Progression in Computing – Sheering CofE Primary School

'Whether you want to uncover the secrets of the universe, or you want to pursue a career in the 21st Century, computing is an essential skill to learn'

Professor Stephen Hawking

By the end of Year 6 children will:

- be responsible, competent, confident and creative users of information and communication technology
- appreciate how to be respectful and responsible online; recognise acceptable/unacceptable behaviour and know ways to report concerns about content and contact
- appreciate how search engines work and evaluate digital content for suitability
- understand that computer networks provide multiple services and opportunities for communication and collaboration
- apply knowledge of information technology to new and unfamiliar technologies to solve problems
- understand and apply the fundamental principles and concepts of computer science (abstraction, logic, algorithms, data representation, sequence, selection and repetition in programs) when designing and writing programs
- use computational language when analysing a problem, breaking the problem down into smaller parts (decompose) to correct errors (debug)
- know how to select, use and combine a variety of software on a range of digital devices to collect, analyse, evaluate and present data and information

EYFS: Computing is embedded throughout the whole of the curriculum *Examples:*

- *Use toy phones/cameras/computers within children's play*
- *Turn technological devices on and off*
- *Complete a simple programme on a device such as an iPad or a computer*
- *Draw information from computers to support children's learning*

	Y1	Y2	Y3	Y4	Y5	Y6
COMPUTER SCIENCE: HARDWARE	Learn how to explore and tinker with hardware to find out how it works Understand that computers and devices around us use inputs and outputs, identifying some of these Learn where keys are located on the keyboard Learn how to operate a camera	Understand what a computer is and that it's 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 tablets or computers Develop confidence with the keyboard and the basics of touch typing	Understand what the different components of a computer do and how they work together Draw comparisons across different types of computers Learn what a server does	Learn about the purpose of routers	Learn that external devices can be programmed by a separate computer 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 about the history of computers and how they have evolved over time Use the understanding of historic computers to design a computer of the future Learn how barcodes, QR codes and RFID work Learn about some of the methods which cause data corruption
COMPUTER SCIENCE: NETWORKS AND DATA REPRESENTATION			Learn what a network is and its purpose Identify the key components within a network, including whether they are wired or wireless Recognise links between networks and the internet Learn how data is transferred	Consolidate understanding of the key components of a network Understand that websites & videos are files that are shared from one computer to another Learn about the role of packets Understand that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration	Learn the vocabulary associated with data: data and transmit Learn how the data for digital images can be compressed Recognise that computers transfer data in binary and understand simple binary addition Relate binary signals (Boolean) 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 bit patterns represent images as pixels	Understand that computer networks provide multiple services

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COMPUTER SCIENCE: COMPUTATIONAL THINKING	Learn that decomposition means breaking a problem down into smaller parts Use decomposition to solve unplugged challenges Use logical reasoning to predict the behaviour of simple programs Develop the skills associated with sequencing in unplugged activities Learn that an algorithm is a set of step-by-step instructions used to carry out a task, in a specific order Follow a basic set of instructions Assemble instructions into a simple algorithm	Articulate what decomposition is Decompose a game to predict the algorithms used to create it Use decomposition to decompose a story into smaller parts Learn what abstraction is Learn that there are different levels of abstraction Explain what an algorithm is Follow an algorithm Create a clear and precise algorithm Learn that computers use algorithms to make predictions Learn that programs execute by following precise instructions Incorporate loops within algorithms	Use decomposition to explain the parts of a laptop computer Use decomposition to explore the code behind an animation Use repetition in programs Understand that computers follow instructions Use an algorithm to explain the roles of different parts of a computer Use logical reasoning to explain how simple algorithms work Explain the purpose of an algorithm Form algorithms independently	Solve unplugged problems by decomposing them into smaller parts Use decomposition to understand the purpose of a script of code Use decomposition to help solve problems Identify patterns through unplugged activities Use past experiences to help solve new problems Use abstraction to identify the important parts when completing both plugged and unplugged activities Create algorithms for a specific purpose	Decompose animations into a series of images Decompose a program without support Decompose a story to be able to plan a program to tell a story Predict how software will work based on previous experience Write more complex algorithms for a purpose	Decompose a program into an algorithm Use past experiences to help solve new problems Write increasingly complex algorithms for a purpose
COMPUTER SCIENCE: PROGRAMMING	Programme a Bee-bot/Blue-bot to follow a planned route Learn to debug instructions when things go wrong Develop a how to video to explain how the Vee-bot/ Bluebot works Learn to debug an algorithm in an unplugged scenario	Use logical thinking to explore software, predicting, testing and explaining what it does Use an algorithm to write a basic computer program Learn what loops are Incorporate loops to make code more efficient	Use logical thinking to explore more complex software, predicting, testing and explaining what it does Incorporate loops to make code more efficient Remix existing code Use a more systematic approach to debugging code, justifying what is wrong and how it can be corrected	Understand that websites can be altered by exploring the code beneath the site Code a simple game Use abstraction and pattern recognition to modify code	Programme an animation Iterate and develop their programming as they work Begin to use nested loops (loops within loops) Debug their own code Write code to create a desired effect Use a range of programming commands Use repetition within a program Amend code within a live scenario	Debug quickly and effectively to make a program more efficient Remix existing code to explore a problem Use and adapt nested loops Programme using the language Python Change a program to personalise it Evaluate code to understand its purpose Predict code and adapt it to a chosen purpose Alter a website's code to create changes

