Comberton Primary School
Computing Curriculum

Our Vision

Our role at Comberton is to spark curiosity, creating a world of opportunity, awe and wonder for our children and staff. We aim to equip our children with the knowledge, skills and values to lead productive, healthy and inspired lives in modern day Britain.

Subject Intent

Our aim is to equip children with the skills to become digitally literate and resilient so that they can be active participants in an ever changing digital world. Our curriculum enables children to develop their computational thinking and creativity so that they can embrace and utilise new technology in a socially responsible and safe way.

National Curriculum Overview

EYFS
Computing is not named specifically in the EYFS curriculum. However, Computing skills are applicable to the following ELGs for children at the expected level of development: **Digital Literacy** ELG: Listening, Attention and Understanding - Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions. **Information Technology** ELG: Speaking - Express their ideas and feelings about their experiences using full sentences, including use of past, present and future tenses and making use of conjunctions, with modelling and support from their teacher. ELG: Self-Regulation - Show an understanding of their own feelings and those of others, and begin to regulate their behaviour accordingly; - Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate. ELG: Past and Present - Know some similarities and differences between things in the past and now, drawing on their experiences and what has been read in class. **Computer Science** ELG: Listening, Attention and Understanding - Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions. ELG: Managing Self - Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. Nursery: C& L ~ Be able to express a point of view and to debate when they disagree with an adult or a friend, using words as well as actions. PSED ~ Develop their sense of responsibility and membership of a community/Increasingly follow rules, understanding why they are important/Talk about their feelings using words like 'happy', 'sad', 'angry' or 'worried'/Understand gradually how others might be feeling. UTW ~ Explore how things work/ Continue developing positive attitudes about the differences between people. EAD ~ Respond to what they have heard, expressing their thoughts and feelings. Reception: C&L ~ Understand how to listen carefully and why listening is important/Ask questions to find out more and to check they understand what has been said to them/Articulate their ideas and thoughts in well-formed sentences/Connect one idea or action to another using a range of connectives/Describe events in some detail/Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen/Develop social phrases. PSED ~ See themselves as a valuable individual/Build constructive and respectful relationships/Express their feelings and consider the feelings of others/Show resilience and perseverance in the face of challenge/Identify and moderate their own feelings socially and emotionally/Think about the perspectives of others. UTW ~ Talk about members of their immediate family and community/Name and describe people who are familiar to them/Comment on images of familiar situations in the past. EAD ~ Create collaboratively, sharing ideas, resources and skills.

National Curriculum Overview

Key Stage 1	Key Stage 2
Pupils should be taught to: • understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions • create and debug simple programs • use logical reasoning to predict the behaviour of simple programs • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.	Pupils should be taught to: • design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • use sequence, selection, and repetition in programs; work with variables and various forms of input and output • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs • understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration • use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content • select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Unit Overview

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Digital Literacy – Online Safety
Including links to PSHRE Curriculum
KCSIE Online Safety Areas

Concept/Area	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Health, Wellbeing and Lifestyle	Identify rules to keep you safe and rules to keep you happy. Explain rules to keep myself safe when using technology both in and beyond the home.	Y2 SCARF – Rights and Respects – 'Playing Games'	Explain why spending too much time using technology can sometimes have a negative impact on anyone; give some examples of both positive and negative activities where it is easy to spend a lot of time engaged. Y3 SCARF – Being my best – 'I am fantastic'	Y4 SCARF – Rights and Respect – 'Who keeps us healthy and safe?'	Y5 SCARF – Keeping Safe – 'Play, like, share' Y5 SCARF – Rights and respect – 'What's the story?' Y5 SCARF – Keeping Safe – 'Spot bullying' Y5 SCARF – Growing & Changing – 'Help I'm a teenager – get me out of here!'	Y6 SCARF – Being my best – 'Five ways to Wellbeing Project' Y6 SCARF – Growing & Changing – 'Media Manipulation' Y6 SCARF – Rights and respect – 'Facebook friends'
Privacy & Security	Explain that passwords are used to protect information, accounts and devices. Recognise more detailed examples of information that is personal to someone. Suggest safe passwords	Y2 SCARF – Rights and Respects – 'Playing Games'	Y3 SCARF – Growing and Changing – 'None of your business' Y3 SCARF – Keeping Safe – 'Super Searcher'	Y4 SCARF – Keeping Safe – 'Picture Wise'	Explain what a strong password is and demonstrate how to create one. Y5 SCARF – Keeping Safe – 'Play, like, share'	Explain what to do if a password is shared, lost or stolen. Describe simple ways to increase privacy on apps and services that provide privacy settings. Y6 SCARF – Keeping Safe – 'To share or not to share'

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Managing Online Information **Content** **Commerce**	**Give simple examples of how to find information using digital technologies, e.g. search engines, voice activated searching. Know how to get help from a trusted adult.**	**Demonstrate how to navigate a simple webpage to get to information I need.** **Y2 SCARF – Rights and Respects – 'Playing Games'**	**Y3 SCARF – Keeping Safe – 'Super Searcher'**	**Analyse information to make a judgement about probable accuracy** **Understand why it is important to make my own decisions regarding content and that my decisions are respected by others.** **-Explain that technology can be designed to act like or impersonate living things (e.g. bots) and describe what the benefits and the risks might be.** **Y4 SCARF – Keeping Safe – 'Picture Wise'** **Y4 SCARF – Rights and Respect – 'In the news'**	**Y5 SCARF – Keeping Safe – 'Play, like, share'** **Y5 SCARF – Valuing Difference – 'Is it true?'** **Y5 SCARF – Rights and respect – 'What's the story?'** **Y5 SCARF – Rights and respect – 'Fact or Opinion?'**	**Explain how to use search technologies effectively.** **Define the terms 'influence', 'manipulation' and 'persuasion' and explain how someone might encounter these online (e.g. advertising and 'ad targeting' and targeting for fake news).** **Y6 SCARF – Growing & Changing – 'Pressure online'** **Y6 SCARF – Keeping Safe – 'To share or not to share'** **Y6 SCARF – Rights and respect – 'Facebook friends'** **Y6 SCARF – Keeping safe – 'Think before you click'**
Online Relationships		**Give examples of how someone**	**Explain what is meant by 'trusting**	**Describe strategies for safe**	**Explain that there are some people I**	**Y6 SCARF – Growing &**

