



Year 1 Computing overview						
Term	Autumn		Spring		Summer	
Unit		Computing systems and networks: Improving mouse skills	Programming 1: Commands unplugged	Online safety	Programming 2: Bee-Bots	Creating media: Digital imagery
Enquiry Question		How can we use a computer to create and explore digital content?	How do instructions help us complete tasks correctly?	How can we stay safe and kind when using the internet?	How can we make a robot follow our instructions?	How can we tell a story using digital photographs?
Unit scope		The children will develop mouse skills by learning how to log in and navigate around a computer while creating digital artwork.	The children will explore commands and instructions through a range of unplugged games and activities while developing an understanding of key programming vocabulary.	The children will explore online safety, including how to stay safe online, manage emotions when something causes upset and understand responsibilities as a digital user.	The children will explore commands, instructions and errors through programming a Bee-Bot and learning how sequences control movement.	The children will develop creativity and imagination through planning a miniature adventure story and capturing it using photography techniques.
Unit outcomes		- Use computers more purposefully - Log in and navigate around a computer - Drag, drop, click and control a cursor using a mouse - Use software tools to create art on the computer	- Describe what a command is and what it does - Recall the key rules a command must follow - Give examples of commands from their life - Follow commands and instructions given by others - Describe that instructions are made of commands that must be in the correct order - Create correct commands for others to follow - Order commands to create clear instructions - Recognise and fix errors in commands, so instructions work correctly	- Discuss what the internet is and how it can be used - Recognise that the internet may affect mood or emotions - Recognise how internet use can affect and upset others - Identify which information is appropriate to share and post online and which is not	- Write instructions for a person to follow - Carry out instructions written for a person to follow - Explain what each Bee-Bot button does - Create and test a short set of instructions - Check instructions and spot errors - Test instructions to check for further errors - Program a Bee-Bot using logical instructions - Identify and correct mistakes in a sequence when the Bee-Bot does not behave as expected	- Plan a pictorial story using photographic images in sequence - Explain how to take clear photos - Take photos using a device - Edit photos by cropping, filtering and resizing - Search for and import images from the internet - Explain what to do if something makes them uncomfortable online - Organise images on the page, orientating where necessary
Key Knowledge		Know that log in and log out mean to begin and	Know there may be an error if a set of	Know that the internet is many devices connected	Know humans need to give robots instructions to follow	Know holding a camera or device still and considering

		end a connection with a computer • Know that a computer and mouse can be used to click, drag, fill, select, and add backgrounds, text, layers, shapes and clipart	instructions does not give the expected result • Know errors could result from sequencing, unclear instructions or missing steps	• Know what to do if they feel unsafe or worried online – tell a trusted adult • Know that people they do not know on the internet are strangers and are not always who they say they are • Know that to stay safe online it is important to keep personal information safe • Know that 'sharing' online means giving something specific to someone else via the internet and 'posting' online means placing information on the internet	and that they will carry out these instructions exactly, even if they are wrong • Know humans need to give instructions in the correct language for the robot to understand • Know an algorithm is a set of instructions used to carry out a task • Know algorithms must give every step of a task • Know there may be an error if a set of instructions does not give the expected result • Know errors could result from sequencing issues, unclear instructions or missing steps	angles and light are important to taking good pictures • Know photos can be edited, cropped and filtered • Know how to search safely for images online
Key Skills		• Learn how to explore and tinker with hardware to find out how it works • Learn where keys are located on the keyboard • Use a basic range of tools within graphic editing software • Develop control of the mouse through dragging, clicking and resizing images to create different effects • Develop an understanding of different software tools • Recognise devices that are connected to the internet • Log in and out and save work on their own account	• Explain what they are trying to achieve with their instructions • Write clear, sequenced instructions for familiar tasks • Use terms like start, end and next to describe the steps in instructions • Change their instructions or algorithms into code that the robot understands	• Recognise devices that are connected to the internet • Understand that we are connected to others when using the internet • When using the internet to search for images, learn what to do if they come across something online that worries them or makes them feel uncomfortable • Understand how to interact safely with others online • Recognise how actions on the internet can affect others	• Recognise that robots are programmed by humans • Explain what they are trying to achieve with their algorithms • Write clear, sequenced algorithms for familiar tasks • Use terms like start, end and next to describe the steps in algorithms • Change their instructions into code that the robot understands • Begin to identify errors in algorithms • Make suggestions for how to fix errors	• Learn how to explore and tinker with hardware to find out how it works • Learn where keys are located on the keyboard • Learn how to operate a camera to take photos and videos • Develop the skills associated with sequencing in unplugged activities • Use a basic range of tools within graphic editing software • Take and edit photos • Develop control of the mouse • Develop an understanding of

				• Recognise what a digital footprint is and how to be careful about posting online • Discuss ways to balance time spent online and offline		different software tools • Search and download images from the internet safely
Vocabulary		Account, click, clipart, computer, drag, drag and drop, layers, log off, log on, mouse, password, predict, resize, screen, software, tool, username.	Command, error, instructions, order	App, device, digital footprint, feelings, going online, in-person interactions, internet, kindness, offline activity, pop-up, posting online, report, screen time, sharing online, stranger, technology, trusted adult, unkind, website	Command, error, instructions, program	Background, blurred, camera, clear, crop, delete, device, digital camera, download, drag and drop, edit, editing software, filter, image, import, internet, keyword, online, resize, save as, screen, search engine, sequence, software, storage space, visual effects



