Hadley Wood Primary School

Computing Curriculum Overview

Our Vision

…that every child will leave our school confident in their own abilities and excited about the future, with the strategies and skills to tackle tasks and situations in a capable manner and caring about their planet and their fellow humans.

Curriculum Intent:

At Hadley Wood, we believe that by teaching computing we are providing pupils with the knowledge and skills that we believe will enable them to make sense of and contribute to their world. Increasingly, that requires the use and understanding of computers. Pupils are taught a variety of skills that they can use to enhance their learning in other subjects in addition to being taught how to use their knowledge and skills to show care and respect to others. Through the computing lessons, children are being equipped for jobs of the future as they are learning along with the advancement of technology. Each year, children will be making progress on previous learning and will be given opportunities to make links and build on learning and skills acquired.

How we plan for and teach Computing:

The Primary National Curriculum for Computing can be split into 3 strands:

- Digital Literacy: Pupils learn to use technology to express themselves and develop their ideas.
- Information Technology: Pupils learn to use technology to create programs, systems and a range of content.
- Computer Science: Pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming.

Furthermore, we believe that it is very important that children are taught to be good Digital Citizens. Therefore, every year group delivers a six week block on online safety at the beginning of each academic year. All pupils will sign their Acceptable Use documents following the teaching input to ensure a shared understanding of how to stay safe in the online world. Throughout the course of the year, class teachers revisit online safety through Digital Citizenship lessons at the beginning of each half term. Digital Citizenship lessons encompass online safety, cyber bullying, the importance of online privacy and identity, healthy technology usage, healthy relationships, use of passwords, copyright and managing information online

Our Key Stage 1 & 2 computing curriculum is developed around the Primary National Curriculum. Computing skills are explicitly taught, practised and developed through the medium of our half-termly themes. In order to ensure children improve their computing knowledge, understanding and skills, we ensure our curriculum builds on prior knowledge, skills and experiences. To ensure a cohesive and progressive Computing curriculum through school from Reception to Year 6, we have developed our own computing curriculum drawing on expertise from NCCE's Teach Computing resources to support our planning, teaching and learning.

What you will see in our Computing lessons:

1. Every lesson is carefully planned around **an enquiry question (the Big Question) for children to answer.** By ensuring that these questions spark children's enquiry and **curiosity**, children are engaged in their learning and want to find out the answer. Lessons are purposeful and result in children gaining a new understanding of the world around them.

2. In each lesson the **enquiry question** is designed so that children have a powerful understanding of the skills and understanding they are developing in the lesson. **Success criteria** define the features of the learning intention in the context of the activity so that children can identify what they are aiming for and how well they are doing.

3. Learning is effectively sequenced by sharing prior learning **'Flashbacks or Blast Offs'** at the start of each lesson/topic/new concept. We recognise that children are more likely to retain new learning if it connected to prior understanding. Building blocks help pupils of all levels to connect new learning with existing concepts and promote **independence**.

4. Teachers utilise a range of strategies drawn from the Walkthru principles developed by Tom Sherrington including: **Think, Pair, Share, Quizzing, Cold Calling, No Opt Out opportunities or quizzing** to engage pupils and draw links between prior and new learning. Different levels of challenge and **'what if'** challenges help to ensure our children have high aspirations of themselves and strive to be the best they can be.

5. Teachers skilfully use the **'Deliberate Mistake'** approach to learning to build pupil **resilience** to failure alongside their ability to work independently to problem solve. This embeds the concept that making mistakes is integral to the learning process.

