

St Dominic's School Needs Led Curriculum Map Computing 2020-21



Curriculum Intent:

The curriculum at St Dominic's aims to enable people with hidden disabilities to be fully included in a society that is increasingly complex and challenging. Our moral responsibility is to ensure that pupils and students *'achieve ambitious goals and live life to the full'* through a purposeful curriculum that is rooted in our collective knowledge and understanding.

Intent: The teaching of Computing at St Dominic's School aims to ensure that children develop an excellent level of digital literacy, problem solving, reasoning and understanding, which enables them to use and apply technology in a range of contexts and stay safe online. Pupils are provided with the best learning opportunities where individuality is celebrated, and a range of qualifications are offered to suit different needs and future prospects.

Implementation: The Computing curriculum makes links to the needs lead curriculum and other subjects, reinforcing and overlearning key skills and functional independence. Digital literacy is promoted throughout the planning and high-quality specialist teaching ensures that lessons are differentiated to suit individual barriers to learning. E-Safety is covered each year with assemblies and visitors to reinforce this critical information to help safeguard our pupils and students. The KS2-4 curriculum is based on guidance and resources from the National Centre for Computing Education, adapted and differentiated for the needs of the pupils at St.Dominic's. We offer a range of KS4 & KS5 qualifications to suit the needs, interests, and abilities of pupils.

Impact: Pupils and students leave St Dominic's with a high level of computational reasoning, digital literacy, and functional independence, ready for their next destinations and later employability. The world is becoming more connected and our learners have the skills to adapt to the development in technology required to function in society independently. The profile of many of the pupils at St Dominic's lends itself to careers and interests in STEM and the Computing curriculum prepares learners and offers the qualifications required for this line of work. Students are able to pursue higher education qualifications, BTEC Level 2&3 in Creative Media and BTEC Level 3 ICT via a collaboration with the OHCAT Digital School, opening doors to further education and careers in this industry.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Core Values	Myself		My Context		The Wider World	
	I am me	I matter	I am unique	I belong	I am safe	I am prepared
Extra-Curricular Events and Assemblies	<ul style="list-style-type: none"> - Year 11 Work Experience - Student Voice Elections - House Captains Elections - Equality Champions Elections - Key Stage transfer events - Debate assemblies - Celebration assemblies 	<ul style="list-style-type: none"> - College open days - Wellbeing week - Anti-bullying week - Debate assemblies - Celebration assemblies 	<ul style="list-style-type: none"> - Year 9 Options choices - Year 11 mock exams - Equality and diversity week - Talent week - Autism awareness - Debate assemblies - Celebration assemblies 	<ul style="list-style-type: none"> - Giving back week - Multicultural week - Careers week - Debate assemblies - Celebration assemblies 	<ul style="list-style-type: none"> - Year 6 SATs - Digital literacy day - Keeping safe week - Bike ability - College taster days - Debate assemblies - Celebration assemblies 	<ul style="list-style-type: none"> - Moving Up Week - Year 10 Mock Examinations - Year 11 and Sixth Form Examinations - Sports Day - College taster days - Debate assemblies - Celebration assemblies
FBV Focus	Individual Liberty Democracy		Mutual Respect Tolerance		The Rule of Law Democracy	
Functional Independence	Self-Care	Functional Motor and Sensory Skills	Independent Living Skills	Independent Living Skills	Personal Safety and Welfare	Organisation and Preparation for Work
Learning to Learn	Self-Managers	Independent Enquirers	Reflective Learners	Team Workers	Effective Participators	Creative Thinkers
Language and Communication	Attention, Listening and Understanding	Vocabulary	Narrative Skills	Social Interaction	Social Interaction	Social Interaction
Myself and Others (SMSC)	Moral Understanding	Emotional Resilience	Spiritual Understanding	Cultural Tolerance	Citizenship	Social Understanding of the Wider World
Reading	Re-telling	Literal Questioning	Prediction	Inference	Inference	Evaluation
Writing Y3-7 GPVS	Combining words, phrases and clauses	Grammatical terms and word classes	Standard English and formality /functions of sentences	Punctuation	Verb forms/tenses and consistency	Vocabulary
Writing Y8-11 GPVS	Sentences and Clauses	Nouns, Verbs and tenses	Adjectives, adverbs and grammar	Possession and Speech	Cohesion, organisation and presentation	Punctuation
Writing Y3-11 Composition	Plan and organise	Narrate and describe	Extend	Summarise	Adapt	Edit and revise

	Autumn 1 Computer Systems and Networks	Autumn 2 Media	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Technology around us	Digital Painting	Digital Writing	Grouping Data	Moving a Robot	Introduction to Animation
Year 1 Computing	<p><u>To identify technology</u></p> <ul style="list-style-type: none"> - I can explain technology as something that helps us - I can locate examples of technology in the classroom - I can explain how these technology examples help us <p><u>To identify a computer and its main parts</u></p> <ul style="list-style-type: none"> - I can name the main parts of a computer - I can switch on and log into a computer - I can use a mouse to click and drag <p><u>To use a mouse in different ways</u></p> <ul style="list-style-type: none"> - I can use a mouse to open a program - I can click and drag to make objects on a screen - I can use a mouse to create a picture <p><u>To use a keyboard to type</u></p> <ul style="list-style-type: none"> - I can tell you that writing on a computer is called typing - I can type my name on a computer - I can use the shift key to type a capital letter - I can save my work to a file <p><u>To use the keyboard to edit text</u></p> <ul style="list-style-type: none"> - I can open my work from a file - I can use the arrow keys to move the cursor - I can delete letters <p><u>To create rules for using technology responsibly</u></p> <ul style="list-style-type: none"> - I can identify rules to keep us safe and healthy when we are using technology in and beyond the home - I can give examples of some of these rules - I can discuss how we benefit from these rules 	<p><u>To describe what different freehand tools do</u></p> <ul style="list-style-type: none"> - I can make marks on a screen and explain which tools I used - I can draw lines on a screen and explain which tools I used - I can use the paint tools to draw a picture <p><u>To use the shape tool and the line tools</u></p> <ul style="list-style-type: none"> - I can make marks with the square and line tools - I can use the shape and line tools effectively - I can use the shape and line tools to recreate the work of an artist addition and subtraction <p><u>To make careful choices when painting a digital picture</u></p> <ul style="list-style-type: none"> - I can choose appropriate shapes - I can make appropriate colour choices - I can create a picture in the style of an artist <p><u>To use a computer on my own to paint a picture</u></p> <ul style="list-style-type: none"> - I know that different paint tools do different jobs - I can choose appropriate paint tools and colours to recreate the work of an artist - I can say which tools were helpful and why <p><u>To use a computer on my own to paint a picture</u></p> <ul style="list-style-type: none"> - I can make dots of colour on the page - I can change the colour and brush sizes - I can use dots of colour to create a picture in the style of an artist on my own <p><u>To compare painting a picture on a computer and on paper</u></p> <ul style="list-style-type: none"> - I can explain that pictures can be made in lots of different ways - I can spot the differences between painting on a computer and on paper - I can say whether I prefer painting using a computer or using paper 	<p><u>To use a computer to write</u></p> <ul style="list-style-type: none"> - I can open a word processor - I can recognise keys on a keyboard - I can identify and find keys on a keyboard <p><u>To add and remove text on a computer</u></p> <ul style="list-style-type: none"> - I can enter text into a computer - I can use letter, number, and space keys - I can use backspace to remove text <p><u>To identify that the look of text can be change on a computer</u></p> <ul style="list-style-type: none"> - I can type capital letters - I can explain what the keys that I have learnt about already do - I can identify the toolbar and use bold, italic, and underline <p><u>To make careful choices when changing text</u></p> <ul style="list-style-type: none"> - I can select a word by double-clicking - I can select all of the text by clicking and dragging - I can change the font <p><u>To explain why I used the tools that I chose</u></p> <ul style="list-style-type: none"> - I can say what tool I used to change the text - I can decide if my changes have improved my writing - I can use 'undo' to remove changes <p><u>To compare writing on a computer with writing on paper</u></p> <ul style="list-style-type: none"> - I can write a message on a computer and on paper - I can compare using a computer with using a pencil and paper - I can say which method I like best 	<p><u>To label objects</u></p> <ul style="list-style-type: none"> - I can describe objects using labels - I can match objects to groups - I can identify the label for a group of objects <p><u>To identify that objects can be counted</u></p> <ul style="list-style-type: none"> - I can count objects - I can group objects - I can count a group of objects <p><u>To describe objects in different ways</u></p> <ul style="list-style-type: none"> - I can describe an object - I can describe a property of an object - I can find objects with similar properties <p><u>To count objects with the same properties</u></p> <ul style="list-style-type: none"> - I can group similar objects - I can group objects in more than one way - I can count how many objects share a property <p><u>To compare groups of objects</u></p> <ul style="list-style-type: none"> - I can choose how to group objects - I can describe groups of objects - I can record how many objects are in a group <p><u>To answer questions about groups of objects</u></p> <ul style="list-style-type: none"> - I can decide how to group objects to answer a question - I can compare groups of objects - I can record and share what I have found 	<p><u>To explain what a given command will do</u></p> <ul style="list-style-type: none"> - I can predict the outcome of a command on a device - I can match a command to an outcome - I can run a command on a device <p><u>To act out a given word</u></p> <ul style="list-style-type: none"> - I can follow an instruction - I can recall words that can be acted out - I can give directions <p><u>To combine forwards and backwards commands to make a sequence</u></p> <ul style="list-style-type: none"> - I can compare forwards and backwards movements - I can start a sequence from the same place - I can predict the outcome of a sequence involving forwards and backwards commands <p><u>To combine four direction commands to make sequences</u></p> <ul style="list-style-type: none"> - I can compare left and right turns - I can experiment with turn and move commands to move a robot - I can predict the outcome of a sequence involving up to four commands <p><u>To plan a simple program</u></p> <ul style="list-style-type: none"> - I can explain what my program should do - I can choose the order of commands in a sequence - I can debug my program <p><u>To find more than one solution to a problem</u></p> <ul style="list-style-type: none"> - I can identify several possible solutions - I can plan two programs - I can use two different programs to get to the same place 	<p><u>To choose a command for a given purpose</u></p> <ul style="list-style-type: none"> - I can find which commands move a sprite - I can use commands to move a sprite - I can compare different programming tools <p><u>To show that a series of commands can be joined together</u></p> <ul style="list-style-type: none"> - I can use more than one block by joining them together - I can use a start block in a program - I can run my program <p><u>To identify the effect of changing a value</u></p> <ul style="list-style-type: none"> - I can find blocks which have numbers - I can change the value - I can say what happens when I change a value <p><u>To explain that each sprite has its own instructions</u></p> <ul style="list-style-type: none"> - I can show that a project can include more than one sprite - I can delete a sprite - I can add blocks to each of my sprites <p><u>To design the parts of a project</u></p> <ul style="list-style-type: none"> - I can choose appropriate artwork for my project - I can decide how each sprite will move - I can create an algorithm for each sprite <p><u>To use my algorithm to create a program</u></p> <ul style="list-style-type: none"> - I can use sprites which match my design - I can add programming blocks based on my algorithm - I can test the programs I have created
Progression	As this is a Year 1 unit, no prior knowledge is assumed. This unit progresses pupils' knowledge and understanding of technology and how they interact with it in school. Learners will build their knowledge of parts of a computer and develop the basic skills needed to effectively use a computer keyboard and mouse.	Learners should be familiar with: - How to switch their device on - Usernames - Passwords For an introduction to keyboard and mouse skills, learners may benefit from completing the Year 1 Computing Systems & Networks unit prior to this unit.	This unit progresses pupils' knowledge and understanding of using computers to create and manipulate digital content, focussing on using a word processor. The learners will develop their ability to find and use the keys on a keyboard in order to create digital content. The learners are then introduced to manipulating the resulting text, making cosmetic changes, and justifying their reason for making these changes.	This unit will introduce pupils to data and information. It will introduce pupils to the concept of labelling and grouping objects based on their properties. Pupils will develop their understanding that objects can be given labels, which is fundamental to their future learning concerning databases and spreadsheets. In addition, pupils will begin to improve their ability to use dragging and dropping skills on a device.	This unit progresses pupils' knowledge and understanding of giving and following instructions. It moves from giving instructions to each other to giving instructions to a robot by programming it.	This unit progresses pupils' knowledge and understanding of programming and follows on from 'Programming A – Moving a robot' where they will have learned to program a floor robot using instructions.

