COMPUTING Subject Profile *Last updated 11.2.25*	**Substantive Knowledge End Points** **Includes:** Declarative knowledge ***To know (that)…*** Procedural knowledge ***To know how to…***	**Substantive Knowledge Strands** **Computing systems and networks** **Programming** **Creating Media** **Data Handling** **Online Safety**	**Disciplinary Knowledge (What an expert does)** Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation Analyse problems in computational terms, and solve them Evaluate and apply information technology analytically to solve problems Use information and communication technology responsibly, competently, confidently and creatively
Reception			
Reception covers the following within continuous provision whilst following the Early Years Foundation Stage - Early Learning Goals.	*Children will know that…* • technology is all around them in many different forms and used for different purposes • it is important for instructions to be in the right order *Children will know how to…* • collect and share simple data • take photos and videos on a tablet • control a device and make choices keep safe in real life and online in different ways	**Computing systems and networks** **Programming** **Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
YEAR 1			
Online Safety Year 1	*Children will know that…* • The people you do not know on the internet are strangers and not always who they say they are. • To stay safe online it is important to keep personal information safe. *Children will know how to…*	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**

	• Recognise devices that are connected to the internet.	**Online Safety**	
Computing systems and networks: Improving mouse skills	*Children will know that…* • A mouse is used to control the cursor on the screen. • Passwords are important for security. *Children will know how to…* • Control a mouse to and drag and click. • Log in and log out of a computer.	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming 1: Algorithms unplugged	*Children will know that…* • An algorithm is an ordered set of instructions. • Some devices have inputs and some have outputs. • We call errors in an algorithm bugs and fixing these is known as debugging. *Children will know how to…* • Assemble instructions in a simple algorithm.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.**
Skills showcase: Rocket to the moon	*Children will know that…* • A spreadsheet is an electronic table for sorting data. • ???? To create a list digitally. *Children will know how to…* • Save work onto their account. • Identify a bug when something goes wrong. • Follow instructions to build their model rocket.	**Computing systems and networks** **Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Programming 2: Bee-Bot	*Children will know that…* • The basic functions of a Bee-Bot. • Decomposition is breaking a problem down into smaller parts. *Children will know how to…* • Operate a camera to take photos and videos. • Operate a Bee-Bot.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Creating media: Digital imagery	*Children will know that…* • Photos can be edited, cropped and filtered. *Children will know how to…* • Search for images and download them safely. • Use a mouse to re-size images.	**Creating Media** **Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Data handling: Introduction to data	*Children will know that…* • Charts and pictograms can be made using a computer. • Computers understand different types of input.		**Apply fundamental principles and concepts of computer science, including**

	• A database is a way to group information. *Children will know how to…* • Represent data as a pictograph or in a table / chart.	**Data Handling**	**abstraction, logic, algorithms and data representation**
YEAR 2			
Online safety: Year 2	*Children will know that…* • Personal information should not be posted online. • Not everything they see and read online is true. *Children will know how to…* • Respect others when sharing content by asking permission.	**Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Computing systems and networks: What is a computer?	*Children will know that…* • People control technology. • A computer is made up of different components. • Computers are used in the wider world. *Children will know how to…* • Use word processing software to type and reformat text.	**Computing systems and networks** **Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming 1: Algorithms and debugging.	*Children will know that…* • Loops in programming are where you set instructions to be repeated multiple times. *Children will know how to…* • Debug a simple programme. • Follow a simple algorithm.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Computing systems and networks 2: Word processing.	*Children will know…* • The basics of touch typing. • The layout of a keyboard. *Children will know how to…* • Copy and paste text and images.	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming 2: Scratch Jr	*Children will know that…* • Buttons cause effects and that technology follows instruction • Coding is writing in a special language that computers understand. *Children will know how to…* • Create a clear and precise algorithm. • Incorporating loops within algorithms.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Creating Media: Stop motion	*Children will know that…* • An animation is made up of a sequenced of photographs. • Small changes in frames create a smoother animation. *Children will know how to…* • Use a camera with precise control.	**Creating Media**	**Use information and communication technology responsibly, competently, confidently and creatively**