How we evaluate learning in Computing:

During each computing lesson, pupils will be uploading work completed into their individual portfolios on Microsoft Teams. At the end of each unit of work, pupil will complete an end of unit assessment which teachers use to inform the assessment grid

Computing Long Term Knowledge Map

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	Digi Duck Autumn 1-Awesome Autumn EYFS - Online Safety	Autumn 2-Winter Warmers	Spring 1-Boat Ahoy	Spring 2-Springtime	Summer 1-Busy Bodies	Summer 2-Summer Fun
Year 1	Y1 Online Safety	Computing systems and networks – Technology around us	Creating media – Digital writing	Creating media – Digital painting	Programming A – Moving a robot	Programming B – Introduction to animation
Year 2	Y2 Online Safety	Creating media – Digital photography	Computing systems and networks – IT around us	Data and information – Pictograms	Programming A – Robot algorithms	Programming B – An introduction to quizzes
Year 3	Y3 Online Safety	Programming A – Sequence sounds	Creating media – Stop-Frame Animation	Programming B – Events and actions in programs	Creating media – Desktop publishing	Computing systems and networks – Connecting computers
Year 4	Y4 Online Safety	Programming A – Repetition in shapes	Data and information – Data logging	Creating media – Photo editing	Creating media – Audio production	Programming B – Repetition in games
Year 5	Y5 Online Safety	Programming A – Selection in physical computing	Computing systems and networks – Systems and Searching	Creating media – Vector drawing	Programming B – Selection in quizzes	Data and information – Flat-file databases
Year 6	Y6 Online Safety	Programming A – Variables in games	Creating media – 3D Modelling	Programming B – Sensing	Creating media – Web page creation	Data and information – Spreadsheets

Rationale for Sequencing

Year 1	Substantive Knowledge Content based around a Big Question	Recurring themes, ideas and language	Contribution on wider Computing knowledge and what later content this prepares for
Autumn 1: Online Safety - Using the internet safely	**BQ: How to we create positive digital experiences?** Explain the rules to keep myself safe when using technology both in and beyond home Recognise that there may be people online who could make me feel negative feelings Understand that we encounter a range of things online including things we like and don't like Give examples of when I should ask permission to do something online and explain why this is important Give examples of when I should ask permission to do something online and explain why this is important Describe how to behave online in ways that do not upset others and can give examples	This unit is aimed to teach basic online safety and digital literacy skills. During this unit, children learn about the potential dangers in the online world and what basic steps we all need to take in order to have positive digital experiences. Children will learn to respect others online as well as prioritise their safety in addition to learning that open communication with their trusted adults is key to navigating the online world safely. Children will also be taught that they are responsible for their actions online and that their behaviour can have real-world consequences.	This unit of work provides the foundations for online safety as children will be making progress and links in each year.
Autumn 2: Technology around us	**BQ: What the components of a computer and what are they used for?** Identify technology Identify a computer and its main parts Use a mouse in different ways Use a keyboard to type on a computer Use the keyboard to edit text Create rules for using technology responsibly	Learners will develop their understanding of technology and how it can help them in their everyday lives. They will start to become familiar with the different components of a computer by developing their keyboard and mouse skills. Learners will also consider how to use technology responsibly.	As this is a Year 1 unit, no prior knowledge is assumed. This unit progresses students' knowledge and understanding of technology and how they interact with it in school. Learners will build their knowledge of parts of a computer and develop the basic skills needed to effectively use a computer keyboard and mouse. This unit directly precedes the Y2 Computer systems and networks unit, IT around us

