Staindrop CE Primary School Computing Curriculum

Intent

When planning and teaching computing at Staindrop Primary School, we believe that it is an essential part of the curriculum; a subject that not only stands alone but is woven and should be an integral part of all learning. Computing, in general, is a significant part of everyone's daily life and children should be at the forefront of new technology, with a thirst for learning what is out there. Computing within schools can therefore provide a wealth of learning opportunities and transferrable skills explicitly within the Computing lesson and across other curriculum subjects.

Through the study of Computing, children will be able to develop a wide range of fundamental skills, knowledge and understanding that will actually equip them for the rest of their life. Computers and technology are such a part of everyday life that our children would be at a disadvantage would they not be exposed to a thorough and robust Computing curriculum. Children must be taught in the art form of 'Computational Thinking' in order to provide them essential knowledge that will enable them to participate effectively and safely in the digital world beyond our gates.

'Through God's love, we are the rich soil where roots grow and seeds flourish.' Luke 8: 4-15

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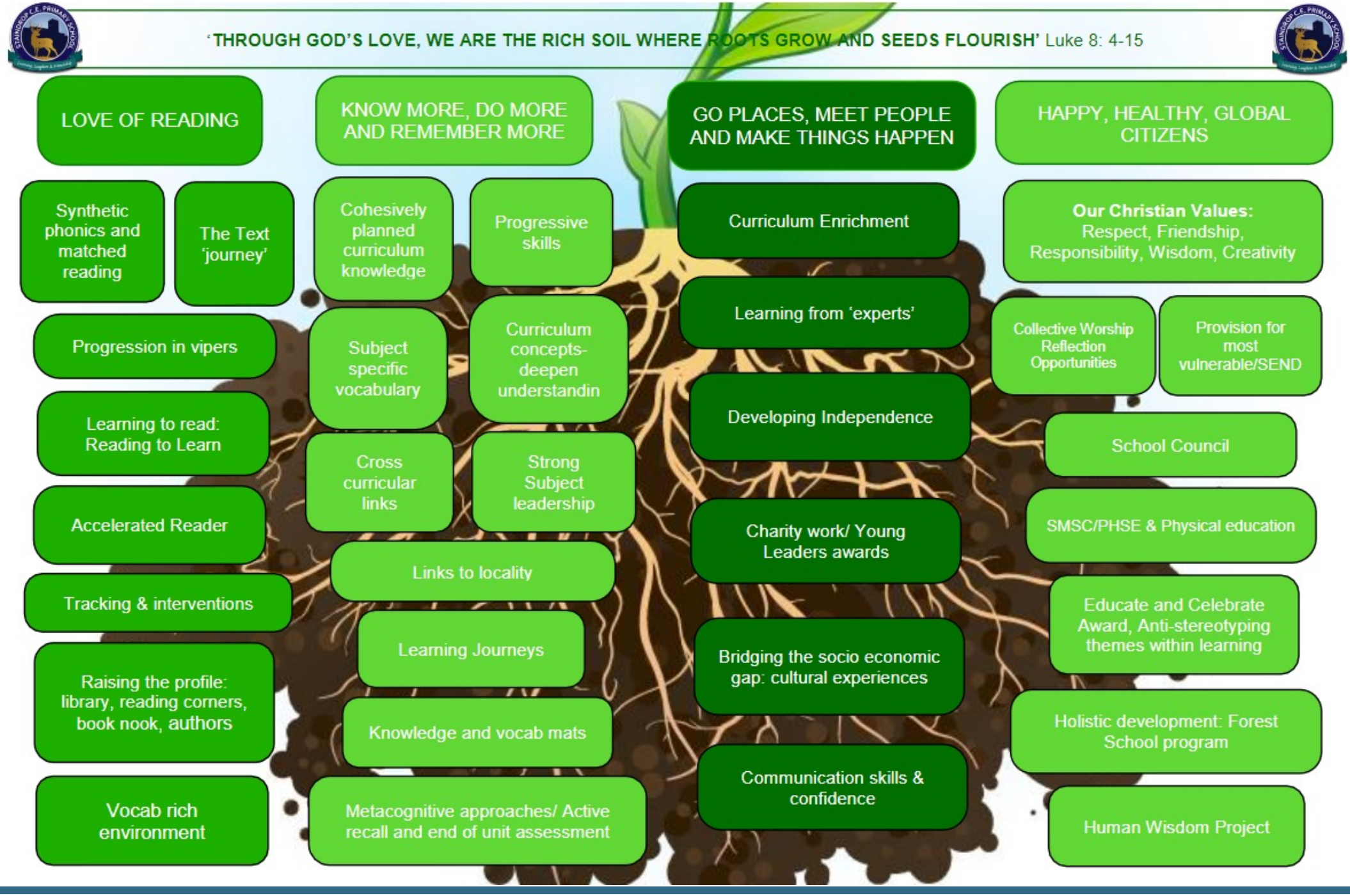