Data handling: International Space Station.	*Children will know that…* • Computers can be used to collect data. *Children will know how to…* • Enter simple data into a spreadsheet. • Create and label images.	**Data Handling**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**

YEAR 3			
Online Safety: Year 3	*Children will know …* • What social media is and that age restrictions apply. • The impact technology can have on mood. *Children will know how to…* • Check the reliability of some information online.	**Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming: Scratch	*Children will know that…* • Scratch is a programming language. • Loops can improve programming. *Children will know how to…* • Use decomposition to explore the code behind an animation. • Use logical reasoning to explain how algorithms work.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Computing systems and networks: Networks	*Children will know that…* • A network is a group of interconnected computers. • A server is central to a network and responds to requests made. • A router connects us to the internet.	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**
Computing Systems and Networks: journey inside a computer	*Children will know….* • How to identify a range of different inputs and outputs. • Decompose a laptop into its different components. • That a computer sends and receives information. *Children will know how to….* • Make comparisons between different types of computers.	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**
Creating digital media: Video trailers	*Children will know that…* • They can add transitions to their video.		**Use information and communication technology**

	Children will know how to… • Edit and enhance a video using music, sound and text.	**Creating Media**	**responsibly, competently, confidently and creatively**
Data handling: Comparison card databases [Option 2 – Microsoft]	*Children will know…* • The vocabulary associated with databases: field, record and data. *Children will know how to…* • Sort and filter databases. • Create and interpret charts and graphs to understand data.	**Data Handling**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Computing systems and networks: Office 365: Email	*Children will know that…* • Email stands for electronic mail. • An attachment is an extra file attached to an email. *Children will know how to…* • Log in and out of an email account. Identify a fake email.	**Computing systems and networks** **Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
YEAR 4			
Online Safety: Year 4	*Children will know that…* • Technology can be designed to act like or impersonate different things. • Technology can be a distraction and identify when someone may need to limit the amount of time spent using technology. *Children will know how to…* • Identify forms of advertising online. • Make judgements about the accuracy of some online searches.	**Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Computing systems and networks: Collaborative learning	*Children will know that …* • Software can be used collaboratively online to work as a team *Children will know how to…* • Use comments to suggest changes to a document and understand how to resolve comments • Create a 'Form' with a range of different question types that will provide different types of answers	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**

Programming: Further programming with Scratch	*Children will know that …* • A variable is a value that can change (depending on conditions). *Children will know how to…* • Code a simple game. • Incorporate variables to make code more efficient.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Skills showcase: HTML	*Children will know that …* • HTML is the programming language used to create and design webpages. • Copyright means those images are protected. *Children will know how to…* • Alter HTML on a live webpage. • Use some strategies to identify fake news.	**Computing systems and networks** **Creating Media** **Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming 2: Computational Thinking	-*Children will know that…* • Abstraction is identifying the important detail and ignoring the irrelevant information. *Children will know how to…* • Create an algorithm for a specific purpose. • Use decomposition to solve a problem by finding out what code was used.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Data handling: Investigating Weather	*Children will know that…* • Computers can use different forms of input to sense the world around them so they can record and respond to data ('sensor data') • Weather stations use sensors to gather and record data that predicts the weather. *Children will know how to…* • Design a device that gathers and records sensor data.	**Data Handling**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Creating Media: Website design	*Children will know that …* • A website is a collection of pages that are all connected. • Websites usually have a homepage and subpages as well as clickable links to new pages called hyperlinks. *Children will know how to…* • Build a webpage and create content.	**Creating Media**	**Use information and communication technology responsibly, competently, confidently and creatively**