Spring 1: Digital writing	**BQ: What are the differences between using a computer to create text and writing on paper?** use a computer to write add and remove text on a computer identify that the look of text can be changed on a computer make careful choices when changing text explain why I used the tools that I chose compare typing on a computer to writing on paper	Learners will develop their understanding of the various aspects of using a computer to create and manipulate text. They will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method they prefer and explain their reasoning for choosing this.	This unit progresses the learners' knowledge and understanding of using computers to create and manipulate digital content, focussing on using a word processor. The learners will develop their ability to find and use the keys on a keyboard in order to create digital content. The learners are then introduced to manipulating the resulting text, making cosmetic changes, and justifying their reason for making these changes. Following this unit, learners will further develop their digital writing skills in the Year 3 – 'Desktop publishing' unit and the Year 6 – 'Web page development' unit.
Spring 2: Digital painting	**BQ: Do you prefer painting with or without digital devices and why?** Describe what different freehand tools do Use the shape tool and the line tools Make careful choices when painting a digital picture Explain why I chose the tools I used Use a computer on my own to paint a picture Compare painting a picture on a computer and on paper	Learners will develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and without the use of digital devices.	This unit progresses the learners' knowledge and understanding of usernames and passwords (Autumn 1) and how to switch devices on, keyboard and mouse skills (Autumn 2).
Summer 1: Moving a robot	**BQ: What are the four commands needed to run a program?** Explain what a given command will do Act out a given word	Learners will be introduced to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each command for the floor robot does, and use that knowledge to	This unit progresses learners' knowledge and understanding of giving and following instructions. It moves from giving instructions to each other to giving instructions to a robot by programming it.

	Combine 'forwards' and 'backwards' commands to make a sequence Combine four direction commands to make sequences Plan a simple program Find more than one solution to a problem	start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming, and builds knowledge in a structured manner. Learners are also introduced to the early stages of program design through the introduction of algorithms.	
Summer 2: Introduction to animation	**BQ: How can I make a quiz question using coding?** Choose a command for a given purpose Show that a series of commands can be joined together Identify the effect of changing a value Explain that each sprite has its own instructions Design the parts of a project Use my algorithm to create a program	Learners will be introduced to on-screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms.	This unit progresses learners' knowledge and understanding of programming and follows on from 'Moving a robot', where children will have learned to program a floor robot using instructions.
Year 2	**Substantive Knowledge Content based around a Big Question**	**Recurring themes, ideas and language**	**Contribution on wider Computing knowledge and what later content this prepares for**
Autumn 1: Online safety - Staying safe online	**BQ: How can I make safe choices when using the Internet?** Say how rules / guides can help anyone accessing online technologies Explain how other people may look and act differently online and offline Explain why some information I find online may not be real or true	Learners will be taught how to be safe online covering themes such as sharing pictures and videos, chatting online, playing games and friendships and socialising. The activities within the lessons help learners to understand the importance of permission and consent, in particular in relation to sharing images and videos, identify signs of manipulative behaviour and respond safely to it, understand the difference between online and offline friendships and the importance of being kind online and understand the	The unit builds on learners' knowledge and skills that were acquired during the Year 1 – using the internet safely unit and will continue to be built upon throughout Key Stage 2.

	Explain who I should ask before sharing things about myself or others online and explain who can help me if I feel under pressure to agree to something I am unsure about or don't want to do Recognise that content on the internet may belong to other people Talk about how anyone experiencing bullying can get help	importance of identifying and seeking help from a trusted adult when they need it and how to do this.	
Autumn 2: Digital photography	**BQ: How can I use a digital device to take and edit photographs?** Use a digital device to take a photograph Make choices when taking a photograph Describe what makes a good photograph Decide how photographs can be improved Use tools to change an image Recognise that photos can be changed	Learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real.	This unit begins the learners' understanding of how photos are captured and can be manipulated for different purposes. Following this unit, learners will develop their photo editing skills in Year 4.
Spring 1: Pictograms	**BQ: How can I present and analyse data on a computer?** Recognise that we can count and compare objects using tally charts Recognise that objects can be represented as pictures Create a pictogram Select objects by attribute and make comparisons	Learners will begin to understand what the term data means and how data can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data presented to answer questions.	This unit is the learners will have their first opportunity to use computing to organise and interpret data. Following this unit, learners will develop their data and information interpretation skills in year 5 and Year 6.