Contact **Conduct**		**might use technology to communicate with others they don't also know offline and explain why this might be risky.** **Y2 SCARF – Me and my relationships – 'Types of bullying'**	**someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online including what information and content they are trusted with.** **Y3 SCARF – Valuing Difference – 'Zeb'**	**and fun experiences in a range of online social environments (e.g. livestreaming, gaming platforms)** **Y4 SCARF – Me and my relationships – 'Under Pressure'**	**communicate with online who may want to do me or my friends harm. Recognise that this is not my / our fault.** **Y5 SCARF – Keeping Safe – 'Play, like, share'** **Y5 SCARF – Keeping Safe – 'Spot bullying'**	**Changing – 'Pressure online'** **Y6 SCARF – Keeping Safe – 'To share or not to share'** **Y6 SCARF – Rights and respect – 'Facebook friends'**
Online Bullying **Conduct**	**Y1 SCARF – Keeping Safe - 'Sharing Pictures'**	**Explain what bullying is, how people may bully others and how bullying can make someone feel. Talk about how anyone who is experiencing bullying can get help.** **Y2 SCARF – Me and my relationships – 'Types of bullying'**	**Describe appropriate ways to behave towards other people online and why this is important.** **Y3 SCARF – Valuing Difference – 'Zeb'**	**Describe ways people can be bullied through a range of media (e.g. image, video, text, chat).** **-Explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation).** **Y4 SCARF – Me and my relationships – 'Under Pressure'**	**Explain how to block abusive users.** **Describe the helpline services which can help people experiencing bullying, and how to access them (e.g. Childline or The Mix)** **Y5 SCARF – Keeping Safe – 'Spot bullying'** **Y5 SCARF – Keeping Safe – 'Play, like, share'**	**Y6 SCARF – Keeping safe – 'Think before you click'** **Y6 SCARF – Growing & Changing – 'Pressure online'** **Y6 SCARF – Keeping Safe – 'To share or not to share'**

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Self-Image & Identity **Content**	**Y1 SCARF – Keeping Safe - 'Sharing Pictures'**	**Explain how other people may look and act differently online and offline.** **Y2 SCARF – Rights and Respects – 'Playing Games'**	**Y3 SCARF – Valuing Difference – 'Zeb'** **Y3 SCARF – Being my best – 'I am fantastic'**	**Explain how my online identity can be different to my offline identity.** **Y4 SCARF – Keeping Safe – 'Picture Wise'**	**Y5 SCARF – Keeping Safe – 'Play, like, share'** **Y5 SCARF – Valuing Difference – 'Is it true?'**	**Identify and critically evaluate online content relating to gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online.** **Explain the importance of asking until I get the help needed.** **Y6 SCARF – Growing & Changing – 'Media Manipulation'** **Y6 SCARF – Keeping Safe – 'To share or not to share'** **Y6 SCARF – Rights and relationships – 'Facebook friends'** **Y6 SCARF – Keeping safe – 'Think before you click'**

Copyright & Ownership **Content** **Commerce**	**Y1 SCARF – Keeping Safe - 'Sharing Pictures'**	**Y2 SCARF – Rights and Respects – 'Playing Games'**	**Y3 SCARF – Keeping Safe – 'Super Searcher'**	**Y4 SCARF – Keeping Safe – 'Picture Wise'**	**Y5 SCARF – Keeping Safe – 'Play, like, share'** **Y5 SCARF – Keeping Safe – 'Spot bullying'**	**Y6 SCARF – Keeping Safe – 'To share or not to share'**
Online reputation **Content** **Conduct**		**Y2 SCARF – Rights and Respects – 'Playing Games'**	**Y3 SCARF – Being my best – 'I am fantastic'**	**Y4 SCARF – Keeping Safe – 'Picture Wise'**	**Y5 SCARF – Keeping Safe – 'Play, like, share'** **Y5 SCARF – Valuing Difference – 'Is it true?'** **Y5 SCARF – Keeping Safe – 'Spot bullying'**	**Y6 SCARF – Growing & Changing – 'Media Manipulation'** **Y6 SCARF – Growing & Changing – 'Pressure online'** **Y6 SCARF – Keeping Safe – 'To share or not to share'** **Y6 SCARF – Being my best – 'This will be your life'** **Y6 SCARF – Keeping safe – 'Think before you click'**
Essential vocabulary	**internet information online technology trusted adult password information search engine**	**web page navigation online vs offline identity online bullying**	**trust balanced - lifestyle age restriction pressured appropriate**	**opinion fact belief content reputation online identity**	**password security permissions shared/private - information abuse report**	**privacy settings influence manipulation persuasion ad targeting fake news representations**