<p>Cross curricular links</p>	<p><u>Health, well-being and lifestyle</u></p> <ul style="list-style-type: none"> - I can identify rules that help keep us safe and healthy in and beyond the home when using technology - I can give some simple examples <p><u>Copyright and ownership</u></p> <ul style="list-style-type: none"> - I know that the work I create belongs to me - I can name my work so that others know it belongs to me 	<p><u>Art and Design</u></p> <ul style="list-style-type: none"> - To develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form, and space - Learn about the work of a range of artists, craft makers, and designers, describing the differences and similarities between different practices and disciplines and making links to their own work 	<p><u>Privacy and security</u></p> <ul style="list-style-type: none"> - I can give reasons why I should only share information with people I choose to and can trust. 	<p><u>Copyright and ownership</u></p> <ul style="list-style-type: none"> - I know that work I create belongs to me - I can name my work so that others know it belongs to me 		
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	Autumn 1 Computer Systems and Networks	Autumn 2 Media	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Information Technology around us	Digital Photography	Making Music	Pictograms	Robot Algorithms	Introduction to quizzes
Year 2 Computing	<p><u>To recognise the uses and features of information technology</u></p> <ul style="list-style-type: none"> - I can identify examples of computers - I can describe some uses of computers - I can identify that a computer is a part of information technology <p><u>To identify information technology in the home</u></p> <ul style="list-style-type: none"> - I can explain the purpose of information technology in the home - I can open a file - I can move and resize images <p><u>To identify information technology beyond school</u></p> <ul style="list-style-type: none"> - I can find examples of information technology - I can talk about uses of information technology - I can compare types of information technology <p><u>To explain how information technology benefits us</u></p> <ul style="list-style-type: none"> - I can demonstrate how information technology is used in a shop - I can recognise that information technology can be connected - I can explain how information technology helps people <p><u>To show how to use information technology safely</u></p> <ul style="list-style-type: none"> - I can list different uses of information technology - I can recognise how to use information technology responsibly - I can say how those rules/guides can help me <p><u>To recognise that choices are made when using information technology</u></p> <ul style="list-style-type: none"> - I can identify the choices that I make when using information technology - I can explain simple guidance for using information technology in different environments and settings - I can enjoy a variety of activities 	<p><u>To know what devices can be used to take photographs</u></p> <ul style="list-style-type: none"> - I can sort devices into old and new - I can talk about how to take a photograph - I can capture digital photos and talk about my experience <p><u>To use a digital device to take a photograph</u></p> <ul style="list-style-type: none"> - I can explain the process of taking a good photograph - I can take photos in both landscape and portrait format - I can explain why a photo looks better in portrait or landscape format <p><u>To describe what makes a good photograph</u></p> <ul style="list-style-type: none"> - I can identify what is wrong with a photograph - I can discuss how to take a good photograph - I can improve a photograph by retaking it <p><u>To decide how photographs can be improved</u></p> <ul style="list-style-type: none"> - I can explore the effect that light has on a photo - I can experiment with different light sources - I can focus on an object <p><u>To use tools to change an image</u></p> <ul style="list-style-type: none"> - I can recognise that images can be changed - I can use a tool to achieve a desired effect - I can explain my choices <p><u>To recognise that images can be changed</u></p> <ul style="list-style-type: none"> - I can apply a range of photography skills to capture a photo - I can recognise which images have been changed - I can identify which images are real and which have been changed 	<p><u>To say how music can make us feel</u></p> <ul style="list-style-type: none"> - I can identify simple differences in pieces of music - I can listen with concentration to a range of music (links to the Music curriculum) - I can describe how music makes me feel, e.g. happy or sad <p><u>To identify that there are patterns in music</u></p> <ul style="list-style-type: none"> - I can create a rhythm pattern - I can play an instrument following a rhythm pattern - I can explain that music is created and played by humans <p><u>To describe how music can be used in different ways</u></p> <ul style="list-style-type: none"> - I can connect images with sounds - I can use a computer to experiment with pitch and duration - I can relate an idea to a piece of music <p><u>To show how music is made from a series of notes</u></p> <ul style="list-style-type: none"> - I can identify that music is a sequence of notes - I can use a computer to create a musical pattern using three notes - I can refine my musical pattern on a computer <p><u>To create music for a purpose</u></p> <ul style="list-style-type: none"> - I can describe an animal using sounds - I can explain my choices - I can save my work <p><u>To review and refine our computer work</u></p> <ul style="list-style-type: none"> - I can reopen my work - I can explain how I made my work better - I can listen to music and describe how it makes me feel 	<p><u>To recognise that we can count and compare objects using tally charts</u></p> <ul style="list-style-type: none"> - I can record data in a tally chart - I can represent a tally count as a total - I can compare totals in a tally chart <p><u>To recognise that objects can be represented as pictures</u></p> <ul style="list-style-type: none"> - I can enter data onto a computer - I can use a computer to view data in a different format - I can use pictograms to answer simple questions about objects <p><u>To create a pictogram</u></p> <ul style="list-style-type: none"> - I can organise data in a tally chart - I can use a tally chart to create a pictogram - I can explain what the pictogram shows <p><u>To select objects by attribute and make comparisons</u></p> <ul style="list-style-type: none"> - I can tally objects using a common attribute - I can create a pictogram to arrange objects by an attribute - I can answer 'more than'/'less than' and 'most/least' questions about an attribute <p><u>To recognise that people can be described by attributes</u></p> <ul style="list-style-type: none"> - I can choose a suitable attribute to compare people - I can collect the data I need - I can create a pictogram and draw conclusions from it <p><u>To explain that we can present information using a computer</u></p> <ul style="list-style-type: none"> - I can use a computer program to present information in different ways - I can share what I have found out using a computer - I can give simple examples of why information should not be shared 	<p><u>To describe a series of instructions as a sequence</u></p> <ul style="list-style-type: none"> - I can follow instructions given by someone else - I can choose a series of words that can be enacted as a sequence - I can give clear and unambiguous instructions <p><u>To explain what happens when we change the order of instructions</u></p> <ul style="list-style-type: none"> - I can create different algorithms for a range of sequences (using the same commands) - I can use an algorithm to program a sequence on a floor robot - I can show the difference in outcomes between two sequences that consist of the same commands <p><u>To use logical reasoning to predict the outcome of a program (series of commands)</u></p> <ul style="list-style-type: none"> - I can follow a sequence - I can predict the outcome of a sequence - I can compare my prediction to the program outcome <p><u>To explain that programming projects can have code and artwork</u></p> <ul style="list-style-type: none"> - I can explain the choices I made for my mat design - I can identify different routes around my mat - I can test my mat to make sure that it is usable <p><u>To design an algorithm</u></p> <ul style="list-style-type: none"> - I can explain what my algorithm should achieve - I can create an algorithm to meet my goal - I can use my algorithm to create a program <p><u>To create and debug a program that I have written</u></p> <ul style="list-style-type: none"> - I can plan algorithms for different parts of a task - I can test and debug each part of the program - I can put together the different parts of my program 	<p><u>To explain that a sequence of commands has a start</u></p> <ul style="list-style-type: none"> - I can identify the start of a sequence - I can identify that a program needs to be started - I can show how to run my program <p><u>To explain that a sequence of commands has an outcome</u></p> <ul style="list-style-type: none"> - I can predict the outcome of a sequence of commands - I can match two sequences with the same outcome - I can change the outcome of a sequence of commands <p><u>To create a program using a given design</u></p> <ul style="list-style-type: none"> - I can tell the actions of a sprite in an algorithm - I can decide which blocks to use to meet the design - I can build the sequences of blocks I need <p><u>To change a given design</u></p> <ul style="list-style-type: none"> - I can choose backgrounds for the design - I can choose characters for the design - I can create a program based on the new design <p><u>To create a program using my own design</u></p> <ul style="list-style-type: none"> - I can choose the images for my own design - I can create an algorithm - I can build sequences of blocks to match my design <p><u>To decide how my project can be improved</u></p> <ul style="list-style-type: none"> - I can compare my project to my design - I can improve my project by adding features - I can debug
Progression	<p>Learners should have an understanding of what technology is and where it is used in a school context. They should also be familiar with the technology available in their own school setting.</p> <p>This unit progresses pupils' knowledge and understanding of technology and how they interact with it beyond school. Learners will also build on their knowledge of using technology safely and responsibly, and begin to consider</p>	<p>Learners should have experience of making choices on a tablet/computer, and they should be able to navigate within an application. Learners should also have some experience of patterns.</p> <p>This unit progresses pupils' knowledge through listening to music and considering how music can affect how we think and feel. Learners will then purposefully create rhythm patterns and music.</p>	<p>This unit progresses pupils' knowledge and understanding of grouping data.</p>	<p>In advance of the lessons in this Year 2 unit, pupils should have had some experience of creating short programs and predicting the outcome of a simple program. This unit progresses students' knowledge and understanding of algorithms and how they are implemented as programs on digital devices. Pupils will spend time looking at how the order of commands affects outcomes. Pupils will use this knowledge and logical reasoning to trace programs and predict outcomes.</p>		

	the implications of the choices that they make.					
Cross curricular links	<p><u>Health, well-being and lifestyle</u></p> <ul style="list-style-type: none"> - I can identify rules that help keep us safe and healthy in and beyond the home when using technology - I can give some simple examples 	<p><u>Art and Design</u></p> <ul style="list-style-type: none"> - To develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form, and space <p><u>Education for a connected world</u></p> <ul style="list-style-type: none"> - To identify that some images are not real (fake) 	<p><u>Music</u></p> <ul style="list-style-type: none"> - Play tuned and un-tuned instruments musically - Listen with concentration and understanding to a range of high-quality live and recorded music - Experiment with, create, select and combine sounds using the inter-related dimensions of music 	<p><u>Maths</u></p> <ul style="list-style-type: none"> - Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: 'equal to', 'more than', 'less than' ('fewer'), 'most', 'least' - interpret and construct simple pictograms, tally charts, block diagrams and simple tables - ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity - ask and answer questions about totalling and comparing categorical data <p><u>Self image and identity</u></p> <ul style="list-style-type: none"> - I can recognise that I can say 'no'/'please stop'/'I'll tell'/'I'll ask' to somebody who asks me to do something that makes me feel sad, embarrassed or upset - I can explain how this could be either in real life or online - If something happens that makes me feel sad, worried, uncomfortable, or frightened I can give examples of when and how to speak to an adult I can trust <p><u>Health, wellbeing and lifestyle</u></p> <ul style="list-style-type: none"> - I can identify rules that help keep us safe and healthy in and beyond the home when using technology - I can give some simple examples <p><u>Privacy and security</u></p> <ul style="list-style-type: none"> - I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location) - I can describe the people I can trust and can share this with; I can explain why I can trust them - I can recognise more detailed examples of information that is personal to me (e.g. where I live, my family's names, where I go to school) 		

	Autumn 1 Computer Systems and Networks	Autumn 2 Media	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Connecting Computers	Animation	Desktop Publishing	Branching Databases	Sequence in Music	Events and Actions
Year 3 Computing	<p><u>To explain how digital devices function</u></p> <ul style="list-style-type: none"> - I can explain that digital devices accept inputs - I can explain that digital devices produce outputs - I can follow a process <p><u>To identify input and output devices</u></p> <ul style="list-style-type: none"> - I can classify input and output devices - I can model a simple process - I can design a digital device <p><u>To recognise how digital devices can change the way we work</u></p> <ul style="list-style-type: none"> - I can explain how I use digital devices for different activities - I can recognise similarities between using digital devices and non-digital tools - I can suggest differences between using digital devices and non-digital tools <p><u>To explain how a computer network can be used to share information</u></p> <ul style="list-style-type: none"> - I can recognise different connections - I can explain how messages are passed through multiple connections - I can discuss why we need a network switch <p><u>To explore how digital devices can be connected</u></p> <ul style="list-style-type: none"> - I can recognise that a computer network is made up of a number of devices - I can demonstrate how information can be passed between devices - I can explain the role of a switch, server, and wireless access point in a network <p><u>To recognise the physical components of a network</u></p> <ul style="list-style-type: none"> - I can identify how devices in a network are connected with one another - I can identify networked devices around me - I can identify the benefits of computer networks 	<p><u>To explain that animation is a sequence of drawings or photographs</u></p> <ul style="list-style-type: none"> - I can draw a sequence of pictures - I can create an effective flip book—style animation - I can explain how an animation/flip book works <p><u>To relate animated movement with a sequence of images</u></p> <ul style="list-style-type: none"> - I can predict what an animation will look like - I can explain why little changes are needed for each frame - I can create an effective stop frame animation <p><u>To plan an animation</u></p> <ul style="list-style-type: none"> - I can break down a story into settings, characters, and events - I can describe an animation that is achievable on screen - I can create a storyboard <p><u>To identify the need to work consistently and carefully</u></p> <ul style="list-style-type: none"> - I can use onion skinning to help me make small changes between frames - I can review a sequence of frames to check my work - I can evaluate the quality of my animation <p><u>To review and improve an animation</u></p> <ul style="list-style-type: none"> - I can explain ways to make my animation better - I can evaluate another learner's animation - I can improve my animation based on feedback <p><u>To evaluate the impact of adding other media to an animation</u></p> <ul style="list-style-type: none"> - I can add other media to my animation - I can explain why I added other media to my animation - I can evaluate my final film 	<p><u>To recognise how text and images convey information</u></p> <ul style="list-style-type: none"> - I can explain the difference between text and images - I can recognise that text and images can communicate messages clearly - I can identify the advantages and disadvantages of using text and images <p><u>To recognise that text and layout can be edited</u></p> <ul style="list-style-type: none"> - I can change font style, size, and colours for a given purpose - I can edit text - I can explain that text can be changed to communicate more clearly <p><u>To choose appropriate page settings</u></p> <ul style="list-style-type: none"> - I can define the term 'page orientation' - I can recognise placeholders and say why they are important - I can create a template for a particular purpose <p><u>To add content to a desktop publishing publication</u></p> <ul style="list-style-type: none"> - I can choose the best locations for my content - I can paste text and images to create a magazine cover - I can make changes to content after I've added it <p><u>To consider how different layouts can suit different purposes</u></p> <ul style="list-style-type: none"> - I can identify different layouts - I can match a layout to a purpose - I can choose a suitable layout for a given purpose <p><u>To consider the benefits of desktop publishing</u></p> <ul style="list-style-type: none"> - I can identify the uses of desktop publishing in the real world - I can say why desktop publishing might be helpful - I can compare work made on desktop publishing to work created by hand 	<p><u>To create questions with yes/no answers</u></p> <ul style="list-style-type: none"> - I can investigate questions with yes/no answers - I can make up a yes/no question about a collection of objects - I can create two groups of objects separated by one attribute <p><u>To identify the object attributes needed to collect relevant data</u></p> <ul style="list-style-type: none"> - I can select an attribute to separate objects into groups - I can create a group of objects within an existing group - I can arrange objects into a tree structure <p><u>To create a branching database</u></p> <ul style="list-style-type: none"> - I can select objects to arrange in a branching database - I can group objects using my own yes/no questions - I can prove my branching database works <p><u>To explain why it is helpful for a database to be well structured</u></p> <ul style="list-style-type: none"> - I can create yes/no questions using given attributes - I can explain that questions need to be ordered carefully to split objects into similarly sized groups - I can compare two branching database structures <p><u>To identify objects using a branching database</u></p> <ul style="list-style-type: none"> - I can select a theme and choose a variety of objects - I can create questions and apply them to a tree structure - I can use my branching database to answer questions <p><u>To compare the information shown in a pictogram with a branching database</u></p> <ul style="list-style-type: none"> - I can explain what a pictogram tells me - I can explain what a branching database tells me - I can compare two ways of presenting information 	<p><u>To explore a new programming environment</u></p> <ul style="list-style-type: none"> - I can identify the objects in a Scratch project (sprites, backdrops) - I can explain that objects in Scratch have attributes (linked to) - I can recognise that commands in Scratch are represented as blocks <p><u>To identify that each sprite is controlled by the commands I choose</u></p> <ul style="list-style-type: none"> - I can choose a word which describes an on-screen action for my design - I can create a program following a design <p><u>To explain that a program has a start</u></p> <ul style="list-style-type: none"> - I can start a program in different ways - I can create a sequence of connected commands - I can explain that the objects in my project will respond exactly to the code <p><u>To recognise that a sequence of commands can have an order</u></p> <ul style="list-style-type: none"> - I can explain what a sequence is - I can combine sound commands - I can order notes into a sequence <p><u>To change the appearance of my project</u></p> <ul style="list-style-type: none"> - I can build a sequence of commands - I can decide the actions for each sprite in a program - I can make design choices for my artwork <p><u>To create a project from a task description</u></p> <ul style="list-style-type: none"> - I can identify and name the objects I will need for a project - I can relate a task description to a design - I can implement my algorithm as code 	<p><u>To explain how a sprite moves in an existing project</u></p> <ul style="list-style-type: none"> - I can explain the relationship between an event and an action - I can choose which keys to use for actions and explain my choices - I can identify a way to improve a program <p><u>To create a program to move a sprite in four directions</u></p> <ul style="list-style-type: none"> - I can choose a character for my project - I can choose a suitable size for a character in a maze - I can program movement <p><u>To adapt a program to a new context</u></p> <ul style="list-style-type: none"> - I can use a programming extension - I can consider the real-world when making design choices - I can choose blocks to set up my program <p><u>To develop my program by adding features</u></p> <ul style="list-style-type: none"> - I can identify additional features (from a given set of blocks) - I can choose suitable keys to turn on additional features - I can build more sequences of commands to make my design work <p><u>To identify and fix bugs in a program</u></p> <ul style="list-style-type: none"> - I can test a program against a given design - I can match a piece of code to an outcome - I can modify a program using a design <p><u>To design and create a maze-based challenge</u></p> <ul style="list-style-type: none"> - I can make design choices and justify them - I can implement my design - I can evaluate my project
Progression	This unit progresses pupils' knowledge and understanding of technology by focussing on digital and non-digital devices, and introducing the concept of computers connected together as a network. Following this unit, learners will explore the internet as a network of networks.	This unit progresses pupils' knowledge and understanding of using digital devices to create media, exploring how they can create stop frame animations. Following this unit, learners will further develop their video editing skills in Year 5.	This unit progresses pupils' knowledge and understanding of using digital devices to combine text and images building on work from the following units; Digital Writing Year 1, Digital painting Year 1, and Digital Photography Year 2.	This unit progresses pupils' knowledge and understanding of presenting information. It builds on their knowledge of data and information from key stage 1. They continue to develop their understanding of attributes and begin to construct and interrogate branching databases as a means of displaying and retrieving information.	This unit assumes that pupils will have some prior experience of programming; the KS1 NCCCE units cover floor robots and Scratch Jr. However, experience of other languages or environments may also be useful.	This unit assumes that pupils will have some prior experience of programming. The KS1 NCCCE units focus on floor robots and Scratch Jr, however experience of other languages or environments may also be useful. The Year 3 Programming A unit introduces the Scratch programming environment and the concept of sequences.
Cross curricular links	<p>Maths</p> <ul style="list-style-type: none"> - Solve number problems and practical problems <p>Art</p>	<p>Literacy</p> <ul style="list-style-type: none"> - Pupils should be taught to: draft and write by: in narratives, creating settings, characters and plot 	<p>English</p> <ul style="list-style-type: none"> - Pupils should be taught to draft and write by: in non-narrative material, using simple organisational devices 	<p>Education for a connected world</p> <ul style="list-style-type: none"> - Use technology safely, respectfully, and responsibly 		