	Recognise that people can be described by attributes		
	Explain that we can present information using a computer		
Spring 2: IT around us	**BQ: What is information technology and how is it used to help us?**	Learners will develop their understanding of what information technology (IT) is and will begin to identify examples. They will discuss where they have seen IT in school and beyond, in settings such as shops, hospitals, and libraries. Learners will then investigate how IT improves our world, and they will learn about the importance of using IT responsibly.	This unit progresses learners' understanding of technology and how they interact with it. They will develop this understanding to become familiar with the term information technology and will be able to identify common features of IT. This unit also builds on the learners' understanding of using technology safely and responsibly. Following this unit, learners will develop their understanding computer systems and networks in Year 3.
	Recognise the uses and features of information technology		
	Identify the uses of information technology in the school		
	Identify information technology beyond school		
	Explain how information technology helps us		
	Explain how to use information technology safely		
	Recognise that choices are made when using information technology		
Summer 1: Robot algorithms	**BQ: How can I design and create a program, test it and debug it?**	This unit develops learners' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Learners will use given commands in different orders to investigate how the order affects the outcome. They will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them.	This unit progresses learners' knowledge and understanding of algorithms and how they are implemented as programs on digital devices. Learners will spend time looking at how the order of commands affects outcomes. Learners will use this knowledge and logical reasoning to trace programs and predict outcomes
	Describe a series of instructions as a sequence		
	Explain what happens when we change the order of instructions		
	Use logical reasoning to predict the outcome of a program		
	Explain that programming projects can have code and artwork		
	Design an algorithm		

	Create and debug a program that I have written		
Summer 2: Introduction to quizzes	**BQ: How can I make improvements to my own programming projects?** Explain that a sequence of commands has a start Explain that a sequence of commands has an outcome Create a program using a given design Change a given design Create a program using my own design Decide how own project can be improved	This unit initially recaps on learning from the Year 1 ScratchJr unit 'Programming B – Programming animations'. Learners begin to understand that sequences of commands have an outcome, and make predictions based on their learning. They use and modify designs to create their own quiz questions in ScratchJr, and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects.	This unit progresses learners' knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes
Year 3	**Substantive Knowledge Content based around a Big Question**	**Recurring themes, ideas and language**	**Contribution on wider Computing knowledge and what later content this prepares for**
Autumn 1: Online safety - Use technology safely	**BQ: How do I navigate the digital world responsibly and safely?** Explain why spending too much time using technology can sometimes have a negative impact on anyone and explain why some online activities have age restrictions, why it is important to follow them 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 Describe and demonstrate how we can get help from a	The recurring themes in online safety and digital citizenship involve understanding the balance between technology use and well-being, recognising the importance of age-appropriate content, maintaining integrity in online identity, seeking help from trusted adults when needed, distinguishing between online and offline relationships, respecting intellectual property, and practicing respectful behaviour in online interactions.	This unit builds on learners' knowledge and understanding of how to use the internet safely and be safe online and will be developed in Year 4 looking at acceptable behaviour online, Year 5 securing your secrets and Year 6 online citizenship.

	trusted adult if we see content that makes us feel sad, uncomfortable, worried or frightened		
	Explain what it means to 'know someone' online and why this might be different from knowing someone offline		
	Explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause		
	Describe appropriate ways to behave towards other people online and why this is important		
Autumn 2: Sequence in music	**BQ: How can you use programming to make a representation of a musical instrument?**	This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. Learners also apply stages of program design through this unit.	This unit builds on learners' knowledge and skills acquired in KS1 units using floor robots and ScratchJr.
	Explore a new programming environment		
	Identify that commands have an outcome		
	Explain that a program has a start		
	Recognise that a sequence of commands can have an order		
	Change the appearance of my project		
	Create a project from a task description		
Spring 1:	**BQ: How can you use technology to create an animation?**	Learners will use a range of techniques to create a stop-frame animation using tablets. Next, they will apply those skills to create a	This unit progresses students' knowledge and understanding of using digital devices to create media, exploring how they can create stop-frame