Year 2 Computing overview						
Term	Autumn		Spring		Summer	
Unit		Computing systems and networks 1: What is a computer?	Programming 1: Algorithms and debugging	Online safety	Programming 2: ScratchJr	Data handling: International Space Station
Enquiry Question		What makes a computer work?	How can we solve problems using algorithms?	How can we protect ourselves and others online?	How can we bring ideas to life through coding?	How does data help astronauts survive in space?
Unit scope		The children will explore what a computer is by identifying different inputs and outputs and understanding how computers process information.	The children will explore algorithms and debugging through unplugged activities and online programming games.	The children will investigate online safety, including what happens to information posted online, how to keep personal information private and how permission is given or denied in online spaces.	The children will explore how programming blocks work using the app ScratchJr and follow a cycle of predict, test and review.	The children will explore how astronauts survive on the International Space Station, including how data is collected, used and displayed through sensor systems and monitoring equipment.
Unit outcomes		- Name some computer peripherals and their functions - Recognise that buttons cause effects - Explain that technology follows instructions - Recognise different forms of technology - Design an invention which includes inputs and outputs - Explain the role of computers in the world around them	- Describe what commands and instructions are and how they are different - Know what an algorithm is and the rules it must follow - Use order words such as first, next and then to write ordered algorithms - Create algorithms using a digital programme - Check that an algorithm works as expected and look for missing commands - Check and fix simple bugs in an algorithm - Use logical thinking to explain why an algorithm does not work correctly	- Explain what is meant by online information - Recognise what information is safe to be shared online - Explain why we need passwords and what makes a strong password - Understand that they need to ask permission before sharing content online and explain why - Understand that they have the right to deny their permission for information about them being shared online - Say who they can ask for help with online worries - Use some strategies to work out if online	- Explain a new application independently - Explain what the blocks on ScratchJr do and use them for a purpose - Recognise a loop in coding and why it is useful - Use code to create an animation of an animal moving - Use code to follow and create an algorithm - Program code to run 'on tap' - Explain the role of the blocks in a program they have created	- Describe and explain how astronauts' survival needs are met aboard the ISS - Identify and digitally draw items which fulfil basic human needs when aboard the ISS - Read the correct temperature on a thermometer - Design a display showing everything that needs to be monitored by sensors on the ISS - Create an algorithm that addresses all plants' needs - Explain how space exploration can benefit life on Earth - Read data to identify whether a planet might be habitable

				information is reliable or not		
Key Knowledge		• Know the difference between a desktop and a laptop computer • Know people control technology • Know some input devices that give a computer an instruction about what to do • Know that computers often work together	• Know programming a computer device involves giving it instructions to perform specific tasks • Know video games, phones, websites and apps are all created using programming • Know an algorithm is a set of instructions used to carry out a task • Know an algorithm becomes a program when it is coded • Know that programs execute the exact instructions they are given, even if they are incorrect • Know that a program is a series of instructions that are written for a computer to follow	• Understand the difference between online and offline • Understand what information they should not post online • Know how to create a strong password • Know that they should ask permission from others before sharing about them online and that they have the right to say no • Understand that not everything they see or read online is true	• Know that coding is writing in a special language so that the computer understands what to do • Understand that the character in ScratchJr is controlled by the programming blocks • Know that you can write a program to create a musical instrument or tell a joke	• Know that simple data can be entered into a spreadsheet • Know what steps are needed to take to create an algorithm • Know what data to use to answer certain questions • Know that computers can be used to monitor supplies
Key Skills		• Understand what a computer is and that it is made up of different components • Recognise that buttons cause effects and that technology follows instructions • Learn how we know that technology is doing what we want it to do via its output • Use greater control when taking photos with a camera, tablets or computers • Develop word processing skills, including altering text, copying and pasting and using keyboard shortcuts	• Recognise examples of computers being programmed by humans to perform simple tasks • Explain what they are trying to achieve with their program • Verbally plan what they aim to achieve with a program • Look at different forms of code and predict how a program will execute	• Identify whether information is safe or unsafe to be shared online • Learn how to create a strong password • Learn to be respectful of others when sharing online and ask for their permission before sharing content • Learn strategies for checking if something they read online is true • Understand how to stay safe when talking to people online and what to do if they see or hear something online that makes	• Recognise that buttons cause effects and that technology follows instructions • Explain what an algorithm is • Follow an algorithm • Create a clear and precise algorithm • Learn that programs execute by following precise instructions • Incorporate loops within algorithms • Use logical thinking to explore software, predicting, testing and explaining what it does	• Develop confidence with the keyboard and the basics of touch typing • Create and label images • Collect and input data into a spreadsheet • Interpret data from a spreadsheet • Learn how computers are used in the wider world