CURRICULUM AIM:
Know more, Do more & Remember more

- To understand what algorithms are, how they are implemented as programs on digital devices and that programs execute by following precise and clear instructions.
- To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
- To create, design, write and debug programs to accomplish specific goals, including controlling or simulating physical systems and use logical reasoning to predict the behaviour of simple programs.
- To use a range of technology to create, organise, store and retrieve digital content as well as recognise common uses of information technology beyond school.
- To use sequence, selection, and repetition in programs and work with variables and various forms of input and output
- To 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.
- To use search technologies effectively, appreciate how results are selected and ranked, and be selective in evaluating digital content
- To 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
- To use technology safely and respectfully, keeping personal information private.
- To recognise acceptable/unacceptable behaviour and to know where to go for help and support when they have concerns about content or contact on the Internet.

CURRICULUM AIM:
Meet people, go places & make things happen

- To use technology to connect and consult with people using systems such as Microsoft teams and zoom.

CURRICULUM AIM:
Love of Reading

- To use a digital reading record and be familiar with online reading programs.

"Through God's love, we are the rich are the rich soil where roots grow and seeds flourish"

Supporting pupils with SEND in Computing

Education Endowment Foundation

To ensure all pupils have access to HQT

- Mastery Approach (concepts taught in **small steps**, **guided →independent practice, examples/non-examples**)
- **Concept frames** breakdown learning and scaffold thinking
- Vocabulary (**explicitly taught, pre-teaching** if necessary, visual aids, celebrated)
- **Metacognitive strategies** (questioning, paired thinking/reasoning and problem solving aloud)

To create a positive and inclusive environment for all learners…

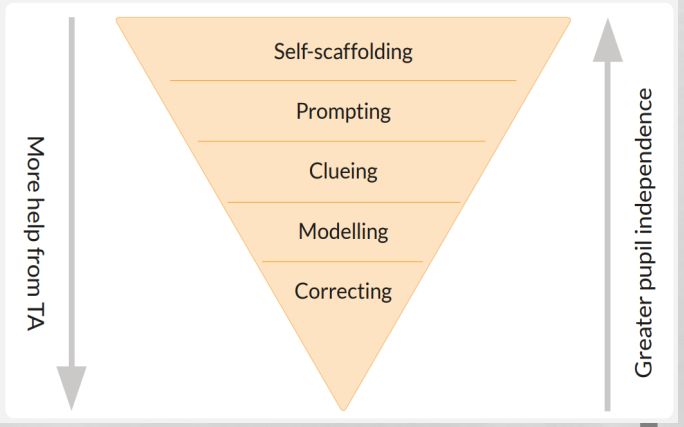
- **Inspire and engage children through use of a range of pedagogical approaches** e.g. modelling
- Partner talk, discussions and feedback (reasoning, **TTYP**, non-verbal feedback)
- **Growth mindset** approach

To assess and implement targeted intervention

- Regular marking, AFL strategies/**diagnostic** assessment used to identify gaps in learning
- Access to **high-quality intervention /additional support**

To deploy support staff effectively

- TA models high-level vocabulary/supports and **encourage rich historical discussion**
- **TA focus on understanding** rather than task completion



THE THREE STRANDS OF THE COMPUTING CURRICULUM

COMPUTER SCIENCE (CS)

HOW COMPUTERS AND COMPUTER SYSTEMS WORK AND HOW THEY ARE DESIGNED AND PROGRAMMED.