	<ul style="list-style-type: none"> - To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials 	<ul style="list-style-type: none"> - Pupils should be taught to: proof-read for spelling and punctuation errors <p><u>Education for a connected world</u></p> <ul style="list-style-type: none"> - I can use key phrases in search engines. - I can use search technologies effectively. - I can explain why copying someone else's work from the internet without permission can cause problems. - I can give examples of what those problems might be. - When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. - I can give some simple examples. - I can give examples of content that is permitted to be reused. - I can demonstrate the use of search tools to find and access online content which can be reused by others. 	<p>[for example, headings and subheadings]</p> <ul style="list-style-type: none"> - Evaluate and edit by assessing the effectiveness of their own and others' writing and suggesting improvements - Proofread for spelling and punctuation errors <p><u>Education for a connected world</u></p> <ul style="list-style-type: none"> - I can use key phrases in search engines - I can use search technologies effectively - When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it - I can demonstrate the use of search tools to find and access online content which can be reused by others 			
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	Autumn 1 Computer Systems and Networks	Autumn 2 Media	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	The Internet	Audio Editing	Photo Editing	Data Logging	Repetition in Shapes	Repetition in Games
Year 4 Computing	<p><u>To describe how networks physically connect to other networks</u></p> <ul style="list-style-type: none"> - I can describe the internet as a network of networks - I can demonstrate how information is shared across the internet - I can discuss why a network needs protecting <p><u>To recognise how networked devices make up the internet</u></p> <ul style="list-style-type: none"> - I can describe the different networked devices and how they connect - I can explain how the internet allows us to view the World Wide Web - I can recognise that the World Wide Web is the part of the internet that contains websites and web pages <p><u>To outline how websites can be shared via the World Wide Web</u></p> <ul style="list-style-type: none"> - I can explain the types of media that can be shared on the World Wide Web (WWW) - I can describe where websites are stored when uploaded to the WWW - I can describe how to access websites on the WWW <p><u>To describe how content can be added and accessed on the World Wide Web</u></p> <ul style="list-style-type: none"> - I can create media which can be found on websites - I can recognise that I can add content to the WWW - I can explain that new content can be created online <p><u>To recognise how the content of the WWW is created by people</u></p> <ul style="list-style-type: none"> - I can explain that websites and their content are created by people - I can suggest who owns the content on websites - I can explain that there are rules to protect content <p><u>To evaluate the consequences of unreliable content</u></p> <ul style="list-style-type: none"> - I can explain that not everything on the World Wide Web is true. - I can explain why some information I find online may not be honest, accurate, or legal. - I can explain why I need to think carefully before I share or re-share content 	<p><u>To identify that sound can be digitally recorded</u></p> <ul style="list-style-type: none"> - I can identify digital devices that can record sound and play it back - I can identify the inputs and outputs required to play audio or record sound - I can recognise the range of sounds that can be recorded <p><u>To use a digital device to record sound</u></p> <ul style="list-style-type: none"> - I can use a device to record audio and play back sound - I can suggest how to improve my recording - I can discuss what other people include when recording sound for a podcast <p><u>To explain that a digital recording is stored as a file</u></p> <ul style="list-style-type: none"> - I can plan and write the content for a podcast - I can discuss why it is useful to be able to save digital recordings - I can save a digital recording as a file <p><u>To explain that audio can be changed through editing</u></p> <ul style="list-style-type: none"> - I can open a digital recording from a file - I can discuss ways in which audio recordings can be altered - I can edit sections of an audio recording <p><u>To show that different types of audio can be combined and played together</u></p> <ul style="list-style-type: none"> - I can discuss sounds that other people combine - I can choose suitable sounds to include in a podcast - I can use editing tools to arrange sections of audio <p><u>To evaluate editing choices made</u></p> <ul style="list-style-type: none"> - I can explain that digital recordings need to be exported to share them - I can discuss the features of a digital recording I like - I can suggest improvements to a digital recording 	<p><u>To explain that digital images can be changed</u></p> <ul style="list-style-type: none"> - I can identify changes that we can make to an image - I can explore how images can be changed in real life - I can explain the effect that editing can have on an image <p><u>To change the composition of an image</u></p> <ul style="list-style-type: none"> - I can explain what has changed in an edited image - I can change the composition of an image by selecting parts of it - I can consider why someone might want to change the composition of an image <p><u>To describe how images can be changed for different uses</u></p> <ul style="list-style-type: none"> - I can talk about changes made to images - I can choose effects to make my image fit a scenario - I can explain why my choices fit a scenario <p><u>To make good choices when selecting different tools</u></p> <ul style="list-style-type: none"> - I can identify how an image has been retouched - I can give examples of positive and negative effects that retouching can have on an image - I can choose appropriate tools to retouch an image <p><u>To recognise that not all images are real</u></p> <ul style="list-style-type: none"> - I can sort images into 'fake' or 'real' and explain my choices - I can combine parts of images to create new images - I can talk about fake images around me <p><u>To evaluate how changes can improve an image</u></p> <ul style="list-style-type: none"> - I can consider the effect of adding other elements to my work - I can compare the original image with my completed publication - I can evaluate the impact of my publication on others through feedback 	<p><u>To explain that data gathered over time can be used to answer questions</u></p> <ul style="list-style-type: none"> - I can choose a data set to answer a given question - I can suggest questions that can be answered using a given data set - I can identify data that can be gathered over time <p><u>To use a digital device to collect data automatically</u></p> <ul style="list-style-type: none"> - I can explain that sensors are input devices - I can use data from a sensor to answer a given question - I can identify that data from sensors can be recorded <p><u>To explain that a data logger collects 'data points' from sensors over time</u></p> <ul style="list-style-type: none"> - I can identify a suitable place to collect data - I can identify the intervals used to collect data - I can talk about the data that I have captured <p><u>To use data collected over a long duration to find information</u></p> <ul style="list-style-type: none"> - I can import a data set - I can use a computer to view data in different ways - I can use a computer program to sort data <p><u>To identify the data needed to answer questions</u></p> <ul style="list-style-type: none"> - I can propose a question that can be answered using logged data - I can plan how to collect data using a data logger - I can use a data logger to collect data <p><u>To use collected data to answer questions</u></p> <ul style="list-style-type: none"> - I can interpret data that has been collected using a data logger - I can draw conclusions from the data that I have collected - I can explain the benefits of using a data logger 	<p><u>To identify that accuracy in programming is important</u></p> <ul style="list-style-type: none"> - I can program a computer by typing commands - I can explain the effect of changing a value of a command - I can create a code snippet for a given purpose <p><u>To create a program in a text-based language</u></p> <ul style="list-style-type: none"> - I can use a template to create a design for my program - I can write an algorithm to produce a given outcome - I can test my algorithm in a text-based language <p><u>To explain what 'repeat' means</u></p> <ul style="list-style-type: none"> - I can identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves - I can identify patterns in a sequence, eg 'step 3 times' means the same as 'step, step, step' - I can use a count-controlled loop to produce a given outcome <p><u>To modify a count-controlled loop to produce a given outcome</u></p> <ul style="list-style-type: none"> - I can identify the effect of changing the number of times a task is repeated - I can predict the outcome of a program containing a count-controlled loop - I can choose which values to change in a loop <p><u>To decompose a program into parts</u></p> <ul style="list-style-type: none"> - I can identify 'chunks' of actions in the real world - I can use a procedure in a program - I can explain that a computer can repeatedly call a procedure <p><u>To create a program that uses count-controlled loops to produce a given outcome</u></p> <ul style="list-style-type: none"> - I can design a program that includes count-controlled loops - I can make use of my design to write a program - I can develop my program by debugging it 	<p><u>To develop the use of count-controlled loops in a different programming environment</u></p> <ul style="list-style-type: none"> - I can list an everyday task as a set of instructions including repetition - I can predict the outcome of a snippet of code - I can modify a snippet of code to create a given outcome <p><u>To explain that in programming there are infinite loops and count controlled loops</u></p> <ul style="list-style-type: none"> - I can modify loops to produce a given outcome - I can choose when to use a count-controlled and an infinite loop - I can recognise that some programming languages enable more than one process to be run at once <p><u>To develop a design which includes two or more loops which run at the same time</u></p> <ul style="list-style-type: none"> - I can choose which action will be repeated for each object - I can explain what the outcome of the repeated action should be - I can evaluate the effectiveness of the repeated sequences used in my program <p><u>To modify an infinite loop in a given program</u></p> <ul style="list-style-type: none"> - I can identify which parts of a loop can be changed - I can explain the effect of my changes - I can re-use existing code snippets on new sprites <p><u>To design a project that includes repetition</u></p> <ul style="list-style-type: none"> - I can evaluate the use of repetition in a project - I can select key parts of a given project to use in my own design - I can develop my own design explaining what my project will do <p><u>To create a project that includes repetition</u></p> <ul style="list-style-type: none"> - I can refine the algorithm in my design - I can build a program that follows my design - I can evaluate the steps I followed when building my project
Progression	This unit progresses pupils' knowledge and understanding of networks in Year 3. In Year 5, they will continue to develop their knowledge and understanding of computing systems and online collaborative working.	This unit progresses pupils' knowledge and understanding of creating media, by focusing on the recording and editing of sound to produce a podcast. Following this unit, learners will explore combining audio with video in the 'Video editing' unit in Year 5.	Pupils should have experience of making choices on a tablet/computer. They should be able to navigate within an application. This unit progresses students' skills through editing digital images and	This unit progresses pupils' knowledge and understanding of data and how it can be collected over time to answer questions. The unit also introduces the idea of automatic data collection.	This unit progresses pupils' knowledge and understanding of programming. It progresses from the sequence of commands in a program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code.	This unit assumes that pupils will have some prior experience of programming; the KS1 units cover floor robots and ScratchJr, and Scratch is introduced in the Year 3 programming units. However, experience of other languages or environments may also be useful

			considering the impact that editing can have on an image. Learners will also consider how editing can be used appropriately for different scenarios, and create and evaluate 'fake' images, combining all of their new skills.		
Cross curricular links	<p><u>PSHCE</u></p> <ul style="list-style-type: none"> - Evaluating content for honesty and accuracy <p><u>Art</u></p> <ul style="list-style-type: none"> - To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials 	<p><u>Science</u></p> <ul style="list-style-type: none"> - Sound: Find patterns between the volume of a sound and the strength of the vibrations that produced it - Sound: Recognise that sounds get fainter as the distance from the sound source increases <p><u>English</u></p> <ul style="list-style-type: none"> - Writing – composition: Plan their writing by discussing and recording ideas - Writing – draft and write by: In non-narrative material, using simple organisational devices [for example, headings and subheadings] - Writing: Read aloud their own writing, to a group or the whole class, using appropriate intonation and controlling the tone and volume so that the meaning is clear <p><u>Music</u></p> <ul style="list-style-type: none"> - Improvise and compose music for a range of purposes using the interrelated dimensions of music <p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can explain why copying someone else's work from the internet without permission can cause problems (Y3) - I can give examples of what those problems might be (Y3) - When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it (Y4) 	<p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can describe ways in which people might make themselves look different online - When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it 	<p><u>Science</u></p> <ul style="list-style-type: none"> - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. 	