Stop-frame animation	Explain that animation is a sequence of drawings or photographs Relate animated movement with a sequence of images 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	story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text.	animations. Following this unit, learners will further develop their video editing skills in Year 5 and in Year 6 where learners will be making links with music.
Spring 2: Events and actions	**BQ: How can you use programming to create a maze?** Explain how a sprite moves in an existing project Create a program to move a sprite in four directions Adapt a program to a new context Develop my program by adding features Identify and fix bugs in a program Design and create a maze-based challenge	This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. Learners begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of **Pen** blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze-tracing program.	This unit builds on learners prior experience of programming. The key stage 1 units focus on floor robots and ScratchJr. The Year 3 Programming units introduces the Scratch programming environment and the concept of sequences.
Summer 1: Desktop publishing	**BQ: How and why is desktop publishing used in the real world?** Recognise how text and images convey information Recognise that text and layout can be edited Choose appropriate page settings	Learners will become familiar with the terms 'text' and 'images' and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' and begin to understand how these can support	This unit progresses learners' knowledge and understanding of using digital devices to combine text and images building on work from the following units; Digital Writing Year 1, Digital painting Year 1, and Digital Photography Year 2.

	Add content to a desktop publishing publication Consider how different layouts can suit different purposes Consider the benefits of desktop publishing	them in making their own template for a magazine front cover. They will start to add text and images to create their own pieces of work using desktop publishing software. Learners will look at a range of page layouts thinking carefully about the purpose of these and evaluate how and why desktop publishing is used in the real world.	
Summer 2: Connecting computers	**BQ: What are the benefits of connecting devices in a network?** Explain how digital devices function Identify input and output devices Recognise how digital devices can change the way that we work Explain how a computer network can be used to share information Explore how digital devices can be connected Recognise the physical components of a network	Learners will develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. They will also compare digital and non-digital devices. Next, learners will be introduced to computer networks, including devices that make up a network's infrastructure, such as wireless access points and switches. Finally, learners will discover the benefits of connecting devices in a network.	This unit progresses learners' knowledge and understanding of technology by focusing on digital and non-digital devices, and introducing the concept of computers connected together as a network.
Year 4	**Substantive Knowledge Content based around a Big Question**	**Recurring themes, ideas and language**	**Contribution on wider Computing knowledge and what later content this prepares for**
Autumn 1: Online safety - Acceptable behaviour	**BQ: How can we keep ourselves and others safe online?** Identify times or situations when someone may need to limit the amount of time they use technology Explain how my online identity can be different to my offline identity	This unit emphasises to learners the importance of understanding and managing their online presence asl well as recognising the potential risks associated with digital interactions, and maintaining respectful and ethical conduct in online environments.	This unit builds on learners' knowledge and understanding of how to use the internet safely and be safe online and will be developed in Year 5 securing your secrets and Year 6 online citizenship.

	Explain what is meant by fake news		
	Describe strategies for safe and fun experiences in a range of online social environments and give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours		
	Give some simple examples of content which I must not use without permission from the owner		
	Describe ways people can be bullied through a range of media and explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them		
Autumn 2: Repetition in shapes	**BQ: How do you give instructions to an online sprite to form shapes?**	Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming	This unit progresses students' knowledge and understanding of programming. It progresses from the sequence of commands in a program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code.
	Identify that accuracy in programming is important		
	Create a program in a text-based language		
	Explain what 'repeat' means		
	Modify a count-controlled loop to produce a given outcome		
	Decompose a task into small steps		
	Create a program that uses count-controlled loops to produce a given outcome		