		• Use word processing software to type and reformat text • Create and label images • Learn how computers are used in the wider world		them feel upset or uncomfortable	• Use an algorithm to write a basic computer program • Use loop blocks when programming to repeat an instruction more than once • Use software to create story animations	
Vocabulary		Battery, buttons, computer, desktop, electricity, input, invention, keyboard, laptop, mouse, output, robot, screen, tablet, technology, wire	Algorithm, bug, debug, sequence	Accepting, consent, denying permission, fake, giving permission, offline, online, password, permission, personal information, pop-up, pressure, private information, real, reliable, sharing online, source, trusted adult	Algorithm, animation, blocks, bug, button, CGI, computer code, code, debug, fluid, icon, imitate, instructions, loop, on tap, programming, repeat, ScratchJr, sequence, sound recording	Algorithm, astronaut, column, data, digital content, essential, experiment, Goldilocks zone, interactive map, input, monitor, row, satellite, sensor, space, spreadsheet, survival, temperature, thermometer



Year 3 Computing overview						
Term	Autumn		Spring		Summer	
Unit	Computing systems and networks 1: Networks	Programming: Scratch	Microsoft Office 365; Computing systems and networks 2: Emailing	Computing systems and networks 3: Journey inside a computer	Video trailers: using iPads	Data handling: Comparison cards databases
Enquiry Question	How do computers communicate with each other?	How can coding help us create animations?	How can we communicate safely and responsibly online?	What happens inside a computer when we use it?	How can digital media persuade and inform an audience?	How can databases help us organise and find information?
Unit scope	The children will develop an understanding of computer networks by learning how devices communicate and share information.	The children will investigate through Scratch by creating animations and learning key coding concepts.	The children will learn how to send emails with attachments and understand the importance of using them safely and responsibly.	The children will explore how computers work by role-playing different computer parts and creating paper models of computer systems.	The children will develop digital video skills through creating trailers that use special effects, transitions and editing techniques.	The children will explore the concepts of sorting and filtering by learning about records, fields and data.
Key outcomes	- Recognise that a network is 2 or more devices connected and its purpose - Identify key components that make up the school's network - Explain the difference between wired and wireless connections - Recognise that files are saved on a server - Understand the role of the server in a network when requesting a website - Identify parts of a website's journey to reach your computer - Recognise that routers connect to send information - Understand that data is broken into packets	- Identify Scratch as a coding application and explore its different code blocks - Make predictions about what code blocks will do and test these ideas - Create a simple animation by combining motion, speech and wait blocks - Plan how to remix an existing animation by choosing which parts to change - Alter and remix code to create a new version of an animation - Test and debug animations to fix problems and improve the code	- Log in and out of email - Send a simple email with a subject plus 'To' and 'From' in the body of the text - Edit an email - Type in the email address correctly and send the email - Add an attachment to an email - Write an email using positive language, with an awareness of how it will make the recipient feel - Recognise unkind behaviour online and know how to report it - Offer advice to victims of cyberbullying - Recognise when an email may be fake	- Recognise inputs and outputs and that the computer sends and receives information - Explain that the parts of a laptop work together and the purpose of each part - Explain what an algorithm is - Suggest what memory is for inside a computer - Make comparisons between different types of computers	- Describe the purpose of a trailer - Create a storyboard for a book trailer - Consider camera angles when taking photos or videos - Import videos and photos into film editing software - Add text to a video - Incorporate transitions between images - Evaluate their own and others' trailers	- Explain what is meant by field, record and data - Compare paper and computerised databases - Put values into a spreadsheet - Sort, filter and interpret data in a spreadsheet - Create a graph - Explain the purpose of visual representations of data

		Reflect on the changes made, explaining what worked well and what could be improved	and explain how they know			
Key Knowledge	- Understand that a network is a group of interconnected devices - Know the components that make up a network - Know that a server is central to a network and responds to requests made - Know that the internet connects all the networks around the world - Know that a router connects us to the internet - Know what a packet is and why it is important for website data transfer	- Know that decomposition is the process of breaking down a task or problem into smaller parts - Know that breaking down a problem into smaller parts makes it easier to solve	- Understand that email stands for 'electronic mail' - Know that an attachment is an extra file added to an email - Understand that emails should contain appropriate and respectful content - Know that cyberbullying is bullying using electronics such as a computer or phone	- Know the roles that inputs and outputs play on computers - Know what some of the different components inside a computer are - Know what a tablet is and how it is different from a laptop/desktop computer	- Know that different types of camera shots can make their photos or videos look more effective - Know that they can edit photos and videos using film editing software - Understand that they can add transitions and text to their video	- Know that a database is a collection of data stored in a logical, structured and orderly manner - Know computer databases can be useful for sorting and filtering data - Know that different visual representations of data can be made on a computer
Key Skills	- Learn about the purpose of routers - Understand the role of the key components of a network - Understand that websites and videos are files that are shared from one computer to another - Learn about the role of packets - Understand how networks work and their purpose - Identify the key components within a network, including whether they are wired or wireless	- Work towards a given goal that a program needs to accomplish - Break down what they need to achieve into smaller, manageable parts - Tinker with an existing text-based code to see how it affects a program - Remix code to alter and add to an existing program - Recognise the relationship between what is happening in a program and the written (block) code - Working backwards, begin to identify the	- Learn to log in and out of an email account - Write an email including a subject, 'to' and 'from' - Send an email with an attachment - Reply to an email - Understand the purpose of emails - Learn about cyberbullying - Learn that not all emails are genuine, recognising when an email might be fake and what to do about it	- Understand what the different components of a computer do and how they work together - Draw comparisons across different types of computers - Use decomposition to explain the parts of a laptop computer - Explain the purpose of an algorithm	- Use logical thinking to explore more complex software; predicting, testing and explaining what it does - Take photographs and record video to tell a story - Use software to edit and enhance their video, adding music and text on screen with transitions	- Use logical thinking to explore more complex software, predicting, testing and explaining what it does - Understand the vocabulary associated with databases: field, record and data - Learn about the pros and cons of digital versus paper databases - Sort and filter databases to quickly retrieve information - Create and interpret charts and graphs to understand data