	Autumn 1 Computer Systems and Networks	Autumn 2 Media	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Sharing Information	Vector Drawing	Video Editing	Flat-file Databases	Selection in Physical Computing	Selection in Quizzes
Year 5 Computing	<p><u>To explain that computers can be connected together to form systems</u></p> <ul style="list-style-type: none"> - I can explain that systems are built using a number of parts - I can describe that a computer system features inputs, processes, and outputs - I can explain that computer systems communicate with other devices <p><u>To recognise the role of computer systems in our lives</u></p> <ul style="list-style-type: none"> - I can identify tasks that are managed by computer systems - I can identify the human elements of a computer system - I can explain the benefits of a given computer system <p><u>To recognise how information is transferred over the internet</u></p> <ul style="list-style-type: none"> - I can recognise that data is transferred using agreed methods - I can explain that networked digital devices have unique addresses - I can explain that data is transferred over networks in packets <p><u>To explain how sharing information online lets people in different places work together</u></p> <ul style="list-style-type: none"> - I can recognise that connected digital devices can allow us to access shared files stored online - I can send information over the internet in different ways - I can explain that the internet allows different media to be shared <p><u>To contribute to a shared project online</u></p> <ul style="list-style-type: none"> - I can suggest strategies to ensure successful group work - I can make thoughtful suggestions on my group's work - I can compare working online with working offline <p><u>To evaluate different ways of working together online</u></p> <ul style="list-style-type: none"> - I can identify different ways of working together online - I can recognise that working together on the internet can be public or private - I can explain how the internet enables effective collaboration 	<p><u>To identify that drawing tools can be used to produce different outcomes</u></p> <ul style="list-style-type: none"> - I can recognise that vector drawings are made using shapes - I can identify the main drawing tools - I can discuss how a vector drawing is different from paper-based drawings <p><u>To create a vector drawing by combining shapes</u></p> <ul style="list-style-type: none"> - I can identify the shapes used to make a vector drawing - I can explain that each element added to a vector drawing is an object - I can move, resize, and rotate objects I have duplicated <p><u>To use tools to achieve a desired effect</u></p> <ul style="list-style-type: none"> - I can use the zoom tool to help me add detail to my drawings - I can explain how alignment grids and resize handles can be used to improve consistency - I can modify objects to create different effects <p><u>To recognise that vector drawings consist of layers</u></p> <ul style="list-style-type: none"> - I can identify that each added object creates a new layer in the drawing - I can identify which objects are in the front layer or in the back layer of a drawing - I can change the order of layers in a vector drawing <p><u>To group objects to make them easier to work with</u></p> <ul style="list-style-type: none"> - I can copy part of a drawing by duplicating several objects - I can group to create a single object - I can reuse a group of objects to further develop my vector drawing <p><u>To evaluate my vector drawing</u></p> <ul style="list-style-type: none"> - I create alternatives to vector drawings - I can suggest improvements to a vector drawing - I can apply what I have learned about vector drawings 	<p><u>To recognise video as moving pictures, which can include audio</u></p> <ul style="list-style-type: none"> - I can explain that a video can include both visual and audio media - I can explain the benefits of adding audio to a video - I can plan a video project using a storyboard <p><u>To identify digital devices that can record video</u></p> <ul style="list-style-type: none"> - I can identify and name digital devices that can record video and sound - I can choose the most suitable digital device for recording my project - I can locate and identify the working features of a digital device that can record video <p><u>To capture video using a digital device</u></p> <ul style="list-style-type: none"> - I can select a suitable device and software to capture my video - I can demonstrate suitable methods of using a digital device to capture my video - I can demonstrate the safe use and handling of devices <p><u>To recognise the features of an effective video</u></p> <ul style="list-style-type: none"> - I can list some of the features of an effective video - I can record a video that demonstrates some of the features of an effective video - I can explain why lighting and angle are important in creating an effective video <p><u>To identify that video can be improved through reshooting and editing</u></p> <ul style="list-style-type: none"> - I can store, retrieve, and export my recording to a computer - I can explain how to improve a video by reshooting and editing - I can select the correct tools to make edits to my video <p><u>To consider the impact of the choices made when making and sharing a video</u></p> <ul style="list-style-type: none"> - I can make edits to my video and improve the final outcome - I can recognise that my choices when making a video will impact on the quality of the final outcome - I can evaluate my video and share my opinions 	<p><u>To use a form to record information</u></p> <ul style="list-style-type: none"> - I can create multiple questions about the same field - I can explain how information can be recorded - I can order, sort, and group my data cards <p><u>To compare paper and computer-based databases</u></p> <ul style="list-style-type: none"> - I can navigate a flat-file database to compare different views of information - I can explain what a 'field' and a 'record' is in a database - I can choose which field to sort data by to answer a given question <p><u>To apply my knowledge of a database to ask and answer real-world questions</u></p> <ul style="list-style-type: none"> - I can explain how information can be grouped - I can group information to answer questions - I can combine grouping and sorting to answer more specific questions <p><u>To explain that tools can be used to select data to answer questions</u></p> <ul style="list-style-type: none"> - I can choose which field and value are required to answer a given question - I can outline how 'AND' and 'OR' can be used to refine data selection - I can choose multiple criteria to answer a given question <p><u>To apply my knowledge of a database to ask and answer real-world questions</u></p> <ul style="list-style-type: none"> - I can select an appropriate chart to visually compare data - I can refine a chart by selecting a particular filter - I can explain the benefits of using a computer to create graphs <p><u>To apply my knowledge of a database to ask and answer real-world questions</u></p> <ul style="list-style-type: none"> - I can ask questions that will need more than one field to answer - I can refine a search in a real-world context - I can present my findings to a group 	<p><u>To control a simple circuit connected to a computer</u></p> <ul style="list-style-type: none"> - I can build a simple circuit to connect a microcontroller to a computer - I can program a microcontroller to light an LED - I can explain why I used an infinite loop <p><u>To write a program that includes count-controlled loops</u></p> <ul style="list-style-type: none"> - I can connect more than one output device to a microcontroller - I can design sequences for given output devices - I can decide which output devices I control with a count controlled loop <p><u>To explain that a loop can stop when a condition is met, e.g. number of times</u></p> <ul style="list-style-type: none"> - I can explain that a condition is something that can either be true or false (e.g. whether a value is more than 10, or whether a button has been pressed) - I can experiment with a do until loop - I can program a microcontroller to respond to an input <p><u>To conclude that a loop can be used to repeatedly check whether a condition has been met</u></p> <ul style="list-style-type: none"> - I can explain a condition being met can start an action - I can identify a condition and an action in my project - I can use selection (an if... then... statement) to direct the flow of a program <p><u>To design a physical project which includes selection</u></p> <ul style="list-style-type: none"> - I can identify a condition to start an action (real world) - I can describe what my project will do (the task) - I can create a detailed drawing of my project <p><u>To create a controllable system which includes selection</u></p> <ul style="list-style-type: none"> - I can write an algorithm to control lights and a motor - I can use selection to produce an intended outcome - I can test and debug my project 	<p><u>To explain how selection is used in computer programs</u></p> <ul style="list-style-type: none"> - I can recall how conditions are used in selection - I can identify conditions in a program - I can modify a condition in a program <p><u>To relate that a conditional statement connects a condition to an outcome</u></p> <ul style="list-style-type: none"> - I can use selection in an infinite loop to check a condition - I can identify the condition and outcomes in an if...then... else statement - I can create a program with different outcomes using selection <p><u>To explain how selection directs the flow of a program</u></p> <ul style="list-style-type: none"> - I can explain that program flow can branch according to a condition - I can design the flow of a program which contains if... then... else... - I can show that a condition can direct program flow in one of two ways <p><u>To design a program which uses selection</u></p> <ul style="list-style-type: none"> - I can outline a given task - I can use a design format to outline my project - I can identify the outcome of user input in an algorithm <p><u>To create a program which uses selection</u></p> <ul style="list-style-type: none"> - I can implement my algorithm to create the first section of my program - I can test my program - I can share my program with others <p><u>To evaluate my program</u></p> <ul style="list-style-type: none"> - I can identify ways the program could be improved - I can identify what setup code my project needs - I can extend my program further
Progression	This unit progresses pupils' knowledge and understanding of computing systems and online collaborative working.	This unit progresses pupils' knowledge and understanding of digital painting and has some links to desktop publishing in which learners used digital images. They are now creating the images that they could use in desktop publishing documents.	This unit progresses pupils' knowledge and understanding of creating media by guiding them systematically through the process involved in creating a video. By the end of the unit, pupils will have developed the skills required to plan, record, edit, and finalise a video.	This unit progresses pupils' knowledge and understanding of why and how information might be stored in a database, and looks at how tools within a database can help us to answer questions about our data. It moves on to demonstrate how a database can help us display data visually, and how real-life	This unit assumes that pupils will have prior experience of programming using block-based construction (e.g. scratch) and understand the concepts of sequence and repetition. The KS1 units focus on floor robots and Scratch Jr, however experience	This unit assumes that pupils will have prior experience of programming using block-based construction (e.g. Scratch) and understand the concepts of sequence, repetition and have some experience of using selection. Ideally, pupils will have completed programming

				databases can be used to help us solve problems. Finally, the pupils create a presentation showing understanding and application of all the tools used within the unit.	of other languages or environments may also be useful.	unit A (selection in physical computing) before undertaking this unit as this will provide them with the required knowledge of selection.
Cross curricular links	<u>Education for a Connected World</u> - I can assess and justify when it is acceptable to use the work of others - I can give examples of content that is permitted to be reused	<u>Education for a Connected World</u> - I can explain why copying someone else's work from the internet without permission can cause problems.	<u>Internet safety</u> - Recognise inappropriate content, contact, and conduct and know how to report concerns - Use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour - Identify a range of ways to report concerns about content and contact <u>Online relationships</u> - I can recognise some ways in which the internet can be used to communicate - I can give examples of how to be respectful to others online		<u>Science</u> - To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	

	Autumn 1 Computer Systems and Networks	Autumn 2 Media	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Communication	3D Modelling	Web Page Creation	Spreadsheets	Variables in Games	Sensing
Year 6 Computing	<p><u>To identify how to use a search engine</u></p> <ul style="list-style-type: none"> - I can complete a web search to find specific information - I can refine my search - I can compare results from different search engines <p><u>To describe how search engines select results</u></p> <ul style="list-style-type: none"> - I can explain why we need tools to find things online - I can recognise the role of web crawlers in creating an index - I can relate a search term to the search engine's index <p><u>To explain how search results are ranked</u></p> <ul style="list-style-type: none"> - I can explain that search results are ordered - I can explain that a search engine follows rules to rank relevant pages - I can suggest some of the criteria that a search engine checks to decide on the order of results <p><u>To recognise why the order of results is important, and to whom</u></p> <ul style="list-style-type: none"> - I can describe some of the ways that search results can be influenced - I can recognise some of the limitations of search engines - I can explain how search engines make money <p><u>To recognise how we communicate using technology</u></p> <ul style="list-style-type: none"> - I can explain the different ways in which people communicate - I can identify that there are a variety of ways of communicating over the internet - I can choose methods of communication to suit particular purposes <p><u>To evaluate different methods of online communication</u></p> <ul style="list-style-type: none"> - I can compare different methods of communicating on the internet - I can decide when I should and should not share - I can explain that communication on the internet may not be private 	<p><u>To use a computer to create and manipulate three-dimensional (3D) digital objects</u></p> <ul style="list-style-type: none"> - I can discuss the similarities and differences between 2D and 3D shapes - I can explain why we might represent 3D objects on a computer - I can select, move, and delete a digital 3D shape <p><u>To compare working digitally with 2D and 3D graphics</u></p> <ul style="list-style-type: none"> - I can identify how graphical objects can be modified - I can resize a 3D object - I can change the colour of a 3D object <p><u>To construct a digital 3D model of a physical object</u></p> <ul style="list-style-type: none"> - I can rotate a 3D object - I can position 3D objects in relation to each other - I can select and duplicate multiple 3D objects <p><u>To identify that physical objects can be broken down into a collection of 3D shapes</u></p> <ul style="list-style-type: none"> - I can identify the 3D shapes needed to create a model of a real-world object - I can create digital 3D objects of an appropriate size - I can group a digital 3D shape and a placeholder to create a hole in an object <p><u>To design a digital model by combining 3D objects</u></p> <ul style="list-style-type: none"> - I can plan my 3D model - I can choose which 3D objects I need to construct my model - I can modify multiple 3D objects <p><u>To develop and improve a digital 3D model</u></p> <ul style="list-style-type: none"> - I can decide how my model can be improved - I can modify my model to improve it - I can evaluate my model against a given criterion 	<p><u>To review an existing website and consider its structure</u></p> <ul style="list-style-type: none"> - I can explore a website - I can discuss the different types of media used on websites - I know that websites are written in HTML <p><u>To plan the features of a web page</u></p> <ul style="list-style-type: none"> - I can recognise the common features of a web page - I can suggest media to include on my page - I can draw a web page layout that suits my purpose <p><u>To consider the ownership and use of images (copyright)</u></p> <ul style="list-style-type: none"> - I can say why I should use copyright-free images - I can find copyright-free images - I can describe what is meant by the term 'fair use' <p><u>To recognise the need to preview pages</u></p> <ul style="list-style-type: none"> - I can add content to my own web page - I can preview what my web page looks like - I can evaluate what my web page looks like on different devices and suggest/make edits. <p><u>To outline the need for a navigation path</u></p> <ul style="list-style-type: none"> - I can explain what a navigation path is - I can describe why navigation paths are useful - I can make multiple web pages and link them using hyperlinks <p><u>To recognise the implications of linking to content owned by other people</u></p> <ul style="list-style-type: none"> - I can explain the implication of linking to content owned by others - I can create hyperlinks to link to other people's work - I can evaluate the user experience of a website 	<p><u>To identify questions which can be answered using data</u></p> <ul style="list-style-type: none"> - I can explain the relevance of data headings - I can answer questions from an existing data set - I can ask simple relevant questions which can be answered using data <p><u>To explain that objects can be described using data</u></p> <ul style="list-style-type: none"> - I can explain what an item of data is - I can apply an appropriate number format to a cell - I can build a data set in a spreadsheet application <p><u>To explain that formula can be used to produce calculated data</u></p> <ul style="list-style-type: none"> - I can explain the relevance of a cell's data type - I can construct a formula in a spreadsheet - I can identify that changing inputs changes outputs <p><u>To apply formulas to data, including duplicating</u></p> <ul style="list-style-type: none"> - I can recognise that data can be calculated using different operations - I can create a formula which includes a range of cells - I can apply a formula to multiple cells by duplicating it <p><u>To create a spreadsheet to plan an event</u></p> <ul style="list-style-type: none"> - I can use a spreadsheet to answer questions - I can explain why data should be organised - I can apply a formula to calculate the data I need to answer questions <p><u>To choose suitable ways to present data</u></p> <ul style="list-style-type: none"> - I can produce a graph - I can use a graph to show the answer to questions - I can suggest when to use a table or graph 	<p><u>To define a 'variable' as something that is changeable</u></p> <ul style="list-style-type: none"> - I can identify examples of information that is variable - I can explain that the way that a variable changes can be defined - I can identify that variables can hold numbers or letters <p><u>To explain why a variable is used in a program</u></p> <ul style="list-style-type: none"> - I can identify a program variable as a placeholder in memory for a single value - I can explain that a variable has a name and a value - I can recognise that the value of a variable can be changed <p><u>To choose how to improve a game by using variables</u></p> <ul style="list-style-type: none"> - I can decide where in a program to change a variable - I can make use of an event in a program to set a variable - I can recognise that the value of a variable can be used by a program <p><u>To design a project that builds on a given example</u></p> <ul style="list-style-type: none"> - I can choose the artwork for my project - I can explain my design choices - I can create algorithms for my project <p><u>To use my design to create a project</u></p> <ul style="list-style-type: none"> - I can create the artwork for my project - I can choose a name that identifies the role of a variable - I can test the code that I have written <p><u>To evaluate my project</u></p> <ul style="list-style-type: none"> - I can identify ways that my game could be improved - I can extend my game further using more variables - I can share my game with others 	<p><u>To create a program to run on a controllable device</u></p> <ul style="list-style-type: none"> - I can apply my knowledge of programming to a new environment - I can test my program on an emulator - I can transfer my program to a controllable device <p><u>To explain that selection can control the flow of a program</u></p> <ul style="list-style-type: none"> - I can identify examples of conditions in the real world - I can use a variable in an if... then... else... statement to select the flow of a program - I can determine the flow of a program using selection <p><u>To update a variable with a user input</u></p> <ul style="list-style-type: none"> - I can use a condition to change a variable - I can experiment with different physical inputs - I can explain that if you read a variable, the value remains <p><u>To use a conditional statement to compare a variable to a value</u></p> <ul style="list-style-type: none"> - I can explain the importance of the order of conditions in else if statements - I can use an operand (e.g. <=>) in an if... then... statement - I can modify a program to achieve a different outcome <p><u>To design a project that uses inputs and outputs on a controllable device</u></p> <ul style="list-style-type: none"> - I can decide what variables to include in a project - I can design the algorithm for my project - I can design the program flow for my project <p><u>To develop a program to use inputs and outputs on a controllable device</u></p> <ul style="list-style-type: none"> - I can create a program based on my design - I can test my program against my design - I can use a range of approaches to find and fix bugs
Progression	This unit progresses pupils' knowledge and understanding of computing systems and online collaborative working.	This unit progresses pupils' knowledge and understanding of creating 3D graphics using a computer. Prior to undertaking this unit, learners should have worked with 2D graphics applications.	This unit progresses pupils' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing.	This unit progresses pupils' knowledge and understanding of data and teaches them how to organise and modify data within spreadsheets.	This unit assumes that pupils will have some prior experience of programming in Scratch. Specifically, they should be familiar with the programming constructs of sequence, repetition, and selection. These constructs are covered in the Year 3, 4, and 5 National Centre for Computing Education programming units respectively. Each year group includes at least one unit that focuses on Scratch.	This unit presumes that pupils are already confident in their understanding of sequence, repetition and selection independently within programming. If pupils are not yet ready for this, you may wish to revisit earlier programming units where these constructs are introduced.

