

**Purpose of study**

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems. 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.

Aims

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

Organisation

Computing is taught in discrete half termly topics, though opportunities for cross-curricular study are always explored. The computing units follow a yearly progression and are adapted to support the specific needs of the children in each year group. Each year group has three regular computing time slots available weekly as well as shared access to Ipads and laptops used within the classroom. We are continually investing in new hardware and software to develop our curriculum whilst developing staff knowledge and delivery of computing lessons. Online Safety features prominently in our curriculum; pupils are given an online safety lesson at the beginning of each half-termly topic in all year groups.

Skills Progression

Aspect	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computing skills - Algorithms and programming skills	Understand what algorithms are; how they are implemented as programmes on digital devices; and what programs execute by following precise unambiguous instructions	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	Debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts Use sequence and repetition in programs Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	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 Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	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	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
Computing skills- Data and information	Use technology purposefully to organise digital content.	Use technology purposefully to create, organise, store, manipulate and retrieve digital content	Select, use and combine a variety of software to design and create a range of content that accomplishes given goals, including collecting and	Explain the importance of human- computer interface design, for example, how a website is designed to help the user navigate the pages	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	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

			presenting data and information	Explain and used common troubleshooting techniques to find errors in data	that accomplish given goals, including collecting, evaluating and presenting data	that accomplish given goals, including collecting, analysing, evaluating and presenting data
Computing skills- How computers work	Recognise common uses of information technology beyond school	Recognise common uses of information technology beyond school	Understand computer networks and the opportunities they offer for communication and collaboration Use technology safely, respectfully and responsibly	Understand computer networks and the opportunities they offer for communication and collaboration Use technology safely, respectfully and responsibly	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 technology safely, respectfully and responsibly	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 technology safely, respectfully and responsibly
Computing skills- Communication and e-safety	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.	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	Understand computer networks and the opportunities they offer for communication and collaboration Use technology safely, respectfully and responsibly	Use search technologies effectively and be discerning in evaluating digital content Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; content and contact	Use search technologies effectively and be discerning in evaluating digital content Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact	Use search technologies effectively, appreciate how evaluating digital content Use technology safely, respectfully and responsibly; identify a range of ways to report concerns about content and contact

National Curriculum objectives

	Key Stage 1	Key Stage 2
	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

Unit Planner

Year	Units					
	Autumn		Spring		Summer	
1	Grouping & Sorting (MS Word)	Coding (Espresso – block coding level 1)	Maze Explorers (Bee bots and bee bots app)	Animated Story Books (2Create a story)	Coding (Espresso – block coding level 2)	Spread Sheets (2 calculate) Technology Outside School
Online Safety	The Internet I can talk about how I use the internet I can discover that the internet can be used to visit faraway places and learn new things	Personal Information I can identify what personal information is and who I can share it with I can recognise why personal information is special I know what action to take if I feel in danger	Searching the Internet I can learn how to search online by using the alphabet I can understand how to search for a specified letter of the alphabet on a children's directory site I can apply the results of their alphabet search to create a picture dictionary	Exploring Online I can visit some exciting places online I know how to follow certain rules to remain safe online I know how and who to ask for help if I get stuck or feel worried	Using Emails I understand that the internet provides a way of communicating with people I can describe how to send an email I demonstrate how people communicate with each other online	Recap all online safety learnt this year
Curriculum Links	Group and sort types of weather.		Make maps of the school for Bee Bots to navigate around.	Use this to retell the Easter story.		
	- Start to introduce to the children the idea of 'ownership' of their creative work - Start to add pictures and text to work	- Follow and create simple instructions on the computer - Consider how the order of instructions affects the result	- Understand the functionality of the basic direction keys - To be able to use the direction keys to complete the challenge	- To be introduced to eBooks and to 2Create a Story - Continue a previously saved story - Add animation to a story	- Explain what is meant by coding - Understand block coding on screen - Make a character move left and right	- Navigate around a spreadsheet - Explain what rows and columns are - Save and open sheets