INFORMATION TECHNOLOGY (IT)

THE PURPOSEFUL USE OF EXISTING PROGRAMS TO DEVELOP PRODUCTS AND SOLUTIONS.

DIGITAL LITERACY (DL)

THE SKILLS KNOWLEDGE AND UNDERSTANDING NEEDED IN ORDER TO PARTICIPATE FULLY AND SAFELY IN AN INCREASINGLY DIGITAL WORLD.

- ★ 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.

Computer Science

- ★ 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.

Information Technology

- ★ Are responsible, competent, confident and creative users of information and communication technology.

Digital Literacy

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn	Getting started – Computing systems and networks.	What is a computer? - Computing systems and networks.	Journey inside a computer - Computing systems and networks.	Collaborative learning – Computing systems and networks.	Mars Rover 1 Data handling	Micro:bit - Programming
Spring 1	Programming Beebots – Programming	Programming Scratch Jr – Programming	Networks and the internet - Computing systems and networks.	Website design – Creating Media	Mars Rover 2 - showcasing skill	Big Data 1 - Data handling
Spring 2	Digital Imagery - Creating Media	Algorithms and debugging/ Bluebots – Programming	Programming Scratch and Probots - Programming	HTML – Showcase Skills	Scratch Programming Music - programming	
Summer 1	Introduction to data – Data handling	International Space Station - Data handling	Video trailers - Creating Media	Programming games – Programming	Search Engines - Computing systems and networks.	History of computers – Creating media
Summer 2	Rocket to the moon – Skill Showcase	Stop Motion – Creating Media	Comparison Cards Database – Data handling	Investigating weather – Data Handling	Micro:bit – Programming	Bletchley park - Computing systems and networks.

	2022-2023 – Online safety					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	How can I use the internet safely?	What happens when I post online?	What is the difference between beliefs, opinions and facts on the internet?	What happens when I search online?	How can I alter permissions?	How can I overcome negativity online?
Autumn 2	How can using the internet affect my emotions?	How do I keep my things safe online?	What can I do when being online makes me upset?	How do companies encourage us to buy things?	How can I use technology safely, respectfully and responsibly?	What are the consequences of sharing online?
Spring 1	How can I be kind and considerate online?	Who should I ask before sharing information online?	What are privacy settings?	How can I create my own judgements about what I read online?	Is information online always fact?	How can I create a positive online reputation?
Spring 2	What is okay to post and share online?	Can I deny permissions?	What are the rules of social media platforms?	What is a bot?	What is the difference between online and offline bullying?	How can I capture evidence?
Summer 1	When should I ask for help?	Is everything I see online true?	Are online friends the same as offline friends?	What is too much screen time?	Is technology good for my health?	What makes a strong password?
Summer 2	How can I use the internet safely to speak to family and friends?	What can I do if I feel sad online?	Why are age restrictions important?	How can I be a good friend online?	How can I keep my accounts secure?	How can I spot scams?

Progression of Skills in Computing

Computer Science

(Hardware)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Learning how to explore and tinker with hardware to find out how it works • Understanding that computers and devices around us use inputs and outputs, identifying some of these • Learning where keys are located on the keyboard • Learning how to operate a camera	• Understanding what a computer is and that it's made up of different components • Recognising that buttons cause effects and that technology follows instructions • Learning how we know that technology is doing what we want it to do via its output. • Using greater control when taking photos with tablets or computers • Developing confidence with the keyboard and the basics of touch typing	• Understanding what the different components of a computer do and how they work together • Drawing comparisons across different types of computers • Learning what a server does	• Learning about the purpose of routers	• Learning that external devices can be programmed by a separate computer • Learning the difference between ROM and RAM • Recognising how the size of RAM affects the processing of data • Understanding the fetch, decode, execute cycle	• Learning about the history of computers and how they have evolved over time • Using the understanding of historic computers to design a computer of the future • Understanding and identifying barcodes, QR codes and RFID • Identifying devices and applications that can scan or read barcodes, QR codes and RFID • Acknowledging that corruption can happen within data during transfer (for example when downloading, installing, copying and updating files)