Cross curricular links	<p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can describe and assess the benefits and the potential risks of sharing information online. - I can use various additional tools to refine my searches (e.g. search filters: size, type, usage rights etc.). - I can explain how to use search effectively and use examples from my own practice to illustrate this. - I can explain how search engine rankings are returned and can explain how they can be influenced (e.g. commerce, sponsored results). 	<p><u>Art and Design</u></p> <ul style="list-style-type: none"> - To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials <p><u>Design and Technology</u></p> <ul style="list-style-type: none"> - Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design <p><u>Mathematics</u></p> <ul style="list-style-type: none"> - Recognise, describe and build simple 3D shapes, including making nets 	<p><u>English links</u></p> <ul style="list-style-type: none"> - Writing composition: Identifying the audience for and purpose of the writing, selecting the appropriate form, and using other similar writing as models for their own. <p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can use the internet with adult support to communicate with people I know. - I can navigate online content, websites, or social media feeds using more sophisticated tools to get to the information I want (e.g. menus, sitemaps, breadcrumb-trails, site search functions). - I can explain why copying someone else's work from the internet without permission can cause problems. - I can give examples of what those problems might be. - When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. - I can demonstrate how to make references to and acknowledge sources I have used from the internet. - I can explain the principles of fair use and apply this to case studies. 	<p><u>Mathematics</u></p> <ul style="list-style-type: none"> - Solve problems involving addition, subtraction, multiplication and division - Interpret and construct pie charts and line graphs and use these to solve problems - Calculate and interpret the mean as an average. <p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can describe how I can search for information within a wide group of technologies (e.g. social media, image sites, video sites). - I can use different search technologies. - I can evaluate digital content and can explain how I make choices from search results. 		

	Autumn 1 Computer Systems and Networks	Autumn 2 Computer Systems and Networks	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Impact of technology - Collaborating online respectfully	Networks from semaphores to the internet	Using media – Gaining support for a cause	Modelling data - Spreadsheets	Programming essentials in Scratch 1	Programming essentials in Scratch 2
Year 7 Computing	<p><u>To understand the rules of the computing lab and set a secure password</u></p> <ul style="list-style-type: none"> - Create a memorable and secure password for an account on the school network - Remember the rules of the computing lab <p><u>To know how to access personal documents and how to send an email</u></p> <ul style="list-style-type: none"> - Find personal documents and common applications - Recognise a respectful email - Construct an effective email and send it to the correct recipients <p><u>To understand ways of communicating with others online</u></p> <ul style="list-style-type: none"> - Describe how to communicate with peers online <p><u>To explore the term 'cyberbullying'</u></p> <ul style="list-style-type: none"> - Plan effective presentations for a given audience - Describe cyberbullying - Explain the effects of cyberbullying <p><u>To plan an effective presentation for an audience</u></p> <ul style="list-style-type: none"> - Plan effective presentations for a given audience - Describe cyberbullying - Explain the effects of cyberbullying <p><u>To discuss the concept of people impersonating others online</u></p> <ul style="list-style-type: none"> - Check who you are talking to online 	<p><u>To know what a computer network is</u></p> <ul style="list-style-type: none"> - Define what a computer network is and explain how data is transmitted between computers across networks - Define 'protocol' and provide examples of non-networking protocols <p><u>To understand the role of key hardware components</u></p> <ul style="list-style-type: none"> - List examples of the hardware necessary for connecting devices to networks <p><u>To compare wired and wireless technologies</u></p> <ul style="list-style-type: none"> - Compare wired to wireless connections and list examples of specific technologies currently used to implement such connections - Define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important <p><u>To understand packet structure and packet switching</u></p> <ul style="list-style-type: none"> - Define what the internet is - Explain how data travels between computers across the internet - Describe key words such as 'protocols', 'packets', and 'addressing' <p><u>To know the difference between the internet and the World Wide Web</u></p> <ul style="list-style-type: none"> - Explain the difference between the internet, its services, and the World Wide Web - Describe how services are provided over the internet - List some of these services and the context in which they are used - Explain the term 'connectivity' as the capacity for connected devices ('Internet of Things') to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation) - Describe how internet-connected devices can affect me <p><u>To discuss the relationship between IP address and domain name</u></p> <ul style="list-style-type: none"> - Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together 	<p><u>To select appropriate software for different tasks</u></p> <ul style="list-style-type: none"> - Select the most appropriate software to use to complete a task - Identify the key features of a word processor - Apply the key features of a word processor to format a document - Evaluate formatting techniques to understand why we format documents <p><u>To apply different formatting techniques and discuss copyright law</u></p> <ul style="list-style-type: none"> - Select appropriate images for a given context - Apply appropriate formatting techniques - Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences - Demonstrate the ability to credit the original source of an image <p><u>To understand that not all information on the internet is reliable</u></p> <ul style="list-style-type: none"> - Critique digital content for credibility - Apply techniques in order to identify whether or not a source is credible - Apply referencing techniques and understand the concept of plagiarism - Evaluate online sources for use in own work <p><u>To discuss the concept of plagiarism</u></p> <ul style="list-style-type: none"> - Construct a blog using appropriate software - Organise the content of the blog based on credible sources - Apply referencing techniques that credit authors appropriately - Design the layout of the content to make it suitable for the audience <p><u>To use a research document to create a blog</u></p> <ul style="list-style-type: none"> - Construct a blog using appropriate software - Organise the content of blog based on credible sources - Apply referencing techniques that credit authors appropriately - Design the layout of the content to make it suitable for the audience 	<p><u>To understand why spreadsheets are useful</u></p> <ul style="list-style-type: none"> - Identify columns, rows, cells, and cell references in spreadsheet software - Use formatting techniques in a spreadsheet <p><u>To know how to use the autofill tool to duplicate cells in a linear pattern</u></p> <ul style="list-style-type: none"> - Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /) - Use the autofill tool to replicate cell data <p><u>To discover the difference between data and information, and between primary and secondary data sources</u></p> <ul style="list-style-type: none"> - Explain the difference between data and information - Explain the difference between primary and secondary sources of data - Collect data <p><u>To know how to use functions to analyse data</u></p> <ul style="list-style-type: none"> - Analyse data - Create appropriate charts in a spreadsheet - Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet <p><u>To use COUNTIF, AVERAGE and IF functions</u></p> <ul style="list-style-type: none"> - Analyse data - Use a spreadsheet to sort and filter data - Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet <p><u>To use conditional formatting</u></p> <ul style="list-style-type: none"> - Use conditional formatting in a spreadsheet - Apply all of the spreadsheet skills covered in this unit 	<p><u>To understand the nature of instructions that computers need to execute</u></p> <ul style="list-style-type: none"> - Compare how humans and computers understand instructions (understand and carry out) - Recognise that computers follow the control flow of input/process/output - Define a sequence as instructions performed in order, with each executed in turn - Predict the outcome of a simple sequence - Modify a sequence <p><u>To predict, run, investigate and modify a Scratch program</u></p> <ul style="list-style-type: none"> - Define a variable as a name that refers to data being stored by the computer - Recognise that computers follow the control flow of input/process/output - Predict the outcome of a simple sequence that includes variables - Trace the values of variables within a sequence - Make a sequence that includes a variable <p><u>To know how selection statements can be used to control the flow of a program</u></p> <ul style="list-style-type: none"> - Define a condition as an expression that will be evaluated as either true or false - Identify that selection uses conditions to control the flow of a sequence - Identify where selection statements can be used in a program - Modify a program to include selection <p><u>To use logical and comparison operators</u></p> <ul style="list-style-type: none"> - Create conditions that use comparison operators (>, <=) - Create conditions that use logic operators (and/or/not) - Identify where selection statements can be used in a program that include comparison and logical operators <p><u>To add iteration to make a program more efficient</u></p> <ul style="list-style-type: none"> - Define iteration as a group of instructions that are repeatedly executed - Describe the need for iteration - Identify where count-controlled iteration can be used in a program - Implement count-controlled iteration in a program - Detect and correct errors in a program (debugging) <p><u>To consolidate learning by completing a dance move game</u></p> <ul style="list-style-type: none"> - Independently design and apply programming constructs to solve a problem (subroutine, selection, count-controlled iteration, operators, and variables) 	<p><u>To formalise the use of subroutines</u></p> <ul style="list-style-type: none"> - Define a subroutine as a group of instructions that will run when called by the main program or other subroutines - Define decomposition as breaking a problem down into smaller, more manageable subproblems - Identify how subroutines can be used for decomposition <p><u>To understand condition-controlled iteration</u></p> <ul style="list-style-type: none"> - Identify where condition-controlled iteration can be used in a program - Implement condition-controlled iteration in a program <p><u>To evaluate different types of iteration</u></p> <ul style="list-style-type: none"> - Evaluate which type of iteration is required in a program <p><u>To use investigation skills to discover tools for using lists</u></p> <ul style="list-style-type: none"> - Define a list as a collection of related elements that are referred to by a single name - Describe the need for lists - Identify when lists can be used in a program - Use a list <p><u>To complete a programming project to translate languages</u></p> <ul style="list-style-type: none"> - Decompose a larger problem into smaller subproblems - Apply appropriate constructs to solve a problem

Progression	This unit has been devised as a transitional unit to allow learners to confidently move from Year 6 to Year 7. By the end of the unit, they should be able to use the school network safely and respectfully.	This unit progresses students' knowledge and understanding of networks and associated hardware. The unit will establish a foundation understanding of how data is transmitted across networks, as well as exploring the factors that can affect performance. The unit will spend time focussing on the internet and services provided over the internet.	This unit progresses students' knowledge and understanding of licensing and legal issues surrounding the use of online sources of information. They will also gain an understanding of how to apply techniques to help determine the reliability of a source. Learners will develop practical skills in using software to make a blog that could be published online.	This unit progresses learners' knowledge and understanding of modelling data using a spreadsheet. Due to the transitional nature of Year 7, the unit assumes that learners have little to no experience of using spreadsheets.		
Cross curricular links	<u>Education for a Connected World</u> <ul style="list-style-type: none"> - I can explain strategies for assessing the degree of trust I place in people or organisations online. - I can give examples of how to make positive contributions to online debates and discussions. - I can describe how bullying may change as we grow older and recognise when it is taking place online. - I can identify and demonstrate actions to support others who are experiencing difficulties online. - I can create and use strong and secure passwords. - I can explain how my internet use is often monitored (e.g. by my school or internet service provider). 	<u>Education for a Connected World</u> <ul style="list-style-type: none"> - Explain the term 'connectivity' as the capacity for connected devices ('internet of things') to collect and share information about me with or without my knowledge (including microphones, cameras and geolocation). - Describe how internet-connected devices can affect me. 	<u>Education for a Connected World</u> <ul style="list-style-type: none"> - I can use a range of features to quality assure the content I access online. - I can explain how to use search effectively and use examples from my own practice to illustrate this. - I know that commercial online content can be viewed, accessed or downloaded illegally. - I can accurately define the concept of plagiarism. - I can use this definition to evaluate my own use of online sources. - I understand the concept of software and content licensing. - I understand Creative Commons Licensing protocols. - I can identify the potential consequences of illegal access or downloading and how it may impact me and my immediate peers. 	-		