	- Recognise links between networks and the internet - Learn how data is transferred	- code they think a program uses - Run small chunks of code at a time to find the error or bug				
Vocabulary	Device, file, internet, network, network switch, packet data, router, server, the cloud, user, wi-fi, wired, wireless, wireless access point	Loop	Account, attachment, Bcc, Vcc, download, email, email address, emoji, hacker, inbox, link, log in, log out, password, recipient, scammer, spam, spoofing, subject bar, username, virus	Algorithm, assemble, CPU, data, decompose, desktop, disassemble, GPU, hard drive, HDD, infinite loop, input, keyboard, laptop, memory, microphone, monitor, mouse, output, photocopier, program, QR Code, RAM, ROM	Application, camera angle, clip, cross dissolve, edit, fade to black, fade to white, film, film editing software, graphics, import, key events, music, photo, plan, recording, slide, sound effects, storyboard, time code, trailer, transition, video, voiceover, wipe	Category, chart, data, database, field, filter, graph, information, interpret, questionnaire, record, representation, sort, spreadsheet



Year 4 Computing overview						
Term	Autumn		Spring		Summer	
Unit	Microsoft 365: Computing systems and networks: collaborative learning	Programming 1: Further Coding with Scratch	Microsoft 365: Creating Media: Website design	Skills showcase: HTML	Programming 2: Computational thinking	Data Handling: Investigating weather
Enquiry Question	How can technology help us work together effectively?	How can coding help us create interactive games?	What makes a successful website?	How does HTML control what we see on a webpage?	How can computational thinking help us solve problems?	How does data help us understand and predict the weather?
Unit scope	The children will develop collaborative working skills through using online software to create and share digital content.	The children will design and programme a game using variables, sensors and 'if' statements to control outcomes and interactions,	The children will develop research, word processing and collaborative working skills while learning how webpages and websites are created using Microsoft tools.	The children will edit the HTML of a web page to change the layout of a website and the text and images.	The children will develop computational thinking skills through decomposition, pattern recognition, abstraction and algorithm design to solve problems.	The children will investigate how weather data is gathered, recorded and used to create forecasts through researching and using spreadsheets to organise information.
Key outcomes	- Understand the need to be thoughtful when working on a collaborative document - Use comments to suggest changes to a document and understand how to resolve comments - Plan a survey for Microsoft Forms with a range of different question types that will provide different types of answers - Export data to a spreadsheet, highlighting data, using conditional formatting and calculating averages and sums of numbers	- Identify how variables and if statements are used in Scratch games - Explain what a variable is, tracking and how a condition changes what happens - Create variables to keep and display scores - Use sensing blocks and if statements to control game actions - Combine variables, sensors and if/else blocks to build a multiplication game - Debug code by finding and fixing errors - Evaluate the game by explaining what worked well and what could be improved	- Create a Sway with a title, image and a completed first header section - Create a clear plan for their web page and begin to create it - Create a professional-looking web page with useful information and a clear style, which is easy for the user to read and find information from - Create a clear plan by referring back to their checklist to include a range of features - Create a web page with clear sections and with a range of features	- Recognise the role of HTML in a web page - Add text between the heading and paragraph tags - Explore a web page using the inspect tool - Explain how they altered the HTML to create their posters - Alter the basic elements within a web page using the inspect tool - Replace the text and images in a webpage	- Understand that problems can be solved more easily using computational thinking - Recognise decomposition, abstraction, algorithm design and pattern recognition as key computational thinking skills - Explain how decomposition and abstraction simplify problem-solving - Identify patterns in problems and use them to solve problems - Design clear algorithms and justify their choices - Create logical sequences of steps to	- Search the web efficiently to find temperatures of different cities and record this accurately - Design a weather station that gathers and records sensor data, explaining how it works and the units of measurement it would use - Design an automated machine that uses selection to respond to sensor data - Search for and record weather forecast information in a spreadsheet and explain how this data is collected - Create a video which includes weather forecast information