Information Technology

Concept/Area	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Creating Content	**Digital Painting** **– Make marks and draw lines on a screen and explain which tools have been used.** **– Use the shape and line tools effectively (including fill and undo)** **– Choose appropriate shapes and make appropriate colour choices** **- Choose appropriate paint tools and colours to recreate the work of an artist** **– Change the colour and size of brushes** **– Spot the differences between painting on a computer and**	**Digital Photography** **-Recognise devices that can be used to take a photograph and talk about how to do this** **-Take photos in both landscape and portrait** **-Discuss how to take a good photograph and improve it by retaking** **-Explore the effect that light has on a photo and experiment with different light sources** **-Recognise when photos have been changed and identify when they are real**	**Desktop Publishing** **- Identify the advantages and disadvantages of using text and/or images** **- Make careful choices regarding font size, colour, and type. Explore the Return, Backspace, and Shift keys and some punctuation marks** **– Explore templates, placeholders and orientation. Use some placeholders to create your own magazine template** **-Add your own content (text and images) to your template (See last lesson). Choose locations and edit content.**	**Audio editing** **-Identify the inputs and outputs required to play audio or record sound** **-Use a device to record audio and play back sound** **Suggest how to improve my recording** **-Explain that a digital recording is stored as a file** **-Edit sections of an audio recording** **-Combine and play together different types of audio** **-Discuss the features of a digital recording and suggest improvements**	**Vector Graphics** **- Recognise that vector drawings are made using shapes** **Experiment with the shape and line tools** **Discuss how vector drawings are different from paper-based drawings** **- Identify the shapes used to make a vector drawing** **Explain that each element added to a vector drawing is an object** **Move, resize, and rotate objects I have duplicated** **- Use the zoom tool to help me add detail to my drawings** **Explain how alignment grids and resize handles**	**Web Page Creation** **Discuss the different types of media used on a website** **Know that websites are written in HTML** **Recognise the common features of a web page** **Find copyright images and understand why they should use these** **Add content to a webpage and evaluate how it looks on different devices** **Create hyperlinks and subpages to other people's work** **Evaluate the user experience of a website**

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	on paper and say which I prefer **<u>Digital Writing</u>** **-Open a word processor and recognise keys on a keyboard** **-Enter text into a computer using letters, numbers and the space key** **-Type capital letters and explain what the keys do** **-Select a word by double clicking and select all of the text by clicking and dragging** **-Use tools to change text and say how the changes have improved the writing** **-Explain the difference between typing and writing**				**can be used to improve consistency** **Modify objects to create a new image** **-Identify that each added object creates a new layer in the drawing** **Change the order of layers in a vector drawing** **Use layering to create an image** **- Copy part of a drawing by duplicating several objects** **Recognise when I need to group and ungroup objects** **Reuse a group of objects to further develop my vector drawing** **- Create a vector drawing for a specific purpose** **Reflect on the skills I have used and why I have used them** **Compare vector drawings to**	

					freehand paint drawings	
Data & Information		**Pictograms** - Organise data into a tally chart – Enter data onto a computer. Use a computer to view data in a different format. Use digital pictograms to answer simple questions about objects. -Use a tally chart to create a digital. pictogram Explain what the pictogram shows -Create a digital pictogram to arrange objects by an attribute Answer 'more than'/'less than' and 'most/least' questions about an attribute -Collect data needed to organise people using attributes	**Branching Databases** - Investigate questions with yes/no answers and use them to split objects - Arrange objects into a tree structure and create a group of objects within an existing group - Create a digital branching database using yes/no questions. Prove my branching database works. - Evaluate digital branching databases and explain why it is helpful for a database to be well structured - Plan your own branching database, thinking about attributes. Create questions that will enable objects to be uniquely identified.	**Data Logging** - Choose a data set to answer a given question Suggest questions that can be answered using a given data set Identify data that can be gathered over time - Explain what data can be collected using input devices called sensors Use data from a sensor to answer a given question Identify that data from sensors can be recorded - Explore how data loggers work. Recognise that a data logger collects data at given points Identify the intervals used to collect data	**Flat-file databases** - Create a database using cards Explain how information can be recorded Order, sort, and group my data cards - Explain what a field and a record is in a database Navigate a flat-file database to compare different views of information Choose which field to sort data by to answer a given question - Explain that data can be grouped using chosen values Group information using a database Combine grouping and sorting to answer specific question	**Spreadsheets** -Ask simple relevant questions that can be answered using data Explain the relevance of data headings -Build a data set in a spreadsheet application Explain what an item of data is -Construct a formula in a spreadsheet Explain the relevance of a cell's data type -Apply a formula to multiple cells by duplicating it Create a formula which includes a range of cells -Explain why data should be organised Use a spreadsheet to answer questions

		and create a pictogram to show this. Draw conclusions from it - Explore other ways to present data digitally (block diagram). Share what I have found out using a computer. Give simple examples of why information should not be shared.	- Create and test your own digital branching database using your plan. Test the database. Suggest real world uses for branching databases.	Talk about the data that I have captured - Open and use an existing data file. View data at different levels of detail Sort data to find information Explain that there are different ways to view data -- Propose a question that can be answered using logged data Plan how to collect data using a data logger Use a data logger to collect data - Interpret data that has been collected using a data logger Draw conclusions from the data that I have collected	- Choose which field and value are required to answer a given question Outline how 'AND' and 'OR' can be used to refine data selection Choose multiple criteria to answer a given question -Select an appropriate chart to visually compare data Refine a chart by selecting a particular filter Explain the benefits of using a computer to create charts Create charts using data and answer questions about it -Use a real life flight search database to ask questions and find answers. Ask questions that will need more than one field to answer Refine a search in a real-world context	-Produce a graph to answer questions answer to questions ansd suggest