	Autumn 1 Computer Systems and Networks	Autumn 2 Computer Systems and Networks	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Lower School	Computing Systems	Developing for the Web	Vector Graphics	Representations - from Clay to Silicon	Introduction to Python Programming	Mobile App Development
Year 8 Computing	<p><u>To understand the difference between computing systems and other purpose-built machinery</u></p> <ul style="list-style-type: none"> - Recall that a general-purpose computing system is a device for executing programs - Recall that a program is a sequence of instructions that specify operations that are to be performed on data - Explain the difference between a general-purpose computing system and a purpose-built device <p><u>To describe the hardware components inside a computer</u></p> <ul style="list-style-type: none"> - Describe the function of the hardware components used in computing systems - Describe how the hardware components used in computing systems work together in order to execute programs - Recall that all computing systems, regardless of form, have a similar structure ('architecture') <p><u>To know the role of an operating system</u></p> <ul style="list-style-type: none"> - Analyse how the hardware components used in computing systems work together in order to execute programs - Define what an operating system is, and recall its role in controlling program execution <p><u>To make links between logic and circuits</u></p> <ul style="list-style-type: none"> - Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions - Use logic gates to construct logic circuits, and associate these with logical operators and expressions - Describe how hardware is built out of increasingly complex logic circuits - Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits <p><u>To define the term 'artificial intelligence' and explore the problems it may pose</u></p> <ul style="list-style-type: none"> - Provide broad definitions of 'artificial intelligence' and 'machine learning' - Identify examples of artificial intelligence and machine learning in the real world - Describe the steps involved in training machines to perform tasks (gathering data, training, testing) - Describe how machine learning differs from traditional programming - Associate the use of artificial intelligence with moral dilemmas 	<p><u>To understand how websites are constructed</u></p> <ul style="list-style-type: none"> - Describe what HTML is - Use HTML to structure static web pages - Modify HTML tags using inline styling to improve the appearance of web pages <p><u>To understand how to use the img tag to add images to web pages</u></p> <ul style="list-style-type: none"> - Display images within a web page - Apply HTML tags to construct a web page structure from a provided design <p><u>To experiment with CSS to format tags in a HTML document</u></p> <ul style="list-style-type: none"> - Describe what CSS is - Use CSS to style static web pages - Assess the benefits of using CSS to style pages instead of in-line formatting <p><u>To consider how web pages are found and catalogued</u></p> <ul style="list-style-type: none"> - Describe what a search engine is - Explain how search engines 'crawl' through the World Wide Web and how they select and rank results - Analyse how search engines select and rank results when searches are made <p><u>To understand how to control what we search for</u></p> <ul style="list-style-type: none"> - Use search technologies effectively - Discuss the impact of search technologies and the issues that arise by the way they function and the way they are used - Create hyperlinks to allow users to navigate between multiple web pages <p><u>To discuss the issues surrounding online safety and security</u></p> <ul style="list-style-type: none"> - Discuss issues of safety and security from a technological perspective - Discuss the impact of networking technologies and services 	<p><u>To use software to draw geometrical shapes</u></p> <ul style="list-style-type: none"> - Draw basic shapes (rectangle, ellipse, polygon, star) with different properties (fill and stroke, shape-specific attributes) - Manipulate individual objects (select, move, resize, rotate, duplicate, flip, z-order) <p><u>To combine simple shapes into more complex ones using path operations</u></p> <ul style="list-style-type: none"> - Manipulate groups of objects (select, group/ungroup, align, distribute) - Combine paths by applying operations (union, difference, intersection) <p><u>To combine elementary shapes with path operations</u></p> <ul style="list-style-type: none"> - Convert objects to paths - Draw paths - Edit path nodes <p><u>To work collaboratively to create a project</u></p> <ul style="list-style-type: none"> - Combine multiple tools and techniques to create a vector graphic design <p><u>To investigate what vector images are made of</u></p> <ul style="list-style-type: none"> - Explain what vector graphics are - Provide examples where using vector graphics would be appropriate <p><u>To showcase and assess the project</u></p> <ul style="list-style-type: none"> - Peer assess another pair's project work - Improve your own project work based on feedback - Complete a summative assessment 	<p><u>To list examples of representations</u></p> <ul style="list-style-type: none"> - List examples of representations - Recall that representations are used to store, communicate, and process information - Provide examples of how different representations are appropriate for different tasks <p><u>To encode, transmit and decode short messages</u></p> <ul style="list-style-type: none"> - Recall that characters can be represented as sequences of symbols and list examples of character coding schemes - Measure the length of a representation as the number of symbols that it contains - Provide examples of how symbols are carried on physical media <p><u>To understand why binary digits are used</u></p> <ul style="list-style-type: none"> - Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters - Measure the size or length of a sequence of bits as the number of binary digits that it contains <p><u>To use binary number conversion</u></p> <ul style="list-style-type: none"> - Describe how natural numbers are represented as sequences of binary digits - Convert a decimal number to binary and vice versa <p><u>To investigate bytes and convert between different units</u></p> <ul style="list-style-type: none"> - Convert between different units and multiples of representation size - Provide examples of the different ways that binary digits are physically represented in digital devices 	<p><u>To write and execute my first Python program</u></p> <ul style="list-style-type: none"> - Describe what algorithms and programs are and how they differ - Recall that a program written in a programming language needs to be translated in order to be executed by a machine - Write simple Python programs that display messages, assign values to variables, and receive keyboard input - Locate and correct common syntax errors <p><u>To understand the use of arithmetic expressions</u></p> <ul style="list-style-type: none"> - Describe the semantics of assignment statements - Use simple arithmetic expressions in assignment statements to calculate values - Receive input from the keyboard and convert it to a numerical value <p><u>To understand selection and randomness</u></p> <ul style="list-style-type: none"> - Use relational operators to form logical expressions - Use binary selection (if, else statements) to control the flow of program execution - Generate and use random integers <p><u>To explore problems using selection</u></p> <ul style="list-style-type: none"> - Use multi-branch selection (if, elif, else statements) to control the flow of program execution - Describe how iteration (while statements) controls the flow of program execution <p><u>To create a times table practice game using counters</u></p> <ul style="list-style-type: none"> - Use iteration (while loops) to control the flow of program execution - Use variables as counters in iterative programs <p><u>To consolidate learning by using iteration and selection</u></p> <ul style="list-style-type: none"> - Combine iteration and selection to control the flow of program execution - Use Boolean variables as flags 	<p><u>To consider how decomposition is important</u></p> <ul style="list-style-type: none"> - Identify when a problem needs to be broken down - Implement and customise GUI elements to meet the needs of the user <p><u>To use variables in programming</u></p> <ul style="list-style-type: none"> - Recognise that events can control the flow of a program - Use user input in an event-driven programming environment - Use variables in an event-driven programming environment - Develop a partially complete application to include additional functionality <p><u>To understand how to debug coding errors</u></p> <ul style="list-style-type: none"> - Identify and fix common coding errors - Pass the value of a variable into an object - Establish user needs when completing a creative project <p><u>To understand how user input is captured and processed</u></p> <ul style="list-style-type: none"> - Apply decomposition to break down a large problem into more manageable steps - Use user input in a block-based programming language - Use a block-based programming language to create a sequence - Use variables in a block-based programming language <p><u>To evaluate and improve my app based on user feedback</u></p> <ul style="list-style-type: none"> - Use a block-based programming language to include sequencing and selection - Use user input in a block-based programming language - Use variables in a block-based programming language - Reflect and react to user feedback - Evaluate the success of the programming project

	<p><u>To understand computing systems concepts</u></p> <ul style="list-style-type: none"> - Explain the implications of sharing program code 					
Progression			<p>This unit progresses pupils' knowledge and understanding of designing vector graphics.</p>	<p>The fundamental concepts around binary representations and the way in which they have been approached in this unit are visualised in the concept map. This can be found in Lesson 1: Across time and space.</p>	<p>The fundamental concepts covered in this unit are visually summarised in the concept map for this unit, which can be found in Lesson 1: First steps. The concepts are organised in a layered hierarchy based on Schulte's Block Model, and there is a distinction between static and dynamic aspects of programs (program text vs program execution).</p>	<p>This unit progresses pupils' knowledge and understanding of programming constructs in a block-based programming environment. Learners will also develop their computational thinking and project planning, by going from decomposing a larger project into smaller parts and creating success criteria for the project to getting user feedback and evaluating their projects.</p>
Cross curricular links		-		-		

	Autumn 1 Computer Systems and Networks	Autumn 2 Computer Systems and Networks	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Upper School	Cybersecurity	Data Science	Animations	Representations - Going Audiovisual	Python Programming with Sequences of Data	Physical Computing (Microbit)
Year 9 Computing	<p><u>To understand the difference between data and information</u></p> <ul style="list-style-type: none"> - I can explain the difference between data and information - I can critique online services in relation to data privacy - I can identify what happens to data entered online - I can explain the need for the Data Protection Act <p><u>To discuss ways to keep your data safe online</u></p> <ul style="list-style-type: none"> - I can recognise how human errors pose security risks to data - I can implement strategies to minimise the risk of data being compromised through human error <p><u>To explore the concept of hacking</u></p> <ul style="list-style-type: none"> - I can define hacking in the context of cyber security - I can explain how a DDoS attack can impact users of online services - I can identify strategies to reduce the chance of a brute force attack being successful - I can explain the need for the Computer Misuse Act <p><u>To compare different types of malware and their potential damage</u></p> <ul style="list-style-type: none"> - I can list the common malware threats - I can examine how different types of malware causes problems for computer systems - I can question how malicious bots can have an impact on societal issues <p><u>To understand the risks of cyber threats</u></p> <ul style="list-style-type: none"> - I can compare security threats against probability and the potential impact to organisations - I can explain how networks can be protected from common security threats <p><u>To compare methods of protection against cyberattacks</u></p> <ul style="list-style-type: none"> - I can identify the most effective methods to prevent cyberattacks 	<p><u>To understand the value in visualising data</u></p> <ul style="list-style-type: none"> - I can define data science - I can explain how visualising data can help identify patterns and trends in order to help us gain insights - I can use an appropriate software tool to visualise data sets and look for patterns or trends <p><u>To understand how advances in technology have made it possible to analyse large data sets</u></p> <ul style="list-style-type: none"> - I can recognise examples of where large data sets are used in daily life - I can select criteria and use data set to investigate predictions - I can evaluate findings to support arguments for or against a prediction <p><u>To describe the investigative cycle PPDAC</u></p> <ul style="list-style-type: none"> - I can define the terms 'correlation' and 'outliers' in relation to data trends - I can identify the steps of the investigative cycle - I can solve a problem by implementing steps of the investigative cycle on a data set - I can use findings to support a recommendation <p><u>To understand the use of the investigative cycle to solve a problem</u></p> <ul style="list-style-type: none"> - I can identify the steps of the investigative cycle - I can identify the data needed to answer a question defined by the learner - I can create a data capture form <p><u>To understand the need for data cleansing</u></p> <ul style="list-style-type: none"> - I can describe the need for data cleansing - I can apply data cleansing techniques to a data set - I can visualise a data set <p><u>To analyse and draw conclusions from data findings</u></p> <ul style="list-style-type: none"> - I can visualise a data set - I can analyse visualisations to identify patterns, trends, and outliers - I can draw conclusions and report findings 	<p><u>To discuss the impact of 3D animation on the wider world</u></p> <ul style="list-style-type: none"> - I can add, delete, and move objects - I can scale and rotate objects - I can use a material to add colour to objects <p><u>To explain the differences between keyframing and stop motion animation</u></p> <ul style="list-style-type: none"> - I can add, move, and delete keyframes to make basic animations - I can play, pause, and move through the animation using the timeline - I can create useful names for objects - I can join multiple objects together using parenting <p><u>To use editing techniques to build realistic-looking models</u></p> <ul style="list-style-type: none"> - I can use edit mode and extrude - I can use loop cut and face editing - I can apply different colours to different parts of the same model <p><u>To understand the importance of breaking symmetry to mimic real world</u></p> <ul style="list-style-type: none"> - Use proportional editing - Use the knife tool - Use subdivision <p><u>To understand the range of lights available in Blender</u></p> <ul style="list-style-type: none"> - I can add and edit set lighting - I can set up the camera - I can compare different render modes <p><u>To create a 3-10 seconds video animation</u></p> <ul style="list-style-type: none"> - I can create a 3–10 second animation - I can render out the animation 	<p><u>To create digital mosaics using pixels</u></p> <ul style="list-style-type: none"> - I can describe how digital images are composed of individual elements - I can recall that the colour of each picture element is represented using a sequence of binary digits - I can define key terms such as 'pixels', 'resolution', and 'colour depth' - I can describe how an image can be represented as a sequence of bits <p><u>To understand colour mixing using an 8-bit sequence</u></p> <ul style="list-style-type: none"> - I can describe how colour can be represented as a mixture of red, green, and blue, with a sequence of bits representing each colour's intensity - I can compute the representation size of a digital image, by multiplying resolution (number of pixels) with colour depth (number of bits used to represent the colour of individual pixels) - I can describe the trade-off between representation size and perceived quality for digital images <p><u>To use software to manipulate an image</u></p> <ul style="list-style-type: none"> - I can perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation - I can explain how the manipulation of digital images amounts to arithmetic operations on their digital representation - I can describe and assess the creative benefits and ethical drawbacks of digital manipulation <p><u>To understand how sound is captured, digitised, manipulated and reproduced</u></p> <ul style="list-style-type: none"> - I can recall that sound is a wave - I can explain the function of microphones and speakers as components that capture and generate sound - I can define key terms such as 'sample', 'sampling frequency/rate', 'sample size' - I can describe how sounds are represented as sequences of bits <p><u>To understand why compression is necessary</u></p> <ul style="list-style-type: none"> - I can calculate representation size for a given digital sound, given its attributes - I can explain how attributes such as sampling frequency and sample size affect characteristics such as representation size and perceived quality, and the trade-offs involved 	<p><u>To read and create simple programs that use selection</u></p> <ul style="list-style-type: none"> - I can write programs that display messages, receive keyboard input, and use simple arithmetic expressions in assignment statements - I can use selection (if-elif-else statements) to control the flow of program execution - I can locate and correct common syntax errors - I can create lists and access individual list items <p><u>To identify and use list operations and understand where lists may be useful</u></p> <ul style="list-style-type: none"> - I can perform common operations on lists or individual items <p><u>To use while loops while comparing lists and strings</u></p> <ul style="list-style-type: none"> - I can use iteration (while statements) to control the flow of program execution - I can perform common operations on lists or individual items - I can perform common operations on strings or individual characters <p><u>To use a for loop to iterate over list items</u></p> <ul style="list-style-type: none"> - I can use iteration (for statements) to iterate over list items - I can perform common operations on lists or strings <p><u>To apply the knowledge and skills to a mini programming project</u></p> <ul style="list-style-type: none"> - I can use iteration (for loops) to iterate over lists and strings - I can use variables to keep track of counts and sums - I can combine key programming language features to develop solutions to meaningful problems 	<p><u>To explore the hardware components of the micro:bit</u></p> <ul style="list-style-type: none"> - Describe what the micro:bit is - List the micro:bit's input and output devices - Use a development environment to write, execute, and debug a Python program for the micro:bit <p><u>To understand and use the built in input and output devices on a micro:bit</u></p> <ul style="list-style-type: none"> - Write programs that use the micro:bit's built-in input and output devices <p><u>To use the GPIO pins to connect to external hardware components</u></p> <ul style="list-style-type: none"> - Write programs that use GPIO pins to generate output and receive input - Write programs that communicate with other devices by sending and receiving messages wirelessly <p><u>To plan a physical computing project</u></p> <ul style="list-style-type: none"> - Design a physical computing artifact purposefully, keeping in mind the problem at hand, the needs of the audience involved, and the available resources - Decompose the functionality of a physical computing system into simpler features <p><u>To gain feedback and make improvements to the programming project</u></p> <ul style="list-style-type: none"> - Implement a physical computing project, while following, revising, and refining the project plan <p><u>To evaluate the programming project</u></p> <ul style="list-style-type: none"> - Implement a physical computing project, while following, revising, and refining the project plan

