Computing SUBSTANTIVE knowledge progression overview

Substantive knowledge is the collection of established facts within a subject. It's the content that students need to know and provides the foundational knowledge needed to understand the world. At Hollybrook we have arranged our computing knowledge under 4 main concepts. The knowledge of computer systems and networks, creating media, data and information and programme. The concept of e-safety is taught through a progressive PSHE curriculum and as part of Internet Safety Day in Spring term.

At Hollybrook our children will know the following:

2024-2025

Key concepts

Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer systems and networks						
Technology Through Play • The technology used within the role play: phones, tills, laptops, televisions, cameras	**Technology** • What technology is • The main parts of a computer • How to use a mouse in different ways • Rules for using technology responsibly	**Information Technology around us** • The uses and features of information technology • Information technology in the home • Information technology beyond school • How information technology benefits us • How to use information technology safely • That choices are made when using information technology	**Connecting Computers** • How digital devices function • Input and output devices • How digital devices can change the way we work • How a computer network can be used to share information • How digital devices can be connected • The physical components of a network	**The internet** • How networks physically connect to other networks • How networked devices make up the internet • How websites can be shared via the World Wide Web • How content can be added and accessed on the World Wide Web • How the content of the WWW is created by people • The consequences of unreliable content	**Sharing information** • That computers can be connected together to form systems • The role of computer systems in our lives • How information is transferred over the internet • How sharing information online lets people in different places work together • How to contribute to a shared project online • Different ways of working together online	**Communication** • How search engines select results • How search engines select results • How search results are ranked • Why the order of results is important, and to whom • How we communicate using technology • Different methods of online communication

Creating Media	**Exploring** • Know how to use the resources for different purposes eg ipads to watch videos, play games, take photographs and listen to stories.	**Digital painting** • What different freehand tools do • Why they chose the tools they used • The differences between painting a picture on paper and on a computer **Digital writing** • That the look of text can be changed on a computer • How to make careful choices when changing text • The differences between writing on a computer with writing on paper	**Digital photography** • What devices can be used to take photographs • What makes a good photograph • How photographs can be improved • That images can be changed **Making music** • That there are patterns in music • How music can be used in different ways • How music is made from a series of notes • To create music for a purpose • To review and refine our computer work	**Stop-frame animation** • That animation is a sequence of drawings or photographs • Plan an animation • Identify the need to work consistently and carefully • Review and improve an animation • Evaluate the impact of adding other media to an animation **Desktop publishing** • Recognise how text and images convey info • How different layouts can suit different purposes • The benefits of desktop publishing	**Audio editing** • How sound can be digitally recorded • That a digital recording is stored as a file • That audio can be changed through editing • That different types of audio can be combined and played together • How to evaluate editing choices made **Photo editing** • How images can be changed for different uses • How to make good choices when selecting different tools • That not all images are real • How changes can improve an image • The importance of light when taking a photo	**Video editing** • Recognise video as moving pictures, which can include audio • Digital devices that can record video • The features of an effective video • That video can be improved through reshooting and editing • The impact of the choices made when making and sharing a video **Vector drawing** • That drawing tools can be used to produce different outcomes • Recognise that vector drawings consist of layers • How to group objects to make them easier to work with • The positives and negatives of their vector drawing	**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 **3D modelling** • To compare working digitally with 2D and 3D graphics • That physical objects can be broken down into a collection of 3D shapes • Design a digital model by combining 3D objects • To develop and improve a digital 3D model