				Explain the benefits of using a data logger	**Present my findings to a group**	
Systems & Networks	**<u>IT around us</u>** **- Find examples of information technology and sort IT by where it is found (barcode, barcode scanner, till, bank card, chip and pin, traffic light, crossing button, crossing signal)** **-Name the main parts of a computer and see similarities and differences between different technological devices and their component parts.** **-Use a mouse to click and drag objects on a screen to create a picture.** **-Use a keyboard to type their name including the shift key to type capital letters and**	**<u>IT around us</u>** **-Describe uses of computers and identify that a computer is part of information technology** **-Sort school IT by what it is used for** **-Find examples of information technology and sort IT by where it is found** **-Demonstrate how IT devices work together and say why we use IT** **-Use IT for different types of activities and explain the need to use it in different ways**			**<u>Systems and Searching</u>** **-Describe that a computer system features inputs, processes and outputs.** **Explain that computer systems communicate with other devices** **-Identify tasks that are managed by computer systems** **-Make use of a web search to find specific information and refine their web search** **-Recognise the role of web crawlers in creating an index** **-Explain that a search engine follows rules to rank results** **-Describe some of the ways that**	**<u>Communication and Collaboration</u>** **– Recognise that data is transferred using agreed methods** **Explain that internet devices have addresses** **Describe how computers use addresses to access websites** **– Identify and explain the main parts of a data packet** **Explain that data is transferred over networks in packets** **Explain that all data transferred over the internet is in packets** **– Recognise how to access shared files stored online** **Send information over the internet in different ways** **Explain that the internet allows**

	backspace to delete letters. **-Use the arrow keys to move the cursor.** **– Consider how they use different forms of information technology safely, in a range of different environment**				**search results can be influenced and recognise some of the limitations of search engines**	**different media to be shared** **– Identify different ways of working together online Recognise that working together on the internet can be public or private Explain how the internet enables effective collaboration within the rules of copyright** **- Explain the different ways in which people communicate Identify that there are a variety of ways to communicate over the internet Choose methods of communication to suit particular purposes** **- Compare different methods of communicating on the internet Decide when I should and should**

						not share information online Explain that communication on the internet may not be private
Essential vocabulary	tool paintbrush pencil line undo fill erase mouse keyboard shift backspace	tally organise pictogram attribute landscape portrait edit flash	Desktop publishing font template placeholder orientation branching database open ended question attribute closed question	input device sensor capture data logger	web crawler search engine database field record values data type vector graphic move resize rotate duplicate zoom alignment layer system output process connection digital	Internet Protocol (IP) address protocols Domain Name Server (DNS) web addresses hyperlink data communication data packer header data payload collaborative-project modifying copyright spreadsheet formula cell

Computer Science

Concept/Area	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Including: *Problem Solving* & Logical Thinking	<u>Programming</u> – Match a command to an Outcome and predict an outcome from a command. - Follow an instruction and recall words that can be acted out (Ext give directions) – Compare forwards and backwards movements Start a sequence from the same place Predict the outcome of a sequence involving forwards and backwards commands - Experiment with turn and move	<u>Sequencing</u> - Define a list of steps (algorithm) to get a friend from their starting position to their goal. - Experiment with standard block-based programming actions such as: clicking, drag and drop, etc. (model computer lab behaviours) - Build a computer program from a set of written instructions. -Identify and locate bugs in a program -Translate a list of steps into a series of physical actions.	<u>Sequencing</u> - Use precision when creating instructions -Identify and address bugs or errors in sequenced instructions - Identify and locate bugs in a program. Translate movements into a series of commands. - Modify an existing program to solve errors. Predict where a program will fail. Reflect on the debugging process in an age-appropriate way. - Develop problem solving and critical thinking skills by	<u>Sequencing</u> - Explain constraints of translating problems from human language to machine language Reframe a sequence of steps as an encoded program - Break down a long sequence of instructions into the largest repeatable sequence. Modify an existing program to solve errors. Order movement commands as sequential steps in a program. - Define ideas using code and symbols.	<u>Sprites</u> - Create new sprites and assign them costumes and behaviours. Define “sprite” as a character or object on the screen that can be moved and changed. - Create an interactive animation using sprites and events. Create new sprites and assign them costumes and locations. <u>Nested Loops</u> - Differentiate between commands that need to be repeated in loops and commands that should be used on their own.	<u>Sprites</u> - Describe the importance of the user in the design process. Identify sprites in a running computer program. - Create an animation using sprites, and behaviours. Create new sprites and assign them costumes and behaviours. - Create an interactive animation using events. Develop programs that respond to timed events. Develop programs that respond to user input. <u>Variables</u>

	commands to move a robot – Explain what my program should do Choose the order of commands in a sequence Debug my program – Identify several possible solutions by planning two different programs to get to the same place	<u>Loops</u> -Convert a series of multiple actions into a single loop. Repeat actions initiated by the instructor. Translate a picture program into a real-world dance. - Break down a long sequence of instructions into the smallest repeatable sequence possible. Create a program for a given task which loops a sequence of commands. Employ a combination of sequential and looped commands to reach the end of a maze. -Identify the benefits of using a loop structure instead of manual repetition. - Count the number of times	reviewing debugging practices. Order movement commands as sequential steps in a program. Represent an algorithm as a computer program. - Break complex shapes into simple parts. Create a program to complete an image using sequential steps. <u>Loops</u> -Identify repeated patterns in code that could be replaced with a loop Write instructions that use loops to repeat patterns - Break down a long sequence of instructions into the largest repeatable sequence. Employ a combination of sequential and	Identify signs of frustration (persistence) Verify work done by teammates. - Describe and implement a plan to debug a program. Identify a bug and the problems it causes in a program. Read and comprehend given code. <u>Events</u> - Create an interactive game using sequence and event-handlers. Identify actions that correlate to input events. Share a creative artifact with other students. - Create an animated, interactive game using sequence and events.	Identify the benefits of using a loop structure instead of manual repetition. - Break complex tasks into smaller repeatable sections. Combine simple shapes into complex designs with nested loops. Count the number of times an action should be repeated and represent it as a loop. <u>Conditionals</u> -Define circumstances when certain parts of a program should run and when they shouldn't. -Determine whether a conditional is met based on criteria. - Define circumstances when certain parts of a program	-Assign a variable a value Call a variable multiple times in a program. -Declare a variable -Determine the relationship between how a variable is defined, stored, and retrieved when we press “Run” on a program. - Use variables in conjunction with prompts. -Use variables to hold words and phrases. –Create Sprite Lab programs where sprites are created in groups, and controlled individually using events. - Create a clicker game in Sprite Lab where sprites can be removed to score points -Create a variable that stores information and changes over time

