COMPUTING KNOWLEDGE Progression

This is how our children's computing knowledge builds from Year 3 to Year 6, taking into account, prior learning (Year 2) and next stage (Year 7).

In order for pupils to become confident computing experts, we believe a high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident, and creative users of information and communication technology

Pillars of our computing curriculum	Computer Science	Information technology	Digital literacy
			

Area of Study			
Year 3	**Year 4**	**Year 5**	**Year 6**
Online safety – 3 hours	**Online safety – 4 hours**	**Online safety – 3 hours**	**Online safety – 2 hours**
Touch Typing – 4 hours	**Animation – 3 hours**	**Concept Maps – 4 hours**	**Blogging – 4 hours**
PowerPoint – 5 hours	**Effective searching – 3 hours**	**Coding – 6 hours**	**Spreadsheets – 5 hours**
Simulations – 3 hours	**Logo coding – 4 hours**	**Game creator coding – 5 hours**	**Text adventure coding – 5 hours**
Coding – 6 hours includes catch up coding	**Coding – 6 hours**	**PowerPoint – 4 hours**	**Coding – 6 hours**
23 hours	**22 hours**	**24 hours**	**24 hours**

In addition to the online safety unit, all units will start with ½ hour online safety lesson.

Area of Study	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Computer Science						
Computer Science	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		**Coding** Know what a **variable** is in programming. Know how to use **variables** within their programs.	**Coding** Know what different **variable** types are. Know how to set and change **variable** values in code. Know some of the common ways that text **variables** can be used in programming.	**Coding** Know how to attribute **variables** to user input.	Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative
				Coding Know what a **function** is in coding and know how to use a **function** in own program to make it more efficient.	**Coding** Know how to use multiple **functions** in own program, building on prior knowledge	

Computer Science

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 logical reasoning to predict the behaviour of simple programs	**Coding** Know how to create a range of programs using coding knowledge. Know how to change attributes/properties of any objects in their **own program** (one they have made).	**Coding** Know how an IF statement works. Know how to interpret an IF statement and therefore know how to create their **own program** that includes an IF statement. Know how an IF/ELSE statement works. To know how to create their **own program** and playable game using a block coding environment	**Coding** Know the need to start coding at a basic level of abstraction to remove superfluous details from **own programs**. Know and use concatenation in **own programs**	**Coding** Know with improving understanding of how they can alter existing **programs** to reflect their **own** ideas.	algorithms for the same problem Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
		Coding Knows that there are different types of **timers** used in coding and which timers should be used for a given purpose.			**Coding** Know how to implement a game which includes **timers** and scoring accurately.	
		Coding Know how to create a range of programs using **code**.		**Coding** Know how to simplify **code** in order to make programming more efficient	**Coding** Know the need to **code** for all possibilities when using user inputs	
		Coding Know how to run, test and **debug** their own programs Know what nesting is and why it needs to be considered when **debugging**.		**Coding** Know what **decomposition** and abstraction are in computer science. Know how to use **decomposition** to plan of a real-life situation.	**Coding** Know how to **debug** more effectively, building on prior knowledge	
		Coding Know what a **command** is and how to use a repeat command	**Coding** Know what and how to use the 'repeat until' **command**		**Coding** Know what the launch **command** is.	
		Coding Knows what a flowchart is and how flowcharts are used in computer programming. Knows how to use a flowchart to create a computer program.	**Coding** Know what selection is in computer programming. Know how to use co-ordinates in computer programming.	**Coding** Know how to create a simple simulation using 2Code. For example, a traffic light sequence.	**Coding** Know how to arrange code in multiple tabs. Know how to develop creativity when coding to generate novel effects. Know the different options of generating user input in 2Code. Know the need to code for all possibilities when using user inputs. Know how 2Code can be used to make a text-based adventure game.	
			Logo Know the structure of coding language Know how to input simple instructions Know to use the repeat functions to create shapes Know how to use and build procedures	**Game creator** Know how to plan a game Know to design and create the game environment Know to design and create the game quest Know how to finish and share the game Know to self and peer evaluate	**Text adventures** Know what a text adventure is Know how to plan a story adventure Know how to make a story-based adventure Know an alternative model for a text adventure which has a less sequential narrative Know to use written plans to code a map-based adventure	
Information Technology 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.						