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INFORMATION TECHNOLOGY: USING SOFTWARE	Use a basic range of tools within graphic editing software Take and edit photographs Understand how to create digital art using an online paint tool Develop control of the mouse through dragging, clicking and resizing of images to create different effects Develop understanding of different software tools	Develop word processing skills, including altering text, copying and pasting and using keyboard shortcuts Use word processing software to type and reformat text Use software to create story animations Create and label images	Take photographs and record video to tell a story Use software to edit and enhance their video adding music, sounds and text on screen with transitions	Build a web page and create content for it Design and create a webpage for a given purpose Use Google online software for documents, presentations, forms and spreadsheets Work collaboratively with others	Use logical thinking to explore software more independently, making predictions based on their previous experience Use software programme Sonic Pi to create music Use the animation software: Stop Motion to create video animation Identify ways to improve and edit final products Independently learn how to use 3D design software package TinkerCAD	Use logical thinking to explore software independently, iterating ideas and testing continuously Use search and word processing skills to create a presentation Plan, record and edit a radio play Create and edit sound recordings for a specific purpose Create and edit videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert Use design software TinkerCAD to design a product Create a website with embedded links and multiple pages
INFORMATION TECHNOLOGY: USING EMAIL AND THE INTERNET	Search and download images from the internet safely		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		Develop searching skills to help find relevant information on the internet Learn how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns	Understand how search engines work

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INFORMATION TECHNOLOGY: USING DATA	Introduction to spreadsheets Represent data in tables, charts and pictograms Sort data and create branching databases Identify where digital content can have advantages over paper when storing and manipulating data	Collect and input data into a spreadsheet Interpret data	Understand the vocabulary associated with databases: field, record, data Learn about the pros and cons of digital versus paper databases Sort and filter databases to easily retrieve information Create and interpret charts and graphs to understand data	Design a weather station which gathers and records sensor data	Understand how data is collected	Understand how barcodes, QR codes and RFID work Gather and analyse data in real time Create formulas and sort data within spreadsheets
INFORMATION TECHNOLOGY: WIDER USE OF TECHNOLOGY	Recognise common uses of information technology, including beyond school Recognise uses of technology beyond school	Learn how computers are used in the wider world	Understand the purpose of emails	Understand that software can be used collaboratively online to work as a team	Learn what a search engine is	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
DIGITAL LITERACY	Log in and out and save work on their own account Understand the importance of a password 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 stay safe when talking to people online. Not sharing personal information and what to do if they see or hear something online that makes them feel upset or uncomfortable	Learn to be a responsible digital citizen; understand their responsibilities to treat others respectfully and recognise when digital behaviour is unkind Learn about cyberbullying Learn that not all emails are genuine, recognise when an email might be fake and what to do about it	Recognise what appropriate behaviour is when collaborating with others online Recognise that information on the Internet might not be true or correct and that some sources are more trustworthy than others	Identify possible dangers online and learn how to stay safe. Create an animation about digital safety Recognise that information on the Internet might not be true or correct and learn ways of checking validity Learn to use an online community safely	Understand the importance of secure passwords and how to create them Use search engines safely and effectively Recognise that updated software can help to prevent data corruption and hacking