	Sort items using a range of criteria	Use simple inputs to affect outputs on the computer	- Understand how to create and debug a set of instructions (algorithm) - Understand how to change and extend the algorithm list	- Add sound to a story including voice recording and music the children have created - Add backgrounds and copying and pasting pages - Share e-books	- Make a character move when clicked - Write a program where objects can disappear when the objects collide - Debug simple programmes	- Add images to a spreadsheet and use an image toolbox 'Lock' cells to prevent changes - Use the 'speak' and 'count' tools in 2Calculate to count items - Understand what is meant by 'technology' - Consider types of technology used in school and out of school
2	Coding (Espresso – block coding level 3)	Online Safety (2Email, Digiduck's Big Decision) Spreadsheets (2Calculate)	Questioning (2Chart)	Effective Searching (Google Chrome)	Creating Pictures (2Paint) Making Music (2Explore, 2Beat, 2Sequence)	Presenting Ideas (MS Publisher)
Online Safety	Games and Apps - I can explain which games I enjoy and which I don't - I know what to do if I get into trouble or feel worried when playing a game - I can explain some dangers of playing online games and apps	Being Careful Online - I can explain what being careful means - I can identify different ways to stay safe in real life and online - I know what to do if I don't feel safe online	Online Stories - I can explain how to help someone if they get into trouble online - I know who to tell if I get into trouble whilst using the internet - Understand how online stories can make you feel - Begin to recognise online safety rules	Internet Safety Rules - I can identify rules which will help me stay safe when using the internet - I know what action to take if I don't follow a rule by mistake	Staying Safe Online - I can understand how to stay safe online - I can explain top tips to stay safe online	Recap all online safety taught this year
Curriculum Links		Create graphs about the different features of	Show decisions that people would have had to	Research about the Great Fire of London.	Make pictures and music inspired by different	Present information on where they would like to go on holiday.

		castles they can spot in different pictures.	make during the Great Fire.		locations around the world.	
	• Use arithmetic operators, if statements and loops, within programs • Use logical reasoning to predict the behaviour of programs • Find and correct simple semantic errors i.e. debugging in algorithms • Explore the possible actions of different types of objects	• Share work electronically • Understand how to share work on the internet • How do we talk to others when they aren't there in front of us? • Send and receive an email • Use Copy and Paste & the totalling tool • Use a spreadsheet to add amounts • Create a table and block graph	• Show that the information provided on pictogram is of limited use beyond answering simple question • Use YES or No questions to separate information • Construct a binary tree to separate different items • Use a database to answer more complex search questions • Use the search tool to find information	• Understand the terminology associated with searching • Gain a better understanding about searching on the Internet • Identify the basic parts of a web search engine search page • Know how to search for information on the Internet	• Use the eCollege function in 2Paint a Picture to create surrealist art using drawing and clipart • Introduce to making music digitally • Add sounds to a tune • Upload a sound from a bank of sounds • Record own sound and upload it	• Explore how a story can be presented in different ways • Know that digital content can be represented in many forms • Extract information and embed into Publisher • Insert photos and data • Use a variety of software to manipulate and present digital content and information • Collect, organise and present data and information in digital content • Children can create digital content to achieve a given goal by combining software packages
3	Coding (Espresso – block coding level 4)	Email (2Email)	Touch-typing (2Type)	Spreadsheets (MS Excel)	Branching Databases (2Question)	Simulations (2Simulate)