					complete a task or project Use computational thinking skills to code, refine and evaluate their work	
Key Knowledge	- Know software can be used collaboratively online or work as a team - Know what type of comments and suggestions on a collaborative document can be useful - Know you can use images, text, transitions and animation in presentation slides	- Know that breaking down a problem into smaller parts makes it easier to solve the problem - Know that a variable is a container or holder for storing information that can change, e.g. numbers or text - Know it is important to identify where the mistake is in the programming as part of the debugging process - Know loops are used to save time when writing code by reducing repetition - Know that conditional statements tell the computer what to do next based on a user's input - Know that errors in a program could result from sequencing errors, coding errors or missing code	- Know that a website is a collection of pages that are all connected - Know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks - Know that websites should be informative and interactive	- Know and identify examples of HTML tags - Know what changes the HTML does to alter the appearance of an object on the web - Know that copyright means that those images are protected and understand that people should use a 'Creative Commons' image search if they wish to use images from the internet - Know what fake news is and ways to spot websites that carry this type of misinformation - Know what the inspect tool is and ways of using it to explore and alter text and images	- Know that decomposition is the process of breaking down a task or problem into smaller parts - Know that abstraction is identifying the important details and ignoring irrelevant information - Know that loops are used to save time when writing code by reducing repetition - Know that a variable is a container or holder for storing information that can change - Know that conditional statements tell the computer what to do next based on a user's input - Know that it is important to identify where the mistake is in the programming as part of the debugging process - Know errors in a program could result from sequencing errors, coding errors or missing code	- Know that computers can use different forms of input to sense the world around them so that they can record and respond to data - Know that a weather machine is an automated machine that responds to sensor data - Understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films
Key Skills	Understand that computer networks provide multiple services, such as the WWW, and opportunities for	- Work towards a given goal that a program needs to accomplish - Break down what they want to achieve into	- Build a web page and create content for it - Design and create a webpage for a given purpose	- Explore the HTML on a web page - Remix existing code - Translate HTML into text and images - Identify HTML tags	- Break down what they want to achieve into smaller, manageable parts - Use logic, pattern recognition and	- Use tablets or digital cameras to film a weather forecast - Understand that weather stations use sensors to gather and

	communication and collaboration • Use online software for documents, presentations, forms and spreadsheets • Use software to work collaboratively with others • Understand that software can be used collaboratively online to work as a team • Recognise what appropriate behaviour is when collaborating with others online	smaller, manageable parts • Tinker with an existing text-based code to see how it affects a program • Remix code to alter and add to an existing program • Create loops to make code more efficient in block-based programs • Begin to use variables in block-based programming languages to make programs more interactive • Include a conditional statement in block-based programming languages • Recognise the relationship between what is happening in a program and the written (block) code • Work backwards, beginning to identify the code they think a program uses • Run small chunks of code at a time to find the error or 'bug'	• Use software to work collaboratively with others	• Alter HTML on a live web page • Replace images on a web page • Recognise that information on the internet might not be true or correct and that some sources are more trustworthy than others	decomposition to solve simple problems • Remix code to alter and add to an existing program • Recognise repeating patterns in a program or code • Create loops to make code more efficient in block-based programs • Begin to use variables in block-based programming languages to make programs more interactive • Include a conditional statement in block-based programming languages • Recognise the relationship between what is happening in a program and the written (block) code	record data that predicts the weather • Use keywords to effectively search for information on the internet • Search the internet for data • Design a device that gathers and records sensor data • Record data in a spreadsheet independently • Sort data in a spreadsheet to compare using the 'sort by...' option • Understand that data is used to forecast weather
Vocabulary	Average, collaborate, comment, data, data representation, edit, e-document, email, insert, multiple choice, numerical data, online, presentation, rating, reply, resolve, reviewing comments, share, slide, spreadsheet, suggestion, survey, teamwork, transition.	Condition, if statement, variable	Assessment, audience, checklist, collaboration, content, contribution, create, design, embed, evaluate, features, Google Sites, homepage, hyperlinks, images, insert, online, plan, progress, published, record, review, style, subpage, tab, theme, website, WWW	Code, content, copyright, CSS, end tag, fake news, hacker, heading, HTML, HTML tags, internet browser, paragraph, remixing, start tag, text, unplugged, URL, web page, web page elements	Abstraction, algorithm, computational thinking, debug, decomposition, effectiveness, evaluate, instructions, logical, pattern recognition, relevant, remixing, sequence, unplugged	Accurate, climate zone, condensation, cylinder, degree Celsius, evaporation, extreme weather, filming, forecast, heat sensor, lightning, measurement, pinwheel, presenter, rain, satellite, script, sensor data, solar panel, temperature, thermometer, tornado, weather, wind speed