				<ul style="list-style-type: none"> - I can perform basic sound editing tasks using appropriate software and combine them in order to solve more complex problems requiring sound manipulation <p><u>To understand why compression is necessary</u></p> <ul style="list-style-type: none"> - I can recall that bitmap images and pulse code sound are not the only binary representations of images and sound available - I can define 'compression', and describe why it is necessary 		
Progression			This unit progresses pupils' knowledge and understanding of creating animations using Blender.	<p>The fundamental concepts around binary representations and the way in which they have been approached in this unit are visualised in these concept maps:</p> <ul style="list-style-type: none"> - Bitmap images concept map (part of Lesson 1: Binary mosaic) - PCM sound concept map (part of Lesson 4: Good vibrations.) <p>The structures of the nodes in these two concept maps are identical. This illustrates the direct correspondence between the concepts that pertain to image and sound digital representations.</p>		
Cross curricular links	<p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can explain how contributors to social media may be 'social bots' - I can explain what malware is and give some examples of how it operates and what its impact could be on a device or user (e.g. viruses, trojans, ransomware) - I can explain how to manage security software (e.g. anti-virus, security patches, adware blockers) on my devices and understand why regular updates are important - I can explain how and assess when more secure use may require more advanced password management (e.g. dual-factor authentication, regular rolling, security questions, CAPTCHA, biometrics) 	-		-		

	Autumn 1 Computer Systems and Networks	Autumn 2 Computer Systems and Networks	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Upper School	Security	Computer Systems	HTML (Website Design)	Data Representations	Programming 1 & 2 (Sequence and Selection)	Programming 3 & 4 (Iteration and Subroutines)
OCR GCSE 9-1 Computing Year 10	<p><u>To investigate the cost of cybercrime and hacker motivation</u></p> <ul style="list-style-type: none"> - To be able to define the terms cybersecurity and network security, explain their importance, and distinguish between the two - To be able to describe the features of a network that make it vulnerable to attack - To understand the impact of cybercrime on businesses and individuals - To be able to analyse an attack on a company and identify what motivated the hackers <p><u>To distinguish between non-automated and automated cybercrime</u></p> <ul style="list-style-type: none"> - Describe different forms of attack in the context of cybersecurity - Identify non-automated forms of cyberattack and how humans can be the weak points in an organisation - Demonstrate knowledge of social engineering in role play and case studies <p><u>To understand what makes companies or individuals vulnerable to attacks</u></p> <ul style="list-style-type: none"> - Describe different forms of attack in the context of cybersecurity (2 of 2) - Understand automated forms of cyberattack - Analyse a real cyberattack and identify the network or software weaknesses that enabled it to happen <p><u>To discover ways to protect software systems from malware threats</u></p> <ul style="list-style-type: none"> - Describe how organisations design software to protect it from cyberattacks - Describe ways in which organisations use software to protect against cyberattacks <p><u>To understand how companies use software to protect against cybercrime</u></p> <ul style="list-style-type: none"> - Describe different ways to protect software systems and networks (2 of 2) - Understand the need for, and importance of, network security - Explain the following methods of network security: authentication, encryption, firewall, MAC address filtering, acceptable use policy, backup policy, disaster recovery policy, validation and authentication, access control, password systems, biometric measures, email confirmations, physical security, firewalls, network policies, anti-malware software, user access levels, effective network security provisions 	<p><u>To distinguish between general purpose and embedded systems</u></p> <ul style="list-style-type: none"> - Understand the difference between embedded and general purpose computer systems - Describe the role of system software as part of a computer system - Explore the role of the operating system and utility software <p><u>To define components of the CPU and their roles in computation</u></p> <ul style="list-style-type: none"> - Describe the basic components of the CPU - Understand the roles and purpose of each component of the CPU in computation <p><u>To understand the fetch-decode-execute cycle</u></p> <ul style="list-style-type: none"> - Explain how the fetch-decode-execute cycle works by describing what happens at each stage - Describe the role of each part of the CPU as part of the fetch-decode-execute cycle <p><u>To compare different types of memory</u></p> <ul style="list-style-type: none"> - Describe the characteristics of RAM and ROM - Explain the role of main memory as part of a computer system - Define cache memory - Describe the role of cache in a computer system <p><u>To understand the need for secondary storage</u></p> <ul style="list-style-type: none"> - Explain why a computer system needs secondary storage - State the different types of secondary storage and describe their functional characteristics - State how solid-state memory works and describe its characteristics <p><u>To explore optical and magnetic storage devices</u></p> <ul style="list-style-type: none"> - Explain how optical and magnetic memory stores data in the form of binary - Describe how data is read from and written to optical and magnetic memory - Apply knowledge of storage devices to compare the three mediums of storage <p><u>To select and justify a storage device for a given use</u></p> <ul style="list-style-type: none"> - Apply the knowledge of storage devices to recommend an appropriate device - Describe the limitations of secondary storage 	<p><u>To understand what a website is and how it gets on the internet</u></p> <ul style="list-style-type: none"> - Understand the purpose of HTML and tags when designing a website - Create a simple web page using basic tags <p><u>To understand how to insert images and links in HTML code</u></p> <ul style="list-style-type: none"> - Recap on the learning from the previous lesson using homework - Can explain what is meant by the term accessibility - Extend an HTML page to include <ul style="list-style-type: none"> o Images o Hyperlinks <a href> <p><u>To consolidate understanding of what makes a good website</u></p> <ul style="list-style-type: none"> - Identify the common features of existing websites and the basics of what makes good web design - Design and create pages for a mini website - Create hyperlinks between pages stored locally within a folder - Insert images stored locally within a folder <p><u>To experiment with the use of CSS</u></p> <ul style="list-style-type: none"> - Understand the purpose of CSS and why it is needed in addition to HTML - Experiment with CSS by changing the style of the tags learnt so far in this unit - Understand the concept of web standards (W3C) by using an HTML validator <p><u>To understand how to break up a page using DIV tags</u></p> <ul style="list-style-type: none"> - Understand the purpose of DIV tags - Apply knowledge of CSS to DIVs within web pages using classes <p><u>To develop skills in wireframing a website</u></p> <ul style="list-style-type: none"> - Understand how to plan a website by developing house style and sketched wireframe - Understand what is meant by the box model in CSS - Apply skills to position items within a page <p><u>To demonstrate skills learned to create a three-page website</u></p> <ul style="list-style-type: none"> - Create a three-page website to showcase the skills learned throughout this unit of study - Self/peer evaluate the webpage produced using a rubric <p><u>To evaluate a website created by a peer</u></p> <ul style="list-style-type: none"> - Extend/finish the assessed website 	<p><u>To explain the need for written representation</u></p> <ul style="list-style-type: none"> - Give examples of the use of representation - Explain how binary relates to two-state electrical signals <p><u>To explore the representation of binary values</u></p> <ul style="list-style-type: none"> - Work out what range of numbers can be stored in a specific number of bits - Explain the concept of a number base - Convert a positive binary integer to decimal - Convert a decimal number to binary - Define the term 'bit' <p><u>To explore binary multiplication and division</u></p> <ul style="list-style-type: none"> - Perform binary shifts (logical) - Perform binary addition - Explain why overflow might occur - Define the term 'byte' <p><u>To understand how to write a hexadecimal number</u></p> <ul style="list-style-type: none"> - Explain how numbers are represented using hexadecimal - Convert decimal numbers to and from hexadecimal - Explain why and where hexadecimal notation is used <p><u>To investigate the relationship between binary numbers and hexadecimal</u></p> <ul style="list-style-type: none"> - Be able to convert binary numbers to and from hexadecimal - Define the term 'nibble' <p><u>To explain the purpose of ASCII and how it is used</u></p> <ul style="list-style-type: none"> - Explain how ASCII is used to represent characters, and its limitations - Explain what a character set is - Explain the need for Unicode - Be able to calculate the number of bits needed to store a piece of text <p><u>To identify a pixel and its role in displaying an image</u></p> <ul style="list-style-type: none"> - Describe what a pixel is and how pixels relate to images - Explain how bitmaps are used to represent images - Convert between binary data and black and white bitmaps - Explain the relationship between resolution, colour depth, and file size for images - Describe colour depth and resolution, and how they impact on image quality <p><u>To discuss vector graphics</u></p>	<p><u>To understand that computers need clear and precise instructions</u></p> <ul style="list-style-type: none"> - Compare how humans and computers interpret instructions - Explain the differences between high- and low-level programming languages - Describe why translators are necessary - List the differences, benefits, and drawbacks of using a compiler, or an interpreter <p><u>To discuss why programmers use an IDE to write programs</u></p> <ul style="list-style-type: none"> - Describe the tools an IDE provides (editors, error diagnostics, runtime environment, translators) - Use subroutines in programs - Define a sequence as instructions performed in order, with each executed in turn - Predict the outcome of a sequence and modify it - Interpret error messages and define error types and identify them in programs (logic, syntax) <p><u>To explore the purpose of variables</u></p> <ul style="list-style-type: none"> - Use meaningful identifiers - Determine the need for variables - Distinguish between declaration, initialisation, and assignment of variables - Demonstrate appropriate use of naming conventions - Output data (e.g. print (my_var)) <p><u>To understand the five main data types</u></p> <ul style="list-style-type: none"> - Obtain input from the keyboard in a program - Differentiate between the data types: integer, real, Boolean, character, string - Cast variables by calling a function that will return a new value of the desired data type - Define runtime errors in programs - Define validation checks <p><u>To interpret and create flowcharts</u></p> <ul style="list-style-type: none"> - Identify flowchart symbols and describe how to use them (start, end, input, output, subroutine) - Translate a flowchart into a program sequence - Design a flowchart for a program <p><u>To determine and generate random numbers</u></p> <ul style="list-style-type: none"> - Be able to locate information using the language documentation - Import modules into your code - Demonstrate how to generate random numbers <p><u>To write and use expressions that use arithmetic operators</u></p>	<p><u>To define and use iteration in a program</u></p> <ul style="list-style-type: none"> - Define iteration as a group of instructions that are repeatedly executed - Modify a program to incorporate a while loop <p><u>To further understand the use of a while loop</u></p> <ul style="list-style-type: none"> - Use a trace table to walkthrough code that uses a while loop - Use a trace table to detect and correct errors in programs <p><u>To use the range function of a for loop</u></p> <ul style="list-style-type: none"> - Define a for loop - Walk through code that uses a for loop - Modify a program that uses a for loop - Compare a while loop and a for loop <p><u>To discuss why data validation checks are important</u></p> <ul style="list-style-type: none"> - Determine the need for validation checks - Use iteration to perform validation checks <p><u>To design and create a quiz using pseudocode</u></p> <ul style="list-style-type: none"> - Describe the purpose of pseudocode - Translate pseudocode into a program - Design and build a program using pseudocode <p><u>To determine why subroutines are used in programs</u></p> <ul style="list-style-type: none"> - Describe a subroutine - Describe the purpose of parameters in subroutines - Use procedures that accept arguments through parameters - Describe how subroutines are used for decomposition - List the advantages of subroutines <p><u>To structure and write a function</u></p> <ul style="list-style-type: none"> - Explain the difference between a function and a procedure - Use trace tables to investigate functions - Use functions to return values in programs <p><u>To convert programs that use global variables into program that pass values through parameters</u></p> <ul style="list-style-type: none"> - Describe scope of variables - Describe how parameters can reduce the need for global variables - Identify when to use global variables - Describe a constant <p><u>To gain an understanding of how the XOR operator works</u></p> <ul style="list-style-type: none"> - Use a truth table - Describe the function of an XOR operator - Design and create a function for an XOR operator