Online Safety (To be taught as first computing lesson of the half term)	Introduction to E-safety Understand what ESafety means Recognise when it is and is not safe online	Exploring Online Compare how staying safe online is similar to staying safe in the real world Explain and identify rules for travelling safely on the Internet	Recap online safety lessons from first two half terms.	Communication Channels The different ways to communicate with people online To understand different communication channels The positives and negatives of communication channels	Communicating Online Understand different forms of communication Identify how to communicate safely online	Recap all online safety learnt this year
Curriculum Links		Compose emails to someone living in the stone or iron age.		Use heights of mountains or facts about rivers.	Use databases to create a Tudor family tree.	Simulate plants growing.
	• Design and write a program that accomplishes a specific goal • Design and write a program that simulates a physical system • Use repetition commands • Debug a program • Set and change variables	• Understand different methods of communication • Open and respond to an email • Compose an email using an address book • Learn how to use email safely • Add an attachment to an email • Explore a simulated email scenario	• Understand the names of the fingers. • Understand what is meant by 'top row', 'home row', 'bottom row' and 'space bar' • Practise and improve typing skills • Type words using the correct fingering • Improve the speed and efficiency of typing	• Create a table of data • Input data into a program to create a chart or graph • Use 'more than', 'less than' and 'equals' tools • Describe a cell location in a spread sheet using the notation of a letter and number	• Sort objects using YES/NO questions • Complete a branching database • Debug a database	• Understand that a simulation can represent real and imaginary situations • Explore a simulation • Use simulations to test different options and predictions • Analyse and evaluate simulations
4	Coding (Espresso – block coding level 5)	Logo (2Logo)	Coding (Espresso – introduction to python)	Writing for Different Audiences (MS Publisher/Word/Powerpoint)	Effective Searching (Google Chrome)	Animation (2Animate, 2Blog)

Online Safety (To be taught as first computing lesson of the half term)	Personal information Identify personal information The importance of not sharing personal details online How to keep personal information safe online	Online Gaming and Apps Identify online games and apps Recognise the dangers of online gaming How to stay safe when using online games and apps	Cyberbullying Develop an understanding of what bullying is To identify incidents of cyberbullying How to keep safe and deal with cyberbullying	Online Situations To identify different types of situations we may face when being online To understand how to deal with online situations	Being Smart Online Understand how to be smart online Know the do's and don'ts when going online	Recap all online safety learnt this year
Curriculum Links				Present information for people in different decades in Britain.	Research about the Ancient Egyptians.	Animate Egyptian hieroglyphs.
	• Design and write a program that accomplishes a specific goal • Create variables • Use repetition and user input • Debug a program Debug someone else's program • Explain how a program can be changed • Control a simulation • Manipulate graphics to achieve a desired look for a program • Use an algorithm when making a simulation of an event on the computer	• Learn the language of Logo • Input instructions to a program • Use 'repeat' function in Logo • Use logical reasoning to explain how some simple algorithms work and detect errors	• Design and write a program that accomplishes a specific goal • Create variables • Use repetition and user input • Debug a program Debug someone else's program • Explain how a program can be changed • Control a simulation • Manipulate graphics to achieve a desired look for a program • Use an algorithm when making a simulation of an event on the computer	• Explore how font size and style can affect the impact of a text • Create a news report using a simulated scenario • Select an appropriate program based on its functionality	• Locate information on the search results page • Structure queries to locate specific information • Use search to effectively find information • Assess whether an information source is true and reliable Understand and identify the different parts that make up a computer	• Discuss what makes a good animated film or cartoon • Understand how animations are crafted by hand • Learn how to use 'onion-skinning' in animation • Add backgrounds and sounds to animations Create a stop motion animation • Share animation by blogging
5	Spreadsheets (MS Excel)	3D Modelling (2Design and Make)	Coding (Espresso – block coding level 6)	Coding (Espresso – python graphics)	Databases (2Question)	Concept Map (2Connect)
Online Safety (To be taught as first)	E-Safety Introduction Understand what is meant by ESafety	Social Media	Cyberbullying Understand what cyber-bullying is	Online Communication Understand how to show respect online	Digital Footprint Understand what a digital footprint is	Recap all online safety learnt this year