Year 5 Computing overview						
Term	Autumn		Spring		Summer	
Unit	Computing systems and networks: Search engines	Programming 1: Music	Data handling: Mars Rover 1	Programming 2: BBC micro: bit	Stop-motion animation: Using Stop Motion Studio	Skills showcase: Mars Rover 2
Enquiry Question	How can we find trustworthy information online?	How can code be used to create music?	How do computers help us explore space?	How can we use code to interact with the world around us?	How are moving images created from still pictures?	How do computers store and display digital images?
Unit scope	The children will investigate how search engines work and develop effective searching skills to find relevant and accurate information online.	The children will apply programming skills to create a soundtrack for a particular genre.	The children will explore how the Mars Rover collects, stores and transmits data back to Earth using binary code and computer systems.	The children will investigate how to program the BBC micro: bit by creating interactive projects using sensors, variables and conditional statements.	The children will develop an understanding of animation by exploring stop-motion techniques and how moving images are created.	The children will investigate how computers represent and process digital images through pixels, binary code and image compression.
Unit outcomes	- Explain what a search engine is, suggest several engines to use and explain how to use them to find websites and information - Suggest that things online are not always true and recognise what to check for - Explain why keywords are important and what TASK stands for, using these strategies to search effectively - Recognise the terms 'copyright' and 'fair use' and combine text and images in a poster - Make parallels between book searching and internet searching, explaining the role of web crawlers and recognising that results are rated to decide rank	- Recognise that Scratch is a coding application with music elements - Predict the effects of different code blocks and explain discoveries from tinkering - Code a soundtrack using sound blocks, loops and nested loops to enhance a scene - Use loops to simplify a program and understand that nested loops can repeat a rhythm or pattern - Decompose a program into smaller parts and remix existing code in new projects - Identify errors in a program, debug them and evaluate the effectiveness of a program	- Identify some types of data the Mars Rover could collect - Explain how the Mars Rover transmits the data back to Earth and the challenges involved - Read any number in binary, up to eight bits - Identify input, processing and output on the Mars Rovers - Use a column method to add two 8-bit binary numbers - Relate binary signals (Boolean) to a simple character-based language, ASCII	- Explore and test simple programs on the micro: bit - Predict and describe how code will work before running it - Plan and create animations using LED displays - Use inputs, variables and conditions to build interactive programs - Create programs that react to sensor data, such as pedometers and weather checkers - Create a program that responds to real-time sensor readings - Test, debug and evaluate programs by identifying and fixing problems	- Create a toy with simple images and a single movement - Create a short stop motion with small changes between images - Think of a simple story idea for their animation and then decompose it into smaller parts to create a storyboard with simple characters - Make small changes to the models to ensure a smooth animation and delete unnecessary frames - Add effects such as extending parts and titles - Provide helpful feedback of other groups about their animations	- Create a pixel picture, explaining that a pixel is the smallest element of a digital image and that binary is used to code and transfer this data - Save a JPEG as a bitmap and recognise the difference in file size, as well as explaining how pixels are used to transfer image data - Explain the 'fetch, decode, execute' cycle in relation to real-world situations - Create a profile with a safe and suitable username and password and begin to use 3D design tools - Independently take tutorial lessons, applying what they have learnt to their design and

						understand the importance of using an online community responsibly
Key Knowledge	- Know how search engines work - Know that anyone can create a website; therefore, people should take steps to check the validity of websites - Know that web crawlers are computer programs that crawl through the internet - Know what copyright is	- Know that programmers often save time when creating code by taking code from one program and turning it into another - Know that nested loops are loops within loops - Know that running a program to identify errors should be done before checking the code - Know that errors in a program could be a result of forgetting to end a loop	- Know that the Mars Rover is a motor vehicle that collects data from space by taking photos and examining rock samples - Know what numbers using binary code look like and be able to identify how messages can be sent in this format - Know RAM is Random Access Memory and acts as the computer's working memory - Know what simple operations can be used to calculate bit patterns	- Know code may sometimes need to be downloaded onto a physical system/device - Know devices with sensors are often programmed to perform specific tasks in reaction to the input from the sensors - Know that running a program to identify errors should be done before checking the code - Know that errors in a program could be the result of forgetting to 'end' a loop - Know that typing and spacing are very important in text-based languages and can cause errors in code if used incorrectly	- Know that decomposition of an idea is important when creating stop-motion animations - Know that stop-motion animation is filming one frame at a time using models and with tiny changes between each photograph - Know editing is an important feature of making and improving a stop-motion animation	- Understand that bit patterns represent images as pixels - Understand that the data for digital images can be compressed - Know the difference between ROM and RAM - Understand various techniques that will improve the design of a 3D object
Key Skills	- Develop searching skills to help find relevant information on the internet - Learn how to use search engines effectively to find information, focus on keyword searches and evaluate search results - Learn about different forms of communication that have developed with the use of technology	- Recognise examples of programming elements in real-life applications - Look at programming blocks and consider how they could be used in a program - Decompose a program independently when given a specific outcome or task to achieve - Alter existing code with a new, specific outcome in mind	- Learn that a separate computer can program external devices - Recognise how the size of RAM affects the processing of data - Learn the vocabulary associated with data and transmission - Recognise that computers transfer data in binary and understand simple binary addition	- Make links between different programming interfaces that they are faced with - Recognise examples of programming elements in real-life applications - Plan a program to be downloaded to a physical system/device to solve a particular problem - Decompose a program independently when	- Decompose animations into a series of images - Decompose a story to be able to plan a program to tell a story - Use video editing software to animate	- Learn the difference between ROM and RAM - Recognise how the size of RAM affects the processing of data - Understand the fetch, decode, execute cycle - Learn how the data for digital images can be compressed - Recognise that computers transfer data in binary and understand simple binary addition