YEAR 5			
Year 5: Online safety	*Children will know that…* • There are pros and cons to online communication. *Children will know how to…* • Use an online community safely. Create a strong password that meets the requirements of the app that they are using.	**Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming 1: Music	*Children will know that…* • Using loops can make the process of writing music simpler and more effective. *Children will know how to…* • Use a software programme to create music. • Write code to create a desired effect.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Computing systems and networks: Search Engines.	*Children will know that…* • Anyone can create a website and therefore we should take steps to check the validity of websites. • Web crawlers are computer programmes that crawl through the internet. *Children will know how to…* • Use search engines effectively to find information online, focusing on key word searching and evaluating search returns.	**Computing systems and networks** **Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Data handling: Mars Rover 1	*Children will know that…* • RAM is random access memory and acts as the computer's working memory. • Binary code is a code used by computers based around the binary values of zero and one. *Children will know how to…* • Read binary code up to eight characters and carry out binary calculations.	**Computing systems and networks** **Data Handling**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Creating Media Stop Motion Animation	*Children will know that…* • Stop motion animation is filmed one frame at a time using models and with tiny changes between each photograph. *Children will know how to…* • Use video editing software to animate and edit.	**Creating Media**	**Use information and communication technology responsibly, competently, confidently and creatively**

Programming 2: BBC Micro:bit	*Children will know that…* • Micro:bit uses a block coding language similar to Scratch. *Children will know how to…* • Use a systematic approach to debugging code, justifying what is wrong and how it can be corrected. • Recognise coding structures including variables.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Skills showcase: Mars Rover 2	*Children will know that…* • There is a difference between ROM and RAM. • Bit patterns are represented as pixels. • CAD software will improve the design of a 3D object. *Children will know how to…* • Compress an image. • Use 3D design software package TinkerCAD	**Computing systems and networks** **Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
YEAR 6			
Online Safety: Year 6	*Children will know that…* • A digital footprint means the information that exists on the internet as a result of a person's online activity. • There are common online scams. *Children will know how to…* • Capture evidence of online bullying to seek help. • Create a positive online reputation.	**Online Safety**	**Use information and communication technology responsibly, competently, confidently and creatively**
Computing systems and networks: Bletchley Park and the history of computers	*Children will know that…* • Computers have evolved over time. • 'Brute force hacking' is when someone, known as a hacker, uses different methods, such as trial and error, to crack entry into secured information. • There are historical figures who have contributed to technological advances in computing. *Children will know how to…* • Remix existing code to explore a problem.	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**
Programming: Intro to Python	*Children will know that…* • There are text-based programming languages such as Logo and Python. *Children will know how to…* • Programme using the language Python. • Use and adapt nested loops. • Use random numbers and remix Python code.	**Programming**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**

Data handling: Big Data 1	*Children will know that…* • RFID is radio frequency identification. • RFID is a more private way of transmitting data. • Big data are massive deposits of information. • Data is often encrypted so that if it is stolen it is not useful. *Children will know how to…* • Identify barcodes, QR codes and RFID.	**Computing systems and networks** **Data Handling**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Computing systems and networks: Exploring AI	*Children will know…* • What AI is and its basic functions. • How AI understands and processes image prompts. • Key ethical considerations of AI. • How AI can be useful. *Children will know how to…* • Identify how AI is commonly used in everyday life. • Generate and refine prompts to use AI effectively.	**Computing systems and networks**	**Use information and communication technology responsibly, competently, confidently and creatively**
Data handling: Big Data 2	*Children will know that…* • Corruption can happen within data during transfer (for example when downloading, installing, copying and updating files). • There is a difference between mobile data and WiFi. • The Internet of Things is a network of smart devices around a building that collect, monitor and distribute data to work harmoniously together. *Children will know how to…* • Send data in packets to reduce the risk of corruption. • Creating formulas and sorting data within spreadsheets.	**Computing systems and networks** **Data Handling**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**
Skills showcase: Inventing a product	*Children will know …* • The building blocks of computational thinking for example: sequence, selection, repetition, variables, inputs and outputs. *Children will know how to…* • Build a website with embedded links and multiple pages. • Create and edit videos, adding multiple elements including voiceovers. • Predict code and adapt it for a chosen purpose.	**Programming** **Creating Media**	**Apply fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation**

Key Stage 1 National Curriculum Expectations	
The national curriculum for KS 1 and 2 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	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
Key Stage 2 National Curriculum Expectations	
The national curriculum for KS 1 and 2 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	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