Spring 1: Data logging	**BQ: How can we use data loggers to collect and analyse data?** Explain that data gathered over time can be used to answer questions Use a digital device to collect data automatically Explain that a data logger collects 'data points' from sensors over time Recognise how a computer can help us analyse data Identify the data needed to answer questions Use data from sensors to answer questions	In this unit, learners will consider how and why data is collected over time. Learners will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Learners will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Learners will spend time using a computer to review and analyse data. Towards the end of the unit, learners will pose questions and then use data loggers to automatically collect the data needed to answer those questions.	This unit progresses learners' knowledge and understanding of data and how it can be collected over time to answer questions. Specifically, it builds on the concept of answering questions with data which is first introduced in the KS1 data and information units. The unit also introduces the idea of automatic data collection. Learners are also introduced to data in tables and graphs, knowledge they will build on in the Year 5 unit (flat file databases) and the Year 6 unit (spreadsheets).
Spring 2: Photo editing	**BQ: How can I create a more exciting photo?** Explain that the composition of digital images can be changed Explain that colours can be changed in digital images Explain how cloning can be used in photo editing Explain that images can be combined Combine images for a purpose Evaluate how changes can improve an image	Learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices.	This unit progresses students' knowledge and understanding of digital photography and using digital devices to create media. Following this unit, learners will further develop their image editing skills in Year 5 – Vector drawing.
Summer 1: Audio editing	**BQ: How do you create a podcast?** Identify that sound can be recorded Explain that audio recordings can be edited Recognise the different parts of creating a podcast project	Learners will identify the input device (microphone) and output devices (speaker or headphones) required to work with sound digitally. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podcast, which will	This unit progresses students' knowledge and understanding of creating media, by focusing on the recording and editing of sound to produce a podcast.

	Apply audio editing skills independently Combine audio to enhance my podcast project Evaluate the effective use of audio	include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners will evaluate their work and give feedback to their peers.	
Summer 2: Repetition in games	**BQ: How do loops make for a more effective code?** Develop the use of count-controlled loops in a different programming environment Explain that in programming there are infinite loops and count-controlled loops Develop a design that includes two or more loops which run at the same time Modify an infinite loop in a given program Design a project that includes repetition Create a project that includes repetition	Learners will explore the concept of repetition in programming using the Scratch environment. The unit begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.	This unit assumes that learners will have some prior experience of programming. The KS1units cover floor robots and ScratchJr, and Scratch is introduced in the Year 3 programming units.
Year 5	**Substantive Knowledge Content based around a Big Question**	**Recurring themes, ideas and language**	**Contribution on wider Computing knowledge and what later content this prepares for**
Autumn 1: Online Safety - Securing your secrets	**BQ: What can I do to keep myself and others safe online?** Describe ways technology can affect health and well-being both positively and negatively and describe some strategies, tips or advice to promote health and wellbeing with regards to technology Explain how identity online can be copied, modified or	Learners will be taught how to be responsible and mindful with their use of technology, the importance of maintaining a safe and authentic online presence, and the need for awareness of the potential negative impacts of digital interactions on oneself and others	This unit builds on learners' knowledge and understanding of how to use the internet safely and be safe online and will be developed in Year 6 online citizenship.

	altered and demonstrate how to make responsible choices about having an online identity, depending on context Describe how fake news may affect someone's emotions and behaviour, and explain why this may be harmful Explain that there are some people I communicate with online who may want to do me or my friends harm Assess and justify when it is acceptable to use the work of others Describe how what one person perceives as playful joking and teasing (including 'banter') might be experienced by others as bullying and identify a range of ways to report concerns and access support both in school and at home about online bullying		
Autumn 2: Vector drawing	**BQ: How can I use drawing tools to create vector images?** Recognise that vector drawings are made using shapes Create a vector drawing by combining shapes Use tools to achieve a desired effect Recognise that vector drawings consist of layers Group objects to make them easier to work with	In this unit, learners start to create vector drawings. They learn how to use different drawing tools to help them create images. Learners recognise that images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. Learners layer their objects and begin grouping and duplicating them to support the creation of more complex pieces of work.	This unit progresses learners' knowledge and understanding of digital painting and has some links to the Year 3 'Desktop publishing' unit, in which learners used digital images. In this Year 5 unit, learners create images that could be used in desktop publishing documents.