	Recognise that information on the internet might not be true or correct and learn ways of checking validity	- Independently use loops to make code more efficient in block-based programs - Use nested loops to make code more efficient - Explain what a program does and how it works, referring to the inputs and outputs - Become more efficient and effective at debugging their programs - Systematically identify mistakes, problems or bugs in a program	- Relate binary signals to the simple character-based language, ASCII - Learn that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary calculations - Understand how data is collected in remote or dangerous places - Understand how data might be used to tell us about a location - Learn about different forms of communication that have developed with the use of technology	given a specific outcome or task - Program a physical system that has the capability for sensory input - Independently use loops to make code more efficient in text-based or block-based programs - Use nested loops to make code more efficient - Explain what a program does and how it works, referring to the inputs and outputs - Become more efficient and effective at debugging their programs - Systematically identify mistakes, problems or 'bugs' in a program		- Understand how bit patterns represent images at pixels - Use logical thinking to explore software, making predictions based on their previous experience - Learn about different forms of communication that have developed with the use of technology
Vocabulary	Algorithm, copyright, credit, fake news, inaccurate, index, keywords, online, page rank, search engine, TASK, web crawler, website, www	Adapt, code, debug, decompose, loop, music, output, pitch, program, repeat, rhythm, Scratch, soundtrack, tempo, timbre, tinker	8-bit binary, ASCII, binary, Boolean, byte, CPU, data, data size, distance, input, Mars Rover, output, planet, processing, RAM, scientist, signal, store, transmit, UHF	Conditional statement, condition, variable	Animation, animator, background, character, decomposition, design, digital device, edit, evaluate, flipbook, fluid movement, frames, model, moving images, onion skinning, still images, stop motion, storyboard, thaumatrope, zoetrope	3D, algorithm, binary, bitmap, CAD, compression, CPU, data, drag and drop, fetch-decode-execute, input, JPEG, memory, operating system, output, pixels, RAM, RGB, ROM, transmission, tinkering



Year 6 Computing overview						
Term	Autumn		Spring		Summer	
Unit	Computing systems and networks: Bletchley Park	Computing systems and networks: Exploring AI	Data handling 1: Big Data 1	Programming: Exploring Python	Data handling 2: Big Data 2	Skills showcase: Inventing a product
Enquiry Question	How has code-breaking changed the world of computing?	How is artificial intelligence changing our lives?	How is data collected and used in everyday technology?	How can text-based coding help us solve problems?	How can big data improve the way we live and work?	How can digital technology help us design and create innovative products?
Unit scope	The children will explore code-breaking at Bletchley Park, historical figures in computing, the evolution of computers, designing a computer of the future and creating an audio advert.	The children will explore what AI is, how it generates text, images and code and its ethical implications.	The children will explore how data is transmitted and used in everyday technology through barcodes, QR codes, infrared communication and RFID systems.	The children will explore Python programming, focusing on syntax, nested loops and debugging syntax and logic errors.	The children will investigate how data is transferred, collected and used in connected technologies, including the Internet of Things and smart systems.	The children will design an electronic product through coding, debugging and computer-aided design to understand how digital technologies support product development.
Unit outcomes	- Explain that codes can be used for several different reasons and decode messages - Explain how to ensure a password is secure and how this works - Explain the importance of historical figures and their contribution towards computer science - Present information about historical figures in an interesting and engaging manner - Develop an idea for a computer of the future and create a simple design - Produce a simple audio advert with simple edits, which demonstrate an understanding of how to use the software	- Explain what AI is and its basic functions - Identify real-life applications of AI that are commonly used in everyday life - Identify how AI understands and processes text and image prompts - Generate and refine prompts to achieve the best possible response from AI - Identify how AI generates code and how it can be useful in web design - Identify how AI can be a useful starting point for a project - Explain the key ethical considerations of AI - Debate the potential of AI replacing human	- Explain why barcodes and QR codes were created - Follow a QR code treasure trail - Explain how infrared can be used to transmit data - Explain how RFID works - Recall the use of RFID chips - Describe real-world uses of RFID - Input data and type formulas into a spreadsheet - Independently sort and analyse spreadsheet data to conclude customer scenarios	- Identify key similarities and differences between block-based code and text-based Python - Predict what a Python program will do before it is run - Explain how Python instructions work and why correct syntax and indentation matter - Spot and fix simple syntax errors, including typing and spacing mistakes - Identify and explain the role of the outer and inner loops in a nested loop program - Change loop values and describe how this affects patterns or movement - Modify existing Python code to create a new, intended outcome	- Recognise that data can become corrupted within a network and that data sent in packets is more robust, as well as identify the need to update devices and software - Recognise differences between mobile data and WiFi and use a spreadsheet to compare and identify high-use data activities and low-use data activities - Make links between the Internet of Things and Big Data and give a basic example of how data analysis/analytics can lead to improvement in town planning	- Evaluate code, understand what it does and adapt existing code for a specific purpose - Debug programs and make them more efficient using sequence, selection, repetition or variables - Design appropriate housing for their product using CAD software, including any input or output devices needed to make it work - Create an appealing website for their product aimed at their target audience, which explains what their product is and what it does using persuasive language - Create an edited video of their project,