		an action should be repeated and represent it as a loop. **Create a program that draws complex shapes by repeating simple sequences.** **Decompose a shape into its largest repeatable sequence.**	**looped commands to reach the end of a maze.** **Identify the benefits of using a loop structure instead of manual repetition.** **- Employ a combination of sequential and looped commands to move and perform actions.** **Identify when a loop can be used to simplify a repetitive action.** **Write a program for a given task which loops a single command.** **- Differentiate between commands that need to be repeated in loops and commands that should be used on their own.** **Identify the benefits of using a loop structure instead of manual repetition.** **<u>Events</u>**	**Identify actions that correlate to input events.** **- Create dance animations with code** **Develop programs that respond to timed events** **Develop programs that respond to user input** **<u>Loops</u>** **- Construct a program using structures that repeat areas of code** **Improve existing code by finding areas of repetition and moving them into looping structures** **-Differentiate between commands that need to be repeated in loops and commands that should be used on their own.** **Identify the benefits of using a loop structure**	**should run and when they shouldn't.** **Determine whether a conditional is met based on criteria.** **(Consolidate using different program)** **- Recognize when a function could help to simplify a program.** **Use pre-determined functions to complete commonly repeated tasks.** **(Using functions alongside conditionals)** **<u>Functions</u>** **- Describe how functions can make programs easier to write.** **Identify sections of a song to pull into a function.** **Locate repeating phrases inside song lyrics.** **- Use functions to simplify complex programs.**	**<u>Simulating Experiments</u>** **-Collect data from a simulation.** **Create a double line graph. Predict how changing a variable might impact an outcome and test that hypothesis** **-Explore how training data is used to enable a machine learning model to classify new data** **Discuss the role artificial intelligence plays in their lives**

			- Practice differentiating pre-defined actions and event-driven ones. **Recognize movements of the teacher as signals to initiate commands.** **Repeat commands given by an instructor.** **- Create a game using event handlers.** **Match blocks with the appropriate event handler.** **Share a creative artifact with other students.** **- Create an animated, interactive game using sequence and event-handlers.** **Identify actions that correlate to input events.**	**instead of manual repetition.** **-Break complex tasks into smaller repeatable sections.** **Identify the benefits of using a loop structure instead of manual repetition.** **Recognize large repeated patterns as made from smaller repeated patterns.** **<u>Conditionals</u>** **-- Define circumstances when certain parts of a program should run and when they shouldn't.** **Determine whether a conditional is met based on criteria.** **Traverse a program and predict the outcome, given a set of input.** **- Define circumstances when certain parts**	**Use pre-determined functions to complete commonly repeated tasks.** **- Categorize and generalize code into useful functions.** **Recognize when a function could help to simplify a program.**	

				of a program should run and when they shouldn't. Determine whether a conditional is met based on criteria. (Minecraft based) **- Solve puzzles using a combination of looped sequences and conditionals. Translate spoken language conditional statements into a program.** **- Distinguish between loops that repeat a fixed number of times and loops that repeat as long as a condition is true. Use a while loop to create programs that can solve problems with unknown values.** **- Build programs with the understanding of multiple strategies**		

				to implement conditionals. Translate spoken language conditional statements and loops into a program.		
Essential vocabulary	**program bug debug algorithm**	**Loop repeat sequence commands**	**actions events**	**conditionals condition while loop**	**sprites functions simplify categorise**	**variable define store retrieve simulation hypothesis artificial-intelligence**

At the End of Year One		
Digital Literacy	**Information Technology**	**Computer Science**
Identify rules to keep you safe and rules to keep you happy. Explain rules to keep myself safe when using technology both in and beyond the home. Explain that passwords are used to protect information, accounts and devices. Recognise more detailed examples of information that is personal to someone. Suggest safe passwords Give simple examples of how to find information using digital technologies, e.g. search engines, voice activated searching. Know how to get help from a trusted adult.	<u>IT around us</u> Find examples of information technology and sort IT by where it is found (barcode, barcode scanner, till, bank card, chip and pin, traffic light, crossing button, crossing signal) Name the main parts of a computer and see similarities and differences between different technological devices and their component parts. Use a mouse to click and drag objects on a screen to create a picture. Use a keyboard to type their name including the shift key to type capital letters and backspace to delete letters. Use the arrow keys to move the cursor. Consider how they use different forms of information technology safely, in a range of different environments <u>Digital Painting</u> Make marks and draw lines on a screen and explain which tools have been used. Use the shape and line tools effectively (including fill and undo) Choose appropriate shapes and make appropriate colour choices Choose appropriate paint tools and colours to recreate the work of an artist	<u>Programming</u> Match a command to an outcome Predict an outcome from a command. Follow an instruction and recall words that can be acted out (Ext give directions) Compare forwards and backwards movements Start a sequence from the same place Predict the outcome of a sequence involving forwards and backwards commands Experiment with turn and move commands to move a robot Explain what my program should do Choose the order of commands in a sequence Debug my program Identify several possible solutions by planning two different programs to get to the same place