	Apply what has been learned about vector drawings		
Spring 1: Sharing information	**BQ: What are the similarities and differences between search engines and how does this influence results?** Explain that computers can be connected together to form systems Recognise the role of computer systems in our lives Identify how to use a search engine Describe how search engines select results Explain how search results are ranked Recognise why the order of results is important, and to whom	Learners develop their understanding of computer systems and how information is transferred between systems and devices. Learners consider small-scale systems as well as large-scale systems. They explain the input, output, and process aspects of a variety of different real-world systems. Learners discover how information is found on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines.	This unit progresses learners' knowledge and understanding of computing systems acquired during Year 2 – IT around us and Year 3 – connecting computers.
Spring 2: Selection in physical computing	**BQ: How can I use my knowledge of algorithms and programs to create a working model of a fairground carousel?** Control a simple circuit connected to a computer Write a program that includes count-controlled loops Explain that a loop can stop when a condition is met Explain that a loop can be used to repeatedly check whether a condition has been met Design a physical project that includes selection	In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program it to control components (including output devices — LEDs and motors). Learners will be introduced to conditions as a means of controlling the flow of actions in a program. Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if...then...' structure) and write algorithms and programs that utilise this concept. To conclude the unit, learners will design and make a working model of a fairground carousel that will	This unit builds on learners' prior experience of programming using a block-based language (eg Scratch) and understand the concepts of sequence and repetition.

	Create a program that controls a physical computing project	demonstrate their understanding of how the microcontroller and its components are connected, and how selection can be used to control the operation of the model. Throughout this unit, learners will apply the stages of programming design	
Summer 1: Selection in quizzes	**BQ: How can I use my knowledge of programming to create a quiz?** Explain how selection is used in computer programs Relate that a conditional statement connects a condition to an outcome Explain how selection directs the flow of a program Design a program that uses selection Create a program that uses selection Evaluate own program	Learners will develop their knowledge of 'selection' by revisiting how 'conditions' can be used in programming, and then learning how the 'if… then… else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'. They represent this understanding in algorithms, and then by constructing programs in the Scratch programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. They use this knowledge to design a quiz in response to a given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying how it meets the requirements of the task, the ways they have improved it, and further ways it could be improved.	This unit builds on learners' prior experience of programming using block-based construction (e.g. Scratch), understanding of the concepts of 'sequence' and 'repetition', and experience of using 'selection'.
Summer 2: Flat-file databases	**BQ: How can I use a database to order and answer questions about data?** Use a form to record information Compare paper and computer-based databases Outline how you can answer questions by grouping and then sorting data Explain that tools can be used to select specific data	This unit looks at how a flat-file database can be used to organise data in records. Learners will use tools within a database to order and answer questions about data. They will create graphs and charts from their data to help solve problems. They will also use a real-life database to answer a question, and present their work to others.	This unit progresses learners' knowledge and understanding of why and how information might be stored in a database, and looks at how tools within a database can help us to answer questions about our data. It moves on to demonstrate how a database can help us display data visually, and how real-life databases can be used to help us solve problems. Finally, the learners create a presentation showing understanding and application of all the tools used within the unit.

	Explain that computer programs can be used to compare data visually		
	Use a real-world database to answer questions		
Year 6	**Substantive Knowledge Content based around a Big Question**	**Recurring themes, ideas and language**	**Contribution on wider Computing knowledge and what later content this prepares for**
Autumn 1: Online safety – Online citizenship	**BQ: What can we do to ensure we keep ourselves safe online?**	This unit explores key areas of online safety that are suitable for this year group as they prepare and transition for Key stage 3. It provides the necessary skills and knowledge to manage technology's impact on health and navigating online emotional challenges. Children have an opportunity to evaluate information and opinion and recognise that popularity does not equate to truthfulness. In addition, children learn that sharing information privately online can lead to unintended consequences for others.	This unit builds on knowledge about online safety that has been covered so far during the primary career in addition to linking areas of understanding needed to support learners in preparation for secondary school.
	Recognise and can discuss the pressures that technology can place on someone and how / when they could manage this and assess and action different strategies to limit the impact of technology on health		
	Describe issues online that could make anyone feel sad, worried, uncomfortable or frightened		
	Explain how and why some people may present 'opinions' as 'facts'; why the popularity of an opinion or the personalities of those promoting it does not necessarily make it true, fair or perhaps even legal		
	Describe how things shared privately online can have unintended consequences for others		
	Demonstrate the use of search tools to find and access online content which can be		