computing lesson of the half term)	How to be smart on the internet	Understand the positive and negative uses of social media Understand the impact of social media on our behaviour, emotions & lives	Identify cyber-bullying and its consequences Learn how to deal with cyber-bullying	Understand the difference between online and face to face communication Learn rules for communicating online	Explore what information is appropriate to be put online	
Curriculum Links	Code breaking linked to WWII.	Design and model air raid shelters.			Create and use databases based around life cycles of different classes of animals.	Create a concept map about the invaders and settlers in England 410 – 1066AD.
	• Create a formula in a spreadsheet to convert m to cm • Use the count tool in a spreadsheet • Use a spreadsheet to work out area and perimeter • Create simple formulae that use different variables • Use a spreadsheet to model a real-life situation and come up with solutions that can be practically applied	• Explore different 2D/3D animation programmes • Explore the effect of moving points when designing • Alter the shape of an object whilst maintaining its form • Understand designing for a purpose • Design, create and print a model Explore possibilities of 3D printing	• Design and write a program that accomplishes a specific goal • Simulate a physical system • Introduce text variable • Create and improve a game • Use coding knowledge to create a program that explains internet safety • Solve problems by decomposing them into smaller parts Use logical reasoning to explain how some algorithms work and detect errors	• Design and write a program that accomplishes a specific goal • Simulate a physical system • Introduce text variable • Create and improve a game • Use coding knowledge to create a program that explains internet safety • Solve problems by decomposing them into smaller parts Use logical reasoning to explain how some algorithms work and detect errors	• Learn how to search for information on a database • Contribute to a class database • Create own database based on a chosen topic Know what a database field is and how to correctly add field information	• Understand the need for visual representation when generating and discussing complex ideas • Use the correct vocabulary when creating a concept map • Understand what is meant by; 'concept maps', 'stage', 'nodes', and 'connections' • Understand how a concept map can be used to retell stories and information • Create a collaborative concept map and present to an audience
6	Coding (Espresso – python random numbers and simulations)	Spreadsheets (MS Excel)	Blogging (2Blog)	Coding (Espresso – introduction to HTML coding)	Network	Quizzing (2Quiz)
Online Safety (To be taught as first)	Online Scams	Online Chatting	Online Behaviour	Online Wellbeing	Staying Safe Online	Recap all online safety learnt this year

computing lesson of the half term)	Recognise the features spam & junk emails Recognise some common online scams	Recognise that online friends may not be who they say they are Understand ways to chat safely and securely online	Understand who to trust about choices and activities online Learn about ways to manage your privacy and reputation online Identify how to make good choices about sharing content online	Identify signs that screen use has become excessive Understand the negative impacts of too much time online Take steps toward moderating screen time	Know how to stay safe online Understand what to do if you face a digital dilemma	
Curriculum Links		Make spreadsheets to evaluate costs of renewable versus non-renewable electricity.	Make a blog as a tourist visiting Peru.			Create quizzes about the local history and geography of Stansted.
	• Design and write a program that accomplishes a specific goal • Explain what functions are and how they can be created and labelled • Move codes to different tabs • Describe codes using the appropriate terms • Include buttons that launch other programs • Include buttons that launch windows to external websites • Follow and adapt code to make it unique • Solve problems by decomposing them into smaller parts • Use logical reasoning to explain how some	• Create a spreadsheet to answer a mathematical question relating to probability • Create, copy and paste shortcuts • Problem solve using the count tool • Create a computational model • Use formula wizard to create formulae • Make practical use of a spreadsheet to help plan actions • Create a spreadsheet to model a real-life situation	• Identify the purpose of writing a blog • Identify the features of successful blog writing • Plan the theme and content for a blog • Understand how to write a blog • Consider the effect upon the audience of changing the visual properties of a blog • Understand the importance of regularly updating the content of a blog • Contribute to an existing blog • Understand how and why blog posts are approved by a teacher • Understand the importance of commenting on blogs	• Design and write a program that accomplishes a specific goal • Explain what functions are and how they can be created and labelled • Move codes to different tabs • Describe codes using the appropriate terms • Include buttons that launch other programs • Include buttons that launch windows to external websites • Follow and adapt code to make it unique • Solve problems by decomposing them into smaller parts • Use logical reasoning to explain how some	• Know the difference between the World Wide Web and the Internet • Find out what a LAN and a WAN are • Understand how we access the internet in school • Research and find out about the age of the Internet (Tim Berners Lee) • Consider major changes in technology that have happened in their lifetime or the lifetime of an adult	• Learn how to create a quiz using a program • Consider the audience and ability • Use different programs to plan and create a quiz • Make a quiz that require the player to search a database

	algorithms work and detect errors		• Demonstrate awareness of cyberbullying	algorithms work and detect errors		
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Knowledge Table