	Change the colour and size of brushes **Spot the differences between painting on a computer and on paper and say which I prefer** **<u>Digital Writing</u>** **Open a word processor and recognise keys on a keyboard** **Enter text into a computer using letters, numbers and the space key** **Type capital letters and explain what the keys do** **Select a word by double clicking and select all of the text by clicking and dragging** **Use tools to change text and say how the changes have improved the writing** **Explain the difference between typing and writing**	
Essential Vocabulary: **internet** **information** **online** **technology** **trusted adult** **password** **information**	**Essential Vocabulary:** **paintbrush** **pencil** **line** **undo** **fill** **clear** **mouse** **keyboard** **shift** **backspace** **technology** **screen** **text**	**Essential Vocabulary:** **programme** **bug** **debug** **algorithm**

At the End of Year Two		
Digital Literacy	**Information Technology**	**Computer Science**
Demonstrate how to navigate a simple webpage to get to information I need. Know that some of the things online are not true. Give examples of how someone might use technology to communicate with others they don't also know offline and explain why this might be risky. Explain what bullying is, how people may bully others and how bullying can make someone feel. Talk about how anyone who is experiencing bullying can get help. Explain how other people may look and act differently online and offline	<u>IT around us</u> Describe uses of computers and identify that a computer is part of information technology Sort school IT by what it is used for Find examples of information technology and sort IT by where it is found Demonstrate how IT devices work together and say why we use IT Use IT for different types of activities and explain the need to use it in different ways <u>Digital Photography</u> Recognise devices that can be used to take a photograph and talk about how to do this Take photos in both landscape and portrait Discuss how to take a good photograph and improve it by retaking Explore the effect that light has on a photo and experiment with different light sources Recognise when photos have been changed and identify when they are real <u>Pictograms</u> Organise data into a tally chart Enter data onto a computer. Use a computer to view data in a different format.	<u>Sequencing</u> Define a list of steps (algorithm) to get a friend from their starting position to their goal. Identify and fix errors in the execution of an algorithm Translate a list of steps into a series of physical actions. Experiment with standard block-based programming actions such as: clicking, drag and drop, etc. (model computer lab behaviours) Build a computer program from a set of written instructions. Construct a program by reorganizing sequential movements. Identify and locate bugs in a program. Translate movements into a series of commands. <u>Loops</u> Convert a series of multiple actions into a single loop. Repeat actions initiated by the instructor. Translate a picture program into a real-world dance. Break down a long sequence of instructions into the smallest repeatable sequence possible.

	Use digital pictograms to answer simple questions about objects. **Use a tally chart to create a digital. pictogram Explain what the pictogram shows** **Create a digital pictogram to arrange objects by an attribute** **Answer 'more than'/'less than' and 'most/least' questions about an attribute** **Collect data needed to organise people using attributes and create a pictogram to show this. Draw conclusions from it** **Explore other ways to present data digitally (block diagram).** **Share what I have found out using a computer.** **Give simple examples of why information should not be shared.**	**Create a program for a given task which loops a sequence of commands.** **Employ a combination of sequential and looped commands to reach the end of a maze.** **Identify the benefits of using a loop structure instead of manual repetition.** **Count the number of times an action should be repeated and represent it as a loop.** **Create a program that draws complex shapes by repeating simple sequences.** **Decompose a shape into its largest repeatable sequence.**
Essential Vocabulary: **web page** **navigation** **online vs offline** **identity** **online bullying**	**Essential Vocabulary:** **tally** **organise** **pictogram** **attribute** **landscape** **portrait** **edit** **flash**	**Essential Vocabulary:** **loop** **sequence** **commands**

At the End of Year Three		
Digital Literacy	**Information Technology**	**Computer Science**
Explain why spending too much time using technology can sometimes have a negative impact on anyone; give some examples of both positive and negative activities where it is easy to spend a lot of time engaged. Explain what is meant by 'trusting someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online including what information and content they are trusted with. Describe appropriate ways to behave towards other people online and why this is important.	<u>Desktop Publishing</u> Identify the advantages and disadvantages of using text and/or images Make careful choices regarding font size, colour, and type. Explore the Return, Backspace, and Shift keys and some punctuation marks Explore templates, placeholders and orientation. Use some placeholders to create your own magazine template Add your own content (text and images) to your template (See last lesson). Choose locations and edit content. <u>Branching Databases</u> Investigate questions with yes/no answers and use them to split objects Arrange objects into a tree structure and create a group of objects within an existing group Create a digital branching database using yes/no questions. Prove my branching database works. Evaluate digital branching databases and explain why it is helpful for a database to be well structured	<u>Sequencing</u> Use precision when creating instructions -Identify and address bugs or errors in sequenced instructions Identify and locate bugs in a program. Translate movements into a series of commands. Modify an existing program to solve errors. Predict where a program will fail. Reflect on the debugging process in an age-appropriate way. Develop problem solving and critical thinking skills by reviewing debugging practices. Order movement commands as sequential steps in a program. Represent an algorithm as a computer program. Break complex shapes into simple parts. Create a program to complete an image using sequential steps. <u>Loops</u> Identify repeated patterns in code that could be replaced with a loop Write instructions that use loops to repeat patterns Break down a long sequence of instructions into the largest repeatable sequence. Employ a combination of sequential and looped commands to reach the end of a maze. Identify the benefits of using a loop structure instead of manual repetition. Employ a combination of sequential and looped commands to move and perform actions.