Computer Science

(Networks and data representations)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Understanding what the internet is	•	• Learning what a network is and its purpose • Identifying the key components within a network, including whether they are wired or wireless • Recognising links between networks and the internet • Learning how data is transferred	• Consolidating understanding of the key components of a network • Understanding that websites & videos are files that are shared from one computer to another • Learning about the role of packets • Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration	• Learning the vocabulary associated with data: data and transmit • Learning how the data for digital images can be compressed • Recognising that computers transfer data in binary and understanding simple binary addition • Relating binary signals (Boolean) to the simple character-based language, ASCII • Learning that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary	• Understanding that computer networks provide multiple services

Computer Science

(Computational Thinking)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Learning that decomposition means breaking a problem down into smaller parts • Using decomposition to solve unplugged challenges • Using logical reasoning to predict the behaviour of simple programs • Developing the skills associated with sequencing in unplugged activities • Learning 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 • Assembling instructions into a simple algorithm	• Articulating what decomposition is • Decomposing a game to predict the algorithms used to create it • Using decomposition to decompose a story into smaller parts • Learning what abstraction is • Learning that there are different levels of abstraction • Explaining what an algorithm is • Following an algorithm • Creating a clear and precise algorithm • Learning that computers use algorithms to make predictions • Learning that programs execute by following precise instructions • Incorporating loops within algorithms	• Using decomposition to explain the parts of a laptop computer • Using decomposition to explore the code behind an animation • Using repetition in programs • Understanding that computers follow instructions • Using an algorithm to explain the roles of different parts of a computer • Using logical reasoning to explain how simple algorithms work • Explaining the purpose of an algorithm • Forming algorithms independently	• Solving unplugged problems by decomposing them into smaller parts • Using decomposition to understand the purpose of a script of code • Using decomposition to help solve problems • Identifying patterns through unplugged activities • Using past experiences to help solve new problems • Using abstraction to identify the important parts when completing both plugged and unplugged activities • Creating algorithms for a specific purpose	• Decomposing animations into a series of images • Decomposing a program without support • Decomposing a story to be able to plan a program to tell a story • Predicting how software will work based on previous experience • Writing more complex algorithms for a purpose	• Decomposing a program into an algorithm • Using past experiences to help solve new problems • Writing increasingly complex algorithms for a purpose

Computer Science

(Programming)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Programming a Bee-bot/Virtual Bee-bot to follow a planned route • Learning to debug instructions when things go wrong • Developing a how-to video to explain how the Bee-bot works. • Learning to debug an algorithm in an unplugged scenario	• Using logical thinking to explore software, predicting, testing and explaining what it does • Using an algorithm to write a basic computer program • Learning what loops are • Incorporating loops to make code more efficient	• Using logical thinking to explore more complex software; predicting, testing and explaining what it does • Incorporating loops to make code more efficient • Remixing existing code • Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected	• Understanding that websites can be altered by exploring the code beneath the site • Coding a simple game • Using abstraction and pattern recognition to modify code • Incorporating variables to make code more efficient • Remixing existing code • Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected	• Programming an animation • Iterating and developing their programming as they work • Beginning to use nested loops (loops within loops) • Debugging their own code • Writing code to create a desired effect • Using a range of programming commands • Using repetition within a program • Amending code within a live scenario	• Debugging quickly and effectively to make a program more efficient • Remixing existing code to explore a problem • Using and adapting nested loops • Programming using the language Python • Changing a program to personalise it • Evaluating code to understand its purpose • Predicting code and adapting it to a chosen purpose • Altering a website's code to create changes