Information Technology	Use technology purposefully to create, organise, store, manipulate and retrieve digital content. Recognise common uses of information technology beyond school.	**PowerPoint** Know the uses of PowerPoint and how to create a slide to **present**. Know how to add media, animations and timings to **present**. Know to use the skills learnt to design and create an engaging **presentation**.		**PowerPoint** Know what a word processing tool is for. Know how to add and edit images to a word document. Know how to use word wrap with images and text. Know to change the look of text within a document to **present**. Know to add features to a document to enhance its look and usability. Know to use tables within MS Word to **present** information.		Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
		Touch typing Know basic typing terminology and how the correct way to sit at the keyboard. Know how to use the home, top and bottom row keys. Know to practise typing with the left and right hand. **Simulations** Know what simulations are Know how to explore simulations Know how to analyse and evaluate a simulation	**Animation** Know what makes a good animated film or cartoon and how these are created by hand or by using a computer Know about onion skinning in animation Know how to add backgrounds and sounds to animations. Know the function of 'stop motion' animation Know how to share animation on the class display board and by blogging. Know how to locate information on the search results page. Know how to use search effectively to find out information. Know to assess whether an information source is true and reliable.	**Concept Maps** Know the need for visual representation when generating and discussing complex ideas. Know the uses of a 'concept map'. Know the correct vocabulary when creating a concept map. Know how to create a concept map. Know how a concept map can be used to retell stories and information. Know how to create a collaborative concept map and present this to an audience. Know to consider page layout including heading and columns.	**Spreadsheets** Know what a spreadsheet looks like. Know how to navigate and enter data into cells. Know introduce some basic data formulae in Excel for percentages, averages and max and min numbers. Know to demonstrate how the use of Excel can save time and effort when performing calculations. Know to use a spreadsheet to model a real-life situation. Know to demonstrate how Excel can make complex data clear by manipulating the way it is presented. Know to create a variety of graphs in Excel. Know to apply spreadsheet skills to solving problems. **Blogging** Know the purposes of writing of blog Know the features of a successful blog Know how to plan the theme and content for blog Know how to write a blog and a blog post Know the effects upon the audience of changing the visual properties of the blog Know how to contribute to an existing blog Know how and why blog posts are approved by the teacher Know the importance of commenting on blogs	
Digital Literacy Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.						
Digital Literacy	Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they	Know what makes a safe **password**. Know different methods for keeping **passwords** safe.		Know how to maintain secure **passwords**.		Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.
			Know the positive and negative **influences** of technology on health and the environment.		Know the positive and negative **influences** of technology on health and the environment.	

	have concerns about content or contact on the internet or other online technologies.		Know how they can protect themselves from online identify theft. Know that information put online leaves a **digital footprint** or trail and that this can aid identity theft.		Know to review the meaning of a **digital footprint**.	
			Know that appropriate **behaviour** when participating or contributing to collaborative online projects for learning.	Know to review sources of support when using technology and children's responsibility to one another in their online **behaviour**.	Know to have a clear idea of appropriate online **behaviour**.	
				Know to gain a greater understanding of the impact that **sharing** digital content can have. Know to be aware of appropriate and inappropriate text, photographs and videos and the impact of **sharing** these online.	Know the benefits and risks of **sharing** personal information. Know to understand how any **shared** information online can persist.	
			Know the importance of balancing game and **screen time** with other parts of their lives.		Know the importance of balancing game and **screen time** with other parts of their lives.	
		Know to consider the truth of the content of websites.	Know that copying the work of others and presenting it as their own is called 'plagiarism' Know the consequences of plagiarism.	Know the advantages, disadvantages, permissions and purposes of altering an image digitally and the reasons for this. Know about how to reference sources in their work. Know to search the Internet with a consideration for the reliability of the results of sources to check validity and understand the impact of incorrect information.		
		Know how the Internet can be used in effective communication. Know how a blog can be used to communicate with a wider audience. Know about the meaning of age restrictions symbols on digital media and devices.	Know the risks and benefits of installing software including apps.	Know to ensure reliability through using different methods of communication.	Know benefits and risks of mobile devices broadcasting the location of the user/device. Know secure sites by looking for privacy seals of approval.	

½ hour of Internet safety before all units – tailored to the year/children.