	Plan your own branching database, thinking about attributes. Create questions that will enable objects to be uniquely identified. **Create and test your own digital branching database using your plan. Test the database. Suggest real world uses for branching databases.**	**Identify when a loop can be used to simplify a repetitive action.** **Write a program for a given task which loops a single command.** **Differentiate between commands that need to be repeated in loops and commands that should be used on their own.** **Identify the benefits of using a loop structure instead of manual repetition.** **<u>Events</u>** **Practice differentiating pre-defined actions and event-driven ones.** **Recognize movements of the teacher as signals to initiate commands.** **Repeat commands given by an instructor.** **Create a game using event handlers.** **Match blocks with the appropriate event handler.** **Share a creative artefact with other students.** **Create an animated, interactive game using sequence and event-handlers.** **Identify actions that correlate to input events.**
Essential Vocabulary: **trust** **balanced - lifestyle** **age restriction** **pressured** **appropriate**	**Essential Vocabulary:** **return** **template** **placeholder** **orientation** **database**	**Essential Vocabulary:** **actions** **events**

At the End of Year Four		
Digital Literacy	**Information Technology**	**Computer Science**
Analyse information to make a judgement about probable accuracy Understand why it is important to make my own decisions regarding content and that my decisions are respected by others. Explain that technology can be designed to act like or impersonate living things (e.g. bots) and describe what the benefits and the risks might be. Describe strategies for safe and fun experiences in a range of online social environments (e.g. livestreaming, gaming platforms) Describe ways people can be bullied through a range of media (e.g. image, video, text, chat). Explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation). Explain how my online identity can be different to my offline identity	<u>Data Logging</u> Choose a data set to answer a given question Suggest questions that can be answered using a given data set Identify data that can be gathered over time Explain what data can be collected using input devices called sensors Use data from a sensor to answer a given question Identify that data from sensors can be recorded Explore how data loggers work. Recognise that a data logger collects data at given points Identify the intervals used to collect data Talk about the data that I have captured Open and use an existing data file. View data at different levels of detail Sort data to find information Explain that there are different ways to view data Propose a question that can be answered using logged data Plan how to collect data using a data logger Use a data logger to collect data Interpret data that has been collected using a data logger Draw conclusions from the data that I have collected Explain the benefits of using a data logger <u>Audio editing</u>	<u>Sequencing</u> Explain constraints of translating problems from human language to machine language Reframe a sequence of steps as an encoded program Break down a long sequence of instructions into the largest repeatable sequence. Modify an existing program to solve errors. Order movement commands as sequential steps in a program. Define ideas using code and symbols. Identify signs of frustration (persistence) Verify work done by teammates. Describe and implement a plan to debug a program. Identify a bug and the problems it causes in a program. Read and comprehend given code. <u>Events</u> Create an interactive game using sequence and event-handlers. Identify actions that correlate to input events. Share a creative artefact with other students. Create an animated, interactive game using sequence and events. Identify actions that correlate to input events. Create dance animations with code Develop programs that respond to timed events Develop programs that respond to user input

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	Identify the inputs and outputs required to play audio or record sound **Use a device to record audio and play back sound** **Suggest how to improve my recording** **Explain that a digital recording is stored as a file** **Edit sections of an audio recording** **Combine and play together different types of audio** **Discuss the features of a digital recording and suggest improvements**	**<u>Loops</u>** **Construct a program using structures that repeat areas of code** **Improve existing code by finding areas of repetition and moving them into looping structures** **Differentiate between commands that need to be repeated in loops and commands that should be used on their own.** **Identify the benefits of using a loop structure instead of manual repetition.** **Break complex tasks into smaller repeatable sections.** **Identify the benefits of using a loop structure instead of manual repetition.** **Recognize large repeated patterns as made from smaller repeated patterns.** **<u>Conditionals</u>** **Define circumstances when certain parts of a program should run and when they shouldn't.** **Determine whether a conditional is met based on criteria.** **Traverse a program and predict the outcome, given a set of input.** **Define circumstances when certain parts of a program should run and when they shouldn't.** **Determine whether a conditional is met based on criteria. (Minecraft based)** **Solve puzzles using a combination of looped sequences and conditionals.** **Translate spoken language conditional statements into a program.**

		Distinguish between loops that repeat a fixed number of times and loops that repeat as long as a condition is true. **Use a while loop to create programs that can solve problems with unknown values.** **Build programs with the understanding of multiple strategies to implement conditionals.** **Translate spoken language conditional statements and loops into a program.**
Essential Vocabulary: **opinion** **fact** **belief** **content** **reputation** **online identity**	**Essential Vocabulary:** **input** **device** **sensor** **capture** **data logger** **audio** **podcast**	**Essential Vocabulary:** **conditionals** **define** **statement** **values**

At the End of Year Five		
Digital Literacy	**Information Technology**	**Computer Science**
Explain what a strong password is and demonstrate how to create one. Explain that there are some people I communicate with online who may want to do me or my friends harm. Recognise that this is not my / our fault. Explain how to block abusive users. Describe the helpline services which can help people experiencing bullying, and how to access them (e.g. Childline or The Mix)	<u>Systems and Searching</u> Describe that a computer system features inputs, processes and outputs. Explain that computer systems communicate with other devices Identify tasks that are managed by computer systems Make use of a web search to find specific information and refine their web search Recognise the role of web crawlers in creating an index Explain that a search engine follows rules to rank results Describe some of the ways that search results can be influenced and recognise some of the limitations of search engines <u>Vector Graphics</u> Recognise that vector drawings are made using shapes Experiment with the shape and line tools Discuss how vector drawings are different from paper-based drawings Identify the shapes used to make a vector drawing Explain that each element added to a vector drawing is an object Move, resize, and rotate objects I have duplicated Use the zoom tool to help me add detail to my drawings Explain how alignment grids and resize handles can be used to improve consistency Modify objects to create a new image	<u>Sprites</u> Create new sprites and assign them costumes and behaviours. Define "sprite" as a character or object on the screen that can be moved and changed. Create an interactive animation using sprites and events. Create new sprites and assign them costumes and locations. <u>Nested Loops</u> Differentiate between commands that need to be repeated in loops and commands that should be used on their own. Identify the benefits of using a loop structure instead of manual repetition. Break complex tasks into smaller repeatable sections. Combine simple shapes into complex designs with nested loops. Count the number of times an action should be repeated and represent it as a loop. <u>Conditionals</u> Define circumstances when certain parts of a program should run and when they shouldn't. Determine whether a conditional is met based on criteria. Define circumstances when certain parts of a program should run and when they shouldn't. Determine whether a conditional is met based on criteria. (Consolidate using different program)

