an animation, a story and a game*	Data Handling Investigating the Weather *Using the theme of a 'Comparison cards game' (based on the popular game, Top Trumps), to understand what a database is by learning the meanings of records, fields and data. Further exploration will lead to the development of the ideas of sorting and filtering*	Creating Media Video Trailers *Developing filming and editing video skills through the storyboarding and creation of book trailers*
Year 4	Computer Systems and Networks Journey Inside a Computer *Assuming the role of computer parts and creating paper versions of computers helps to consolidate an understanding of how a computer works, as well as identifying similarities and differences between various models*	Programming 1 Further Coding with Scratch *Using variables in coding*	Programming 2 Computational Thinking *Plugged and unplugged activities to develop the four areas of computational thinking*	Creating Media Stop Motion Animation *Storyboarding ideas, taking photographs and editing to create a video animation*

Curriculum Organisation

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Foundation		Computer Systems and Networks Using a Computer	Programming 1 All about instructions		Programming 2 Programming Bee-Bots	Data Handling Introduction to Data
Year 1		Computer Systems and Networks Improving Mouse Skills	Programming 1 Algorithms unplugged	Programming 2 Bee-Bots		Data Handling Introduction to Data
Year 2		Computer Systems and Networks What is a computer?	Data Handling International Space Station	Programming 1 Algorithms and Debugging		Programming 2 Programming: ScratchJr
Year 3		Computer Systems and Networks Networks and the Internet	Programming 1 Programming: Scratch	Data Handling Investigating the Weather		Creating Media Video Trailers
Year 4		Computer Systems and Networks Journey Inside a Computer	Programming 1 Further Coding with Scratch	Programming 2 Computational Thinking		Creating Media Stop Motion Animation

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:



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

National Curriculum Coverage

EYFS (2021)

Unit	Prime Areas	Specific Areas
Using a computer	**Physical Development**: Develop their small motor skills so that they can use a range of tools competently, safely and confidently	**Literacy**: spell words by identifying the sounds and then writing the sounds with letter/s, Re-read what they have written to check that it makes sense **Mathematics**: link the number symbol (numeral) with its cardinal number value
All About Instructions	**Communication and Language**: Understand how to listen carefully and why listening is important, describe events in some detail, use talk to help work our problems and organise thinking and activities, and to explain how things work and why they might happen **Personal, Social and Emotional Development**: (ELG: Self-Regulation) Give focused attention to what the teacher says, responding appropriately even when engaged in activity, and show an ability to follow instructions involving several ideas or actions, (ELG: Managing Self) Be confident to try new activities and show independence, resilience and perseverance in the face of challenge, (ELG: Building Relationships) Work and play cooperatively and take turns **Physical Development**: Know and talk about the different factors that support their overall health and wellbeing, further develop the skills they need to manage the school day successfully	
Programming Bee-Bots	**Personal, Social and Emotional Development**: (ELG: Managing Self) Be confident to try new activities and show independence, resilience and perseverance in the face of challenge	**Mathematics**: Count objects, actions and sounds, link the number symbol (numeral) with its cardinal number value
Introduction to Data	**Communication and Language**: Articulate their thoughts and ideas in well-formed sentences, use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen, (ELG: Listening, Attention and Understanding) Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions, (ELG: Listening, Attention and Understanding) Make comments about what they have heard and ask questions to clarify their understanding, (ELG: Speaking) Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary	**Mathematics**: (ELG: Numerical Patterns) Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity, count objects, actions and sounds, subitise, count beyond 10, compare numbers, understand the 'one more than/ one less than' relationship between consecutive numbers, continue, copy and create repeating patterns, compare length, weight and capacity

KS1

NC Objective	Unit Coverage
Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions	Y1: Programming: Bee-Bots, Algorithms Unplugged Y2: What is a computer? Programming: ScratchJr, Algorithms and Debugging, International Space Station
Create and debug simple programs	Y1: Programming: Bee-Bots, Algorithms Unplugged Y2: Programming: ScratchJr, International Space Station
Use logical reasoning to predict the behaviour of simple programs	Y1: Programming: Bee-Bots Y2: Programming: ScratchJr, Algorithms and Debugging
Use technology purposefully to create, organise, store, manipulate and retrieve digital content	Y1: Introduction to Data Y2: Programming: ScratchJr, International Space Station
Recognise common uses of information technology beyond school	Y1: Introduction to Data Y2: What is a computer?
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	*See E-safety curriculum*

KS2

NC Objective	Unit Coverage
Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	Y3: Programming: Scratch Y4: Computational thinking, Further coding with Scratch, Journey inside a computer
Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	Y3: Programming: Scratch, Investigating the weather Y4: Computational thinking, Further coding with Scratch,
Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	Y3: Programming: Scratch Y4: Computational thinking, Further coding with Scratch, Journey inside a computer
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	Y3: Programming: Scratch, Networks and the Internet Y4: Journey inside a computer
Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content	Y3: Networks and the Internet, Video Trailers
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	Y3: Investigating the weather, Video Trailers
Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact	*See E-safety curriculum*