Information Technology

(Using Software)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Using a basic range of tools within graphic editing software • Taking and editing photographs • Understanding how to create digital art using an online paint tool • Developing control of the mouse through dragging, clicking and resizing of images to create different effects • Developing understanding of different software tools	• Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts • Using word processing software to type and reformat text • Using software to create story animations • Creating and labelling images	• Taking photographs and recording video to tell a story. • Using software to edit and enhance their video adding music, sounds and text on screen with transitions	• Building a web page and creating content for it • Designing and creating a webpage for a given purpose • Use Google online software for documents, presentations, forms and spreadsheets. • Work collaboratively with others	• Using logical thinking to explore software more independently, making predictions based on their previous experience • Using a software programme (Sonic Pi or Scratch) to create music • Using video editing software or animation software to animate • Identify ways to improve and edit programs, videos, images etc. • Independently learning how to use 3D design software package TinkerCAD	• Using logical thinking to explore software independently, iterating ideas and testing continuously • Using search and word processing skills to create a presentation • Planning, recording and editing a radio play • Creating and editing sound recordings for a specific purpose • Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert • Using design software TinkerCAD to design a product • Creating a website with embedded links and multiple pages

Information Technology

(Using email and the internet)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Searching and downloading images from the internet safely • Understanding that we are connected to others when using the internet	• Understanding that personal information should not be shared on the internet. • Learning how to be respectful to others when sharing content online.	• Learning to log in and out of an email account • Writing an email including a subject, 'to' and 'from' • Sending an email with an attachment • Replying to an email • Identifying useful terms and phrases for search engines	• Understanding why some results come before others when searching • Understanding that information on the internet is not all grounded in fact	• Developing searching skills to help find relevant information on the internet • Understanding how apps can access our personal information and how to alter the permissions.	• Understanding how search engines work

Information Technology

(Using Data)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Introduction to spreadsheets • Representing data in tables, charts and pictograms • Sorting data and creating branching databases • Identifying where digital content can have advantages over paper when storing and manipulating data	• Collecting and inputting data into a spreadsheet • Interpreting data	• Understanding the vocabulary associated with databases: field, record, data • Learning about the pros and cons of digital versus paper databases • Sorting and filtering databases to easily retrieve information • Creating and interpreting charts and graphs to understand data	• Designing a weather station which gathers and records sensor data	• Understanding how data is collected	• Understanding how barcodes, QR codes and RFID work • Gathering and analysing data in real time • Creating formulas and sorting data within spreadsheets

Information Technology

(Wider use of Technology)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Recognising common uses of information technology, including beyond school • Understanding some of the ways we can use the internet	• Learning how computers are used in the wider world	• Understanding the purpose of emails. • Learning what a search engine is • Recognising how social media platforms are used to interact	• Understanding that software can be used collaboratively online to work as a team	• Learn about different forms of communication that have developed with the use of technology.	• Learning about the Internet of Things and how it has led to 'big data'. • Learning how 'big data' can be used to solve a problem or improve efficiency

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Digital Literacy					
• Logging in and out and saving work on their own account • Understand the importance of a password • When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable • Recognising when someone has been unkind online • Learning some top tips for staying safe online • Understanding how we 'share' information on the internet	• Understanding that personal information should not be shared on the internet. • Learning how to be respectful to others when sharing content online.	• Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind • Learning about cyberbullying • Learning that not all emails are genuine, recognising when an email might be fake and what to do about it • Learning that not all information on the internet is factual • Understanding who personal information should/ should not be shared with	• Recognising what appropriate behaviour is when collaborating with others online • Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others • Learning about different forms of advertising on the internet.	• Learning about how permissions work and how to change them • Identifying possible issues with online communication • Considering the effects of screen-time on physical and mental wellbeing • Learning about online bullying and where to seek advice	• Understanding the importance of secure passwords and how to create them, along with two-step authentication • Using search engines safely and effectively • Recognising that updated software can help to prevent data corruption and hacking • Considering their digital footprint and online reputation and future implications they may have • Learning about how to collect evidence and report online bullying concerns