	reused by others and demonstrate how to make references to and acknowledge sources I have used from the internet		
	Describe how to capture bullying content as evidence (e.g., screengrab, URL, profile) to share with others who can help me and explain how someone would report online bullying in different contexts		
Autumn 2: Variables in games	**BQ: How can variables to be used to set and change the running of a program?**	This unit explores the concept of variables in programming through games in Scratch. First, learners find out what variables are and relate them to real-world examples of values that can be set and changed. Then they use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, learners experiment with variables in an existing project, then modify them, before they create their own project. In Lesson 4, learners focus on design. Finally, in Lesson 6, learners apply their knowledge of variables and design to improve their games in Scratch.	This unit builds on learners' prior experience of programming in Scratch. Specifically, programming constructs of sequence, repetition, and selection. These constructs are covered in the Year 3, 4, and 5 programming units.
	Define a 'variable' as something that is changeable		
	Explain why a variable is used in a program		
	Choose how to improve a game by using variables		
	Design a project that builds on a given example		
	Use my design to create a project		
	Evaluate own project		
Spring 1: 3D modelling	**BQ: How can 3D graphics be used to create a design of a building?**	Learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, moving, resizing, and duplicating objects. They will then create hollow objects using placeholders and combine multiple objects to create a model of a desk tidy. Finally, learners will examine the benefits of grouping and	This unit progresses students' knowledge and understanding of creating 3D graphics using a computer. Prior to undertaking this unit, learners should have worked with 2D graphics applications.
	Recognise that you can work in three dimensions on a computer		
	Identify that digital 3D objects can be modified		

	Recognise that objects can be combined in a 3D model Create a 3D model for a given purpose Plan my own 3D model Create my own digital 3D model	ungrouping 3D objects, then go on to plan, develop, and evaluate their own 3D model of a building.	
Spring 2: Sensing	**BQ: How can I use my understanding of coding to program a controllable device?** Create a program to run on a controllable device Explain that selection can control the flow of a program Update a variable with a user input Use an conditional statement to compare a variable to a value Design a project that uses inputs and outputs on a controllable device Develop a program to use inputs and outputs on a controllable device	This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables (introduced in Year 6 – 'Programming A'. It offers pupils the opportunity to use all of these constructs in a different, but still familiar environment, while also utilising a physical device — the micro:bit. The unit begins with a simple program for pupils to build in and test within the new programming environment, before transferring it to their micro:bit. Pupils then take on three new projects in Lessons 2, 3, and 4, with each lesson adding more depth.	This unit builds on learners' confidence in their understanding of sequence, repetition and selection independently within programming acquired during KS2.
Summer 1: Web page creation	**BQ: What features can I use to create an effective website?** Review an existing website and consider its structure Plan the features of a web page Consider the ownership and use of images (copyright) Recognise the need to preview pages Outline the need for a navigation path	Learners will be introduced to creating websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process, learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths	This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing.

	Recognise the implications of linking to content owned by other people		
Summer 2: Spreadsheets	**BQ: How can spreadsheets be useful when collecting and modifying data?** Create a data set in a spreadsheet Build a data set in a spreadsheet Explain that formulas can be used to produce calculated data Apply formulas to data Create a spreadsheet to plan an event Choose suitable ways to present data	This unit introduces the learners to spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, learners will create charts, and evaluate their results in comparison to questions asked.	This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets. Specifically, learners will have experienced data in tables and charts in the Y4 data logging and Y5 branching database units.