Progression of Knowledge: Computer Science

	Foundation	Year 1	Year 2	Year 3	Year 4
Hardware	• Learning how to operate a camera to take photographs of meaningful creations or moments • Learning how to explore and tinker with hardware to develop familiarity and introduce relevant vocabulary • Learning how to operate a camera • Recognising that a range of technology is used in places such as homes and schools • Learning what a keyboard is and how to locate relevant keys • Learning what a mouse is and developing basic mouse skills such as moving and clicking	• Learning how to explore and tinker with hardware to find out how it works • Understanding that computers and devices around us use inputs and outputs, identifying some of these • Learning where keys are located on the keyboard • Learning how to operate a camera	• Understanding what a computer is and that it's made up of different components • Recognising that buttons cause effects, and that technology follows instructions • Learning how we know that technology is doing what we want it to do via its output. • Using greater control when taking photos with tablets or computers • Developing confidence with the keyboard and the basics of touch typing	• Understanding what the different components of a computer do and how they work together • Drawing comparisons across different types of computers • Learning what a server does	• Learning about the purpose of routers
Networks		• Understanding what the internet is		• Learning what a network is and its purpose • Identifying the key components within a network, including whether they are wired or wireless • Recognising links between networks and the internet • Learning how data is transferred	• Consolidating understanding of the key components of a network • Understanding that websites & videos are files that are shared from one computer to another • Learning about the role of packets • Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration
Computational Thinking	• Using logical reasoning to read simple instructions and predict the outcome	• Learning that decomposition means breaking a problem down into smaller parts • Using decomposition to solve unplugged challenges • Using logical reasoning to predict the behaviour of simple programs • Developing the skills associated with sequencing in unplugged activities • Learning that an algorithm is a set of step-by-step	• Articulating what decomposition is • Decomposing a game to predict the algorithms used to create it • Using decomposition to decompose a story into smaller parts • Learning what abstraction is • Learning that there are different levels of abstraction • Following an algorithm • Creating a clear and precise algorithm	• Using decomposition to explain the parts of a laptop computer • Using decomposition to explore the code behind an animation • Using repetition in programs • Understanding that computers follow instructions • Using an algorithm to explain the roles of different parts of a computer	• Solving unplugged problems by decomposing them into smaller parts • Using decomposition to understand the purpose of a script of code • Using decomposition to help solve problems • Identifying patterns through unplugged activities • Using past experiences to help solve new problems • Using abstraction to identify the important parts when

		instructions used to carry out a task, in a specific order • Follow a basic set of instructions • Assembling instructions into a simple algorithm	• Learning that computers use algorithms to make predictions • Learning that programs execute by following precise instructions • Incorporating loops within algorithms	• Using logical reasoning to explain how simple algorithms work • Explaining the purpose of an algorithm • Forming algorithms independently	completing both plugged and unplugged activities • Creating algorithms for a specific purpose
Programming	• Following instructions as part of practical activities and games and learning to debug when things go wrong • Learning to give simple instructions • Learning that an algorithm is a set of instructions to carry out a task, in a specific order • Experimenting with programming a Bee-bot and learning how to give simple commands • Learning to debug instructions, with the help of an adult, when things go wrong	• Programming a Bee-bot/Virtual Bee-bot to follow a planned route • Learning to debug instructions when things go wrong • Developing a how-to video to explain how the Bee-bot works • Learning to debug an algorithm in an unplugged scenario	• Using logical thinking to explore software, predicting, testing and explaining what it does • Using an algorithm to write a basic computer program • Learning what loops are • Incorporating loops to make code more efficient	• Using logical thinking to explore more complex software, predicting, testing and explaining what it does • Incorporating loops to make code more efficient • Remixing existing code • Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected	• Understanding that websites can be altered by exploring the code beneath the site • Coding a simple game • Using abstraction and pattern recognition to modify code • Incorporating variables to make code more efficient • Remixing existing code • Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected

Progression of Knowledge: Information Technology

	Foundation	Year 1	Year 2	Year 3	Year 4
Software	• Using a simple online paint tool to create digital art	• Using a basic range of tools within graphic editing software • Taking and editing photographs • Understanding how to create digital art using an online paint tool • Developing control of the mouse through dragging, clicking and resizing of images to create different effects • Developing understanding of different software tools	• Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts • Using word processing software to type and reformat text • Using software to create story animations • Creating and labelling images	• Taking photographs and recording video to tell a story • Using software to edit and enhance their video adding music, sounds and text on screen with transitions	• Building a web page and creating content for it • Designing and creating a webpage for a given purpose • Use Google online software for documents, presentations, forms and spreadsheets • Work collaboratively with others
Email and the Internet	• Participating in group image searches, led by the teacher	• Searching and downloading images from the internet safely • Understanding that we are connected to others when using the internet	• Understanding that personal information should not be shared on the internet • Learning how to be respectful to others when sharing content online	• Identifying useful terms and phrases for search engines	• Understanding why some results come before others when searching • Understanding that information on the internet is not all grounded in fact
Using Data	• Representing data through sorting and categorising objects in unplugged scenarios • Representing data through pictograms • Exploring branch databases through physical games	• Introduction to spreadsheets • Representing data in tables, charts and pictograms • Sorting data and creating branching databases • Identifying where digital content can have advantages over paper when storing and manipulating data	• Collecting and inputting data into a spreadsheet • Interpreting data		
Wider use of technology		• Recognising common uses of information technology, including beyond school • Understanding some of the ways we can use the internet	• Learning how computers are used in the wider world	• Learning what a search engine is • Recognising how social media platforms are used to interact	• Understanding that software can be used collaboratively online to work as a team

Progression of Knowledge: Digital Literacy

See below for separate E-Safety curriculum for more detail

	Foundation	Year 1	Year 2	Year 3	Year 4
Digital Literacy	• Recognising that a range of technology is used in places such as homes and schools • Learning to log in and log out • When using the internet alongside an adult, or independently, learning what to do if they come across something that worries them or makes them feel uncomfortable	• Logging in and out and saving work on their own account • Understand the importance of a password • When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable • Recognising when someone has been unkind online • Learning some top tips for staying safe online • Understanding how we 'share' information on the internet	• Understanding that personal information should not be shared on the internet • Learning how to be respectful to others when sharing content online	• Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind • Learning about cyberbullying • Learning that not all emails are genuine, recognising when an email might be fake and what to do about it • Learning that not all information on the internet is factual • Understanding who personal information should/ should not be shared with	• Recognising what appropriate behaviour is when collaborating with others online • Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others • Learning about different forms of advertising on the internet

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 Henbury and the challenges online that they specifically face.

	Foundation	Year 1	Year 2	Year 3	Year 4
Managing Online Information *Autumn 1*	I know / 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 or make believe / a joke	I know how to get help from a trusted adult if we see content that makes us feel sad, uncomfortable, worried or frightened	I can explain the difference between things that are imaginary, 'made up' or 'make believe' and things that are 'true' or 'real'	I can explain the difference between a 'belief', an 'opinion' and a 'fact. and can give examples of how and where they might be shared online, e.g. in videos, memes, posts, news stories	I can describe how to search for information within a wide group of technologies and make a judgement about the probable accuracy (e.g. social media, image sites, video sites)
Online Reputation, Copyright and Ownership *Autumn 2*	I know that work I create belongs to me	I can describe what information I should not put online without asking a trusted adult first	I can describe how anyone's online information could be seen by others	I can give examples of what anyone may or may not be willing to share about themselves online. I can explain the need to be careful before sharing anything personal	I can explain who someone can ask if they are unsure about putting something online
Privacy and Security *Spring 1*	I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location)	I can explain why it is important to always ask a trusted adult before sharing any personal information online, belonging to myself or others	I can describe and explain some rules for keeping personal information private (e.g. creating and protecting passwords)	I can give reasons why someone should only share information with people they choose to and can trust. I can explain that if they are not sure or feel pressured then they should tell a trusted adult	I can describe strategies for keeping personal information private, depending on context
Self-Image, Identity, Health, Well Being and Lifestyle *Spring 2*	I can explain rules to keep myself safe when using technology both in and beyond the home	I can explain simple guidance for using technology in different environments and settings e.g. accessing online technologies in public places and the home environment	I can give examples of issues online that might make someone feel sad, worried, uncomfortable or frightened; I can give examples of how they might get help	I can explain why spending too much time using technology can sometimes have a negative impact on anyone; I can give some examples of both positive and negative activities where it is easy to spend a lot of time engaged	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
Online Relationships *Summer 1*	I can recognise some ways in which the internet can be used to communicate	I can explain why it is important to be considerate and kind to people online and to respect their choices	I can explain who I should ask before sharing things about myself or others online	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 including what information and content they are trusted with	I can describe strategies for safe and fun experiences in a range of online social environments (e.g. livestreaming, gaming platforms)
Online Bullying *Summer 2*	I can describe ways that some people can be unkind online	I can describe how to behave online in ways that do not upset others and can give examples	I can explain what bullying is, how people may bully others and how bullying can make someone feel	I can describe appropriate ways to behave towards other people online and why this is important	I can give examples of how bullying behaviour could appear online and how someone can get support

For more information, please see the specific E-Safety curriculum