	Identify that each added object creates a new layer in the drawing **Change the order of layers in a vector drawing** **Use layering to create an image** **Copy part of a drawing by duplicating several objects** **Recognise when I need to group and ungroup objects** **Reuse a group of objects to further develop my vector drawing** **Create a vector drawing for a specific purpose** **Reflect on the skills I have used and why I have used them** **Compare vector drawings to freehand paint drawings** **<u>Flat-file databases</u>** **Create a database using cards** **Explain how information can be recorded** **Order, sort, and group my data cards** **Explain what a field and a record is in a database** **Navigate a flat-file database to compare different views of information** **Choose which field to sort data by to answer a given question** **Explain that data can be grouped using chosen values** **Group information using a database** **Combine grouping and sorting to answer specific question** **Choose which field and value are required to answer a given question** **Outline how 'AND' and 'OR' can be used to refine data selection** **Choose multiple criteria to answer a given question**	**Recognize when a function could help to simplify a program.** **Use pre-determined functions to complete commonly repeated tasks.** **(Using functions alongside conditionals)** **<u>Functions</u>** **Describe how functions can make programs easier to write.** **Identify sections of a song to pull into a function.** **Locate repeating phrases inside song lyrics.** **Use functions to simplify complex programs.** **Use pre-determined functions to complete commonly repeated tasks.** **Categorize and generalize code into useful functions.** **Recognize when a function could help to simplify a program.**

	Select an appropriate chart to visually compare data **Refine a chart by selecting a particular filter** **Explain the benefits of using a computer to create charts** **Create charts using data and answer questions about it** **Use a real life flight search database to ask questions and find answers. Ask questions that will need more than one field to answer** **Refine a search in a real-world context** **Present my findings to a group**	
Essential Vocabulary: **password security** **permissions** **shared/private -information** **abuse** **report**	**Essential Vocabulary:** **search engine** **web crawler** **field** **record** **vector** **graphic** **move** **resize** **rotate** **duplicate** **zoom** **alignment** **layer**	**Essential Vocabulary:** **sprites** **functions** **simplify** **categorise**

At the End of Year Six		
Digital Literacy	**Information Technology**	**Computer Science**
Explain what to do if a password is shared, lost or stolen. Describe simple ways to increase privacy on apps and services that provide privacy settings. Explain how to use search technologies effectively. Define the terms 'influence', 'manipulation' and 'persuasion' and explain how someone might encounter these online (e.g. advertising and 'ad targeting' and targeting for fake news). Identify and critically evaluate online content relating to gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online. Explain the importance of asking until I get the help needed.	<u>Communication and Collaboration</u> Recognise that data is transferred using agreed methods Explain that internet devices have addresses Describe how computers use addresses to access websites Identify and explain the main parts of a data packet Explain that data is transferred over networks in packets Explain that all data transferred over the internet is in packets Recognise how to access shared files stored online Send information over the internet in different ways Explain that the internet allows different media to be shared Identify different ways of working together online Recognise that working together on the internet can be public or private Explain how the internet enables effective collaboration within the rules of copyright Explain the different ways in which people communicate Identify that there are a variety of ways to communicate over the internet Choose methods of communication to suit particular purposes	<u>Sprites</u> Describe the importance of the user in the design process. Identify sprites in a running computer program. Create an animation using sprites, and behaviours. Create new sprites and assign them costumes and behaviours. Create an interactive animation using events. Develop programs that respond to timed events. Develop programs that respond to user input. <u>Variables</u> Assign a variable a value Call a variable multiple times in a program. Declare a variable Determine the relationship between how a variable is defined, stored, and retrieved when we press "Run" on a program. Use variables in conjunction with prompts. Use variables to hold words and phrases. Create Sprite Lab programs where sprites are created in groups, and controlled individually using events. Create a clicker game in Sprite Lab where sprites can be removed to score points Create a variable that stores information and changes over time

	Compare different methods of communicating on the internet **Decide when I should and should not share information online** **Explain that communication on the internet may not be private** **<u>Web Page Creation</u>** **Discuss the different types of media used on a website** **Know that websites are written in HTML** **Recognise the common features of a web page** **Find copyright images and understand why they should use these** **Add content to a webpage and evaluate how it looks on different devices** **Create hyperlinks and subpages to other people's work** **Evaluate the user experience of a website** **<u>Spreadsheets</u>** **Ask simple relevant questions that can be answered using data** **Explain the relevance of data headings** **Build a data set in a spreadsheet application** **Explain what an item of data is** **Construct a formula in a spreadsheet** **Explain the relevance of a cell's data type** **Apply a formula to multiple cells by duplicating it**	**<u>Simulating Experiments</u>** **Collect data from a simulation. Create a double line graph. Predict how changing a variable might impact an outcome and test that hypothesis** **Explore how training data is used to enable a machine learning model to classify new data** **Discuss the role artificial intelligence plays in their lives**

	Create a formula which includes a range of cells **Explain why data should be organised** **Use a spreadsheet to answer questions** **Produce a graph to answer questions**	
Essential Vocabulary: **privacy settings** **influence** **manipulation** **persuasion** **ad targeting** **fake news** **representations**	**Essential Vocabulary:** **Internet Protocol (IP) address** **protocols** **Domain Name Server (DNS)** **hyperlink** **web addresses** **data** **communication** **data packer** **header** **spreadsheet** **formula** **cell** **data payload** **collaborative- project** **modifying** **copyright**	**Essential Vocabulary:** **variable** **define** **store** **retrieve** **simulation** **hypothesis** **artificial- intelligence**