Data and Information	**Maths Programs** • The children use the interactive whiteboard with support of an adult to access information, to count and compare groups	**Grouping data** • To label objects • That objects can be counted • That objects can be described in different ways • To answer questions about groups of objects • Count objects with the same properties	**Pictograms** • That we can count and compare objects using tally charts • hat objects can be represented as pictures • To select objects by attribute and make comparisons • That people can be described by attributes • That we can present information using a computer	**Branching databases** • How to identify the object attributes needed to collect relevant data • To identify objects using a branching database • Why it is helpful for a database to be well structured • The similarities and differences between information shown in a pictogram with a branching database	**Data logging** • That data gathered over time can be used to answer questions • That a data logger collects 'data points' from sensors over time • To identify the data needed to answer questions • To use collected data to answer questions	**Flat-file databases** • The differences between paper and computer-based databases • How grouping and then sorting data allows us to answer questions • That tools can be used to select specific data • That computer programs can be used to compare data visually • How to apply my knowledge of a database to ask and answer real-world questions	**Spreadsheets** • Which questions can be answered using data • That objects can be described using data • That a formula can be used to produce calculated data • Which is the most suitable way to present data
Programming	**Exploring Devices** • The children will explore ipads to listen to music or play games, beebots and other technology to find out how it works	**On the Move** • That when a computer does something, it is following instructions called 'code' • You need to give instructions to make objects on the screen move when the program starts • That objects move when they are clicked on if you make a code	**Different sorts of inputs** • How to write code that makes an object move around the screen when the keys are pressed • Objects perform different actions when the keys are pressed on a keyboard • How to write a code that makes an object change direction	**Sequence and animation** • Different pieces of code execute in a particular sequence • To create a program that uses sequences for two different objects moving on the screen • A timer helps to create a sequence of events	**Introduction to Variables** • How a variable can be used to keep track of the score in a game • How to use variables to keep track of the score in a game that uses conditional events • How to use multiple different variables and to set the value of a variable	**Speed, Direction and Coordinates** • How to use object properties (speed, heading and angle) to create a driving simulation. • How to change position using co-ordinates. • How to write code including statements to make an object rotate and combine this with conditional events to make a game	**More Complex Variables** • How to write code that prompts the user to input the value of a variable and use this to create an interactive block chart • How to create a stopwatch with stop, start and reset buttons and both digital and analogue displays

		Introduction to animation • To choose a command for a given purpose • That a series of commands can be joined together • To identify the effect of changing a value • That each sprite has its own instructions • To use an algorithm to create a program	**Introduction to quizzes** • That a sequence of commands has a start • That a sequence of commands has an outcome • How to change a given design	**Events and actions** • How a sprite moves in an existing project • How to adapt a program to a new context • How to identify and fix bugs in a program • How to design and create a maze-based challenge	**Repetition in games** • 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 • How to modify an infinite loop in a given program	**Selection in games** • How selection is used in computer programs • That a conditional statement connects a condition to an outcome • That selection directs the flow of a program • How to evaluate their program	**Sensing** • That selection can control the flow of a program • How to update a variable with a user input • How inputs and outputs on a controllable device work

Computing in Early Years

The early learning goals that previously linked to computing (EYFS technology) have been removed from the Early Years Foundation Stage Framework. There is no mention of the teaching of technology in the education programmes or development matters document either. We understand how important it is that children develop their technology skills and will continue to use a range of technology to support and enhance learning in other areas of the curriculum. We also recognise the rapidly changing world of computing and the role technology plays in our media rich environment.
We want to enable both EYFS staff and children to use computing confidently to support teaching and learning using appropriate tools and software. All children have equal access to computing in order to develop their personal computing capability and understanding. By carefully planning our environment to reflect the world in which we live, children will, through play, gain experience and an understanding of computing.

Technology in the Early Years can mean:
Taking a photograph with a tablet, playing games on the interactive whiteboard, using a Beebot, watching video clips, listening to music, beginning to understand online safety, playing on a touch screen game and use computers/keyboards/mouse-preloaded games (e.g. Peter rabbit, Number blocks and Paint), exploring Google maps and understanding how technology is used in our environment, how technology is used within the role play: phones, tills, laptops, televisions, cameras.

Additional uses include: sharing learning online (through tapestry) from between school and home, having daily access to a range of technology resources such as torches with switches, remote controlled cars, beebots, talking tins, voice-recording toys, as well as class ipads and interactive whiteboards, using a range of technology resources to support learning in other areas of the curriculum and being taught how to use the resources for different purposes.

KS1	KS2
Pupils should be taught to: • understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions • create and debug simple programs • use logical reasoning to predict the behaviour of simple programs • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • 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.	**Pupils should be taught to:** • design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • 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 • 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 • 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 • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.