		roles, presenting well-structured arguments		Use a systematic approach to identify, debug and explain syntax and logical errors	- Explain ways that Big Data or IoT principles could be used to solve a problem or improve efficiency within the school and prepare a presentation about their ideas, considering the privacy of some data - Present their ideas about how Big Data/IoT can improve the school and provide feedback to others on their presentations	articulating the key benefits Describe and show how to search for information online and be aware of the accuracy of the results presented
Key Knowledge	- Know the importance of having a secure password and what brute-force hacking is - Know that the first computers were created at Bletchley Park to crack the Enigma code - Know about some of the historical figures that contributed to technological advances in computing - Know what techniques are required to create a presentation using appropriate software - Know that sound clips can be recorded using sound recording software - Know that sound clips can be edited and trimmed	- Know that AI is artificial intelligence and is used in everyday life - Know AI is trained on data to recognise patterns and generate outputs - Know AI can be used to generate written content - Know AI can be used to create visual content like pictures - Know AI can help generate basic HTML code to create the structure and layout of a website - Know there are ethical issues surrounding AI, including data privacy, bias and responsible use	- Know that computers can use the data contained within barcodes and QR codes - Know infrared waves are a way of transmitting data - Know that Radio Frequency Identification (RFID) is a more private way of transmitting data - Know data is often encrypted so that even if it is stolen, it is not useful to the thief	- Know that code may sometimes need to be downloaded onto a physical system/device - Know programmers often save time when creating code by taking code from one program and turning it into another - Know that nested loops are loops within loops - Know it is important to follow the syntax rules in a programming language so that the computer understands what we are trying to tell it - Know that many text-based coding languages use brackets or indentation to show which code belongs to a particular function or loop - Know that typing and spacing are very	- Know that data can become corrupted within a network, but this is less likely to happen if it is sent in 'packets' - Know that devices that are not updated are most vulnerable to hackers - Know the difference between mobile data and WiFi	- Know what designing an electronic product involves - Know which programming software/language is best to achieve a purpose - Know the building blocks of computational thinking

				important in text-based languages • Know that running a program to identify errors should be done before checking the code • Know that errors in a program could be the result of forgetting to 'end' a loop		
Key Skills	• Learn about the history of computers and how they have evolved • Use past experiences to help solve new problems • Write increasingly complex algorithms for a purpose • Debug quickly and effectively to make a program more efficient • Change a program to personalise it • Evaluate code to understand its purpose • Predict code and adapt it to a chosen purpose • Use search and word processing skills to create a presentation • Understand how search engines work • Understand the importance of secure passwords and how to create them • Plan, record and edit an audio recording • Create and edit sound recordings for a specific purpose • Remix existing code to explore a problem	• Identify different types of AI and their applications in everyday life • Explore text-based and image-based AI tools to understand how they generate content • Apply coding skills like decomposition and pattern recognition to interact with AI applications • Analyse the effectiveness of prompts and refine them for improved AI outputs • Explore ethical considerations around AI use and its impact on society	• Understand and identify barcodes, QR codes and RFID • Identify devices and applications that can scan or read barcodes, QR codes and RFID • Understand how barcodes, QR codes and RFID work • Gather and analyse data in real time • Create formulas and sort data within spreadsheets • Learn how 'big data' can be used to solve a problem or improve efficiency	• Recognise a wider range of text-based programming languages • Make links between different programming interfaces that they are faced with • Recognise examples of programming elements in real-life applications • Decompose a program when given a specific outcome or task to achieve • Alter existing code with a new, specific outcome in mind • Use nested loops to make code more efficient • Become more efficient and effective at debugging their programs • Systematically identify mistakes, problems or 'bugs' in a program	• Understand how corruption can happen within data during transfer • Understand that computer networks provide multiple services • Use search and word processing skills to create a presentation • Create formulas and sort data within spreadsheets • Learn about the Internet of Things and how it has led to 'big data' • Learn how 'big data' can be used to solve a problem or improve efficiency	• Use past experiences to help solve new problems • Write increasingly complex algorithms for a purpose • Debug quickly and effectively to make a program more efficient • Remix existing code to explore a problem • Evaluate code to understand its purpose • Predict code and adapt it to a chosen purpose • Use logical thinking to explore software • Create and edit videos, adding multiple elements • Use design software Tinkercad to design a product • Create a website with embedded links and multiple pages • Understand how search engines work • Use search engines safely and effectively

Vocabulary	Acrostic code, audio advert, brute force hacking, Caesar cypher, chip and PIN system, cypher, combination, date shift cypher, discovery, invention, Nth letter cypher, password, pigpen cypher, scrambled, script, secret, secure, trial and error	AI, AI-generated image, AI-generated text, algorithm, applications, authenticity, code, considerations, debate, ethical, fake, generate, HTML, implications, instructions, modify, output, prompt, refine, response, trained	Algorithm, barcode, Boolean, data, encrypt, infrared, QR code, RFID, spreadsheet	Loop, nested loop, syntax	Big data, Bluetooth, corrupted, data, energy, GPS, improve, infrared, internet of things, personal, privacy, QR codes, revolution, RFID, SM, simulation, smart city, smart school, stop motion, threat, wireless	Abstraction, adapt, advert, algorithm, bug, code, coding, debug, design, edit, electronic, image rights, images, information, input, loop, photos, product, program, repetition, selection, sequence, software, structure, variable, video, website.
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