Year	Knowledge
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1	• To know an algorithm is a way of solving a problem. • To know that algorithms can be followed by humans and also by computers. • To know digital content can be organised in different ways. • To know how to organise and manipulate digital content purposefully. • To know common uses of information technology beyond school. • To know who to ask for help and support if they have concerns or are worried by something they see on a computer or digital device. • To know how to keep their personal information private.
2	• To know how to create and debug a simple program. • To apply logical reasoning to predict the behaviour of a simple program. • To know how to collect data, using simple tally charts and manipulate it into pictograms (real world contexts). • To know how to load and save a file in a computer program. • To know how to store and retrieve digital content. • To know the main features and functions of a computer; including CPU, the memory and hard drive. • To know the benefits of going online and also how to stay safe. • To know the same rules apply to communicating online in a kind friendly manner as in person.
3	• To know how to decompose programs into smaller parts. • To know how to use sequence, select and use repetition in programs. • To know the importance of human computer interface design (how a website is designed to help the user navigate the pages). • To know how to trouble shoot to find errors in data. • To know how they can communicate and work together online. • To know how to search for information using more accurate choice of words. • To know how to select information based on its relevance and appropriateness.
4	• To know how to write and debug programs using a visual programming language. • To know why there is sometimes different operating systems and application software for the same hardware. • To know how they can communicate and work together online. • To know the importance of human- computer interface design, for example, how a website is designed to help the user navigate the pages. • To have the knowledge to find errors in data using common troubleshooting techniques. • To have the knowledge to recognise acceptable/unacceptable behaviour; content and contact whilst online
5	• To know how algorithms can use sequence, selection and repetition in programs. • To know and understand variables and how they work; with various forms of input and output. • To show how programs can be planned, tested, corrected, documented and are able to annotate programs with simple comments.

	• To know how data is transported on the internet, including packets and the concept of a protocol. • To know what a binary number system is and how it works. To be able to name and explain how a number can be represented in binary. • To have the knowledge to use search technologies effectively and be discerning in evaluating digital content
6	• To know how to solve more complex problems by decomposing them into smaller parts. • To know how to work with variables using various forms of input and output. • To know and can show how programs can be planned, tested, corrected, and documented- able to annotate programs with detailed comments. • To be able to look beyond a web browser to explain how HTML constructs the rendering of a web page. • To know the difference between the term 'World Wide Web' and 'the internet'. • To know the key features of the World Wide Web and their relationships, for example browsers, URLs and navigation methods, should continue to be developed. • To know real-world uses of data and information and the need of the Data Protection Act and how it can affect them. • To explain the role of search engines and what happens when a user requests a webpage in a browser. • To know social and ethical issues raised by the role of computers in the world. • To know possible career paths involving computing. • To have the knowledge to use technology safely, respectfully and responsibly.

Conceptual Links

Computing equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. In addition to this there may be further conceptual links with:

E-Safety- influence, well-being, discrimination, media, equality, responsibility

Data and information- consent, rights, freedom, identity, individuality

Use of technology throughout society/different countries- Wealth, poverty, class, community

Computing Curriculum Key Vocabulary

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Algorithm Code Debug Operator If statement Loop Input Output Instruction Digital Technology Internet Online App Devices Phone Tablet Computer Laptop Mouse Keyboard Username Password Copy Paste	Programme Web search Search engine Logical Content Software Database E-mail Spreadsheet Total Sum Save Folder Documents Insert Publisher	Command Sequence Simulate Repeat Variables Sprite Network Source Data Private Personal World Wide Web Communication Address Book Cell Branching	Manipulate Control Font Monitor Hard drive Speaker Router Central Processing Unit (CPU) Random Access Memory (RAM) Motherboard USB Port Sound card Animate Blog Stop animation Onion skinning	Select Cyberbullying Digital footprint Formula Count Stage Node Connection Concept map Python code Field	Extract Local Area Network (LAN) Wide area network (WAN) Switch Functions Decomposing Broadband Dial Up Mobile Data