	<p><u>To understand how companies test their own vulnerability to cybercrime</u></p> <ul style="list-style-type: none"> - Describe different methods of identifying cybersecurity vulnerabilities, such as: penetration testing, ethical hacking, network forensics, commercial analysis tools, review of network and user policies <p><u>To consolidate this unit and evaluate careers in cybersecurity</u></p> <ul style="list-style-type: none"> - Evaluate the potential for cybersecurity careers - Apply knowledge of cybersecurity to GCSE-style questions 	<ul style="list-style-type: none"> - Explain the definition of 'cloud storage' and describe the characteristics of cloud storage <p><u>To evaluate a computer based on its specifications</u></p> <ul style="list-style-type: none"> - Explore the factors that impact a CPU's performance - Select components to create a computer system - Evaluate a computer's suitability for a given task <p><u>To revise unit content by designing and producing a quiz</u></p> <ul style="list-style-type: none"> - Revise computer systems content covered so far - Design and implement a software project <p><u>To understand how logic gates are used to address real-world problems</u></p> <ul style="list-style-type: none"> - Discover the logic gates AND, NOT, and OR, including their symbols and truth tables - Learn how logic gates are used in carrying out computation - Design a logical circuit, combining logic gates to solve a problem <p><u>To make links to show that computer circuits are made up of logic gates</u></p> <ul style="list-style-type: none"> - Construct truth tables for a three-input logic circuit - Write a Boolean expression to describe a logical circuit - Describe how combinations of logic gates can perform mathematical operations <p><u>To design and write an assembly language program</u></p> <ul style="list-style-type: none"> - Understand that assembly language has a 1:1 relationship with machine code - Explain the basic commands in the LMC's assembly code: INP, OUT, STA, LDA, ADD, SUB, and BRP - Design and write your own program in assembly language 	<ul style="list-style-type: none"> - Showcase the assessed website - Demonstrate what has been learnt by taking an end-of-unit test 	<ul style="list-style-type: none"> - Define the terms 'bit', 'nibble', 'byte', 'megabyte', 'gigabyte', 'terabyte', and 'petabyte' - Be able to convert between units of measurement - Explain the difference between raster and vector graphics - Describe the use of metadata in image files <p><u>To investigate the effect of sound waves and relate this to speakers and microphones</u></p> <ul style="list-style-type: none"> - Explain why analogue sound data needs to be converted to discrete values - Describe the concepts of sampling, sample rate, and sample resolution - Describe the use of metadata in sound files - Calculate file size requirements for sound files 	<ul style="list-style-type: none"> - Evaluate arithmetic expressions using rules of operator precedence (BIDMAS) - Write and use expressions that use arithmetic operators (add, subtract, multiply, real division, integer division, MOD, to the power) - Assign expressions to variables <p><u>To understand how a condition can be used to control the flow of execution in a program</u></p> <ul style="list-style-type: none"> - Define a condition as an expression that can be evaluated to either True or False - Identify flowchart symbols and describe how to use them (decision) - Identify that selection uses conditions to control the flow of execution - Walkthrough code that includes selection (if, elif, else) <p><u>To use selection statements in a program</u></p> <ul style="list-style-type: none"> - Use selection statements in a program - Identify when selection statements should be used in programs - Write and use expressions that use comparison operators (equal to, not equal to, less than, greater than, less than or equal to, greater than or equal to) <p><u>To understand logical expressions</u></p> <ul style="list-style-type: none"> - Describe how Boolean/logical operators can be used in expressions - Walk through code that use conditions with Boolean/logical operators (AND, OR) - Write and use expressions that use Boolean/logical operators (AND, OR) <p><u>To define nested selection</u></p> <ul style="list-style-type: none"> - Define nested selection - Walk through code that uses nested selection - Modify a program that uses nested selection 	<p><u>To describe structured programming</u></p> <ul style="list-style-type: none"> - Describe the structured approach to programming - Explain the advantages of the structured approach - Use the structured approach in programming <p><u>To design, create and test a program</u></p> <ul style="list-style-type: none"> - Describe iterative testing - Describe the types of testing (erroneous, boundary, normal) - Design and create a program
Progression		This unit progresses pupils' knowledge and understanding of computer systems.		This unit progresses pupils' knowledge and understanding of how text, images, and sound are represented in computer systems, including the use of binary and hexadecimal.	This unit progresses pupils' knowledge and understanding of programming.	This unit progresses pupils' knowledge and understanding of programming.
Cross curricular links	<p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can explain what malware is and give some examples of how it operates and what the impact could be on a device or user (e.g. viruses, trojans, ransomware) - I can explain how to manage security software (e.g. antivirus, security patches, adware blockers) on my devices and understand why regular updates are important - I can explain how and assess when more secure use may require more advanced password management (e.g. dual-factor authentication, regular rolling, security questions, CAPTCHA, biometrics) 					

	<ul style="list-style-type: none">- I can explain how the security of data in a network can be compromised internally or externally and give examples of how this might occur (e.g. DDoS, proxy-bypass, distro, hacking); I can describe actions that can minimise risks- I can explain why networks require secure management and can give examples of services that support this (e.g. firewalls, VPN, user monitoring)- I can explain the value of regular data backup in system recovery, and can give examples of and demonstrate effective practice in how this might be achieved (e.g. removable media, cloud)- I can identify and assess when data needs to be transferred securely and can describe strategies to achieve this (e.g. encryption, secure services)- I can explain why it is essential to recognise and follow my future employer's online security policy and protocols					
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	Autumn 1 Computer Systems and Networks	Autumn 2 Computer Systems and Networks	Spring 1 Media	Spring 2 Data and Information	Summer 1 Programming A	Summer 2 Programming B
Upper School	Impacts of Technology	Networks	Algorithms	Databases and SQL	Programming 5 (Strings and Lists)	Programming 6 (Dictionaries and Datafiles)
OCR GCSE 9-1 Computing Year 11	<p><u>To discuss the impact of technology</u></p> <ul style="list-style-type: none"> - Apply the terms 'privacy', 'legal', 'ethical', 'environmental', and 'cultural' - Explain data legislation, including an organisation's obligation to protect and supply data <p><u>To examine the relationship between data protection and GDPR</u></p> <ul style="list-style-type: none"> - Explain the term 'stakeholder' - Explain the right to be forgotten - Distinguish the differences between legitimate creative uses and clear infringement of material subject to copyright <p><u>To discuss computer misuse and associated offences</u></p> <ul style="list-style-type: none"> - Explain the Freedom of Information Act - Define 'computer misuse' and the associated offences - Identify situations that would be classified as an offence under the Act <p><u>To understand what is meant by digital divide</u></p> <ul style="list-style-type: none"> - Define 'downtime' and explain the associated impact on an organisation - Explain what is meant by the 'digital divide' and measures to mitigate its effect - Identify positive and negative aspects of the use of mobile technology <p><u>To identify and explain the implications of having personal data online</u></p> <ul style="list-style-type: none"> - Identify the implications of having personal data online - Explain the social and environmental impacts of social media - Explain the positive and negative effects of online content <p><u>To explain the environmental impact of a technological society</u></p> <ul style="list-style-type: none"> - Explain the environmental effects of the use of technology <p><u>To investigate ethical issues surrounding technology</u></p> <ul style="list-style-type: none"> - Explain the ethical issues surrounding the use of AI in society - Explain the ethical impact of using algorithms to make decisions - Demonstrate knowledge of the five impacts of technology 	<p><u>To identify advantages and disadvantages of using computer networks</u></p> <ul style="list-style-type: none"> - Define what networks are - Describe the hardware components required to build networks of devices - Analyse the benefits and problems associated with networks <p><u>To compare wired and wireless networks</u></p> <ul style="list-style-type: none"> - Explain how devices can be connected to a network either through a wired or wireless connection - Define MAC addresses and their use in networks - Analyse specific examples including Ethernet and Wi-Fi - Explain the importance of connectivity in modern computing systems <p><u>To describe the different network topologies</u></p> <ul style="list-style-type: none"> - List and describe the different types of networks depending on node distribution, including personal, local, and wide area networks - List, describe, and compare the different types of networks depending on topology, such as ring, star, and bus <p><u>To compare peer-to-peer and server-client network models</u></p> <ul style="list-style-type: none"> - List, describe, and compare the different types of communication models encountered in networks, such as server-client and peer-to-peer <p><u>To determine the difference between the internet and the World Wide Web</u></p> <ul style="list-style-type: none"> - Define and describe the internet - Define the WWW and describe its main components <p><u>To design a networking protocol</u></p> <ul style="list-style-type: none"> - Define and explain the concept of a networking protocol - List and explain standard internet protocols in the application layer, such as HTTP, HTTPS, FTP, DNS, SMTP, POP, and IMAP <p><u>To evaluate the advantages and disadvantages of circuit and packet switching</u></p> <ul style="list-style-type: none"> - Explain and describe the advantages and disadvantages of circuit switching and packet switching - List and explain the four different layers associated with the Internet Protocol: link, network/internet, transport, and application - Explain the Internet Protocol in the internet layer 	<p><u>To explore the terms decomposition, abstraction and algorithmic thinking</u></p> <ul style="list-style-type: none"> - Define the terms decomposition, abstraction and algorithmic thinking - Recognise scenarios where each of these computational thinking techniques are applied - Apply decomposition, abstraction and algorithmic thinking to help solve a problem <p><u>To understand the difference between algorithms and computer programs</u></p> <ul style="list-style-type: none"> - Identify algorithms that are defined as written descriptions, flowcharts and code - Analyse and create flowcharts using the flowchart symbols <p><u>To use trace tables in programming</u></p> <ul style="list-style-type: none"> - Use a trace table to walk through code that contains a while loop, a for loop and a list of items - Use a trace table to detect and correct errors in a program <p><u>To describe and use linear searches</u></p> <ul style="list-style-type: none"> - Identify why computers often need to search data - Describe how linear search is used for finding the position of an item in a list of items - Perform a linear search to find the position of an item in a list <p><u>To describe how binary search is used</u></p> <ul style="list-style-type: none"> - Describe how binary search is used for finding the position of an item in a list of items - Perform a binary search to find the position of an item in a list - Identify scenarios when a binary search can and cannot be carried out <p><u>To compare features of linear and binary searches</u></p> <ul style="list-style-type: none"> - Compare the features of linear and binary search and decide which is most suitable in a given context - Interpret the code for linear search and binary search - Trace code for both searching algorithms with input data <p><u>To investigate the efficiency of a bubble sort</u></p> <ul style="list-style-type: none"> - Identify why computers often need to sort data - Traverse a list of items, swapping the items that are out of order - Perform a bubble sort to order a list containing sample data 	<p><u>To compare flat file and relational databases</u></p> <ul style="list-style-type: none"> - Describe a database - Define database key terms (table, record, field, primary key, foreign key) - Describe a flat file database - Describe a relational database <p><u>To describe and use SQL</u></p> <ul style="list-style-type: none"> - Describe the function of SQL - Use SQL to retrieve data from a table in a relational database - Use SQL to retrieve data from more than one table in a relational database <p><u>To understand the purpose of INSERT, UPDATE and DELETE queries</u></p> <ul style="list-style-type: none"> - Describe the function of different data types. - Use SQL to insert, update and delete data into a relational database <p><u>To build, interrogate and update a database</u></p> <ul style="list-style-type: none"> - Interrogate and update an existing database. 	<p><u>To explore the differences between event-driven and procedural programming</u></p> <ul style="list-style-type: none"> - Define the term GUI - Import third-party libraries - Use guizero to create an event-driven program that uses a GUI <p><u>To use string handling techniques in programming</u></p> <ul style="list-style-type: none"> - Describe the function of string operators - Use string handling techniques - Use for loops with string operations <p><u>To use ASCII conversion to create a message decoder</u></p> <ul style="list-style-type: none"> - Use a substring in a program - Use the in operator to check for a substring - Use chr() and ord() to perform ASCII conversions <p><u>To combine use of the random module with string handling techniques</u></p> <ul style="list-style-type: none"> - Create a program that uses string handling techniques <p><u>To explain the differences between arrays and lists</u></p> <ul style="list-style-type: none"> - Define a data structure - Define a list and an array - Describe the differences between lists and arrays - Use a list in a program - Append to a list <p><u>To use list methods and demonstrate traversing of lists</u></p> <ul style="list-style-type: none"> - Traverse a list of elements - Use list methods - Create a function that returns a list - Import custom built functions <p><u>To use a Raspberry Pi to output a list</u></p> <ul style="list-style-type: none"> - Use lists to display output on a physical computing device <p><u>To append items on a list using randomisation</u></p> <ul style="list-style-type: none"> - Use randomisation to append items to a list <p><u>To define and use two-dimensional arrays and lists</u></p> <ul style="list-style-type: none"> - Define a 2D array and a list - Use a 2D list in a program <p><u>To create a noughts and crosses game using 2D lists</u></p> <ul style="list-style-type: none"> - Use a 2D list as part of a programming challenge 	<p><u>To create and use records in Python to form a database</u></p> <ul style="list-style-type: none"> - Describe the record data structure - Use a dictionary to represent a record in a program - Use a dictionary with a list to represent records in a database <p><u>To create a Caesar cipher encryption program using a dictionary</u></p> <ul style="list-style-type: none"> - Describe the dictionary data structure - Use a dictionary to produce key-value pairs <p><u>To use data from a text file within a program</u></p> <ul style="list-style-type: none"> - Determine the purpose of external data files - Read data from an external text file <p><u>To write and append text files</u></p> <ul style="list-style-type: none"> - Write to text files - Append to text files <p><u>To discuss the reasons for using a CSV file</u></p> <ul style="list-style-type: none"> - Describe a CSV file - Read from a CSV file - Use the split() method - Select data from a collection of values <p><u>To write CSV files</u></p> <ul style="list-style-type: none"> - Write data from a 1D list to a CSV file - Write data from a 2D list to a CSV file <p><u>To investigate alternative approaches to programming solutions</u></p> <ul style="list-style-type: none"> - Determine the good habits of a programmer - Explore alternative approaches to programming solutions - Append to a CSV file <p><u>To plan a programming project</u></p> <ul style="list-style-type: none"> - Write success criteria for a challenging project - Design the program for a challenging project using flowchart or pseudocode <p><u>To create and evaluate a programming project</u></p> <ul style="list-style-type: none"> - Create the solution for the battle boats program - Perform final testing of the solution to a challenging problem - Evaluate a challenging program

		<ul style="list-style-type: none"> - List and explain standard internet protocols in the transport layer, such as TCP and UDP <p><u>To discuss how network broadcast traffic affects network performance</u></p> <ul style="list-style-type: none"> - Describe how network data speeds are measured, and the factors affecting network performance - Define what virtual networks are, and how they are used to maintain network performance - Explain why networks are a target for criminals, and what some of the tools available to defend against attacks are 	<p><u>To use an insertion sort</u></p> <ul style="list-style-type: none"> - Insert an item into an ordered list of items - Describe how insertion sort is used for ordering a list of items - Perform an insertion sort to order a list containing sample data <p><u>To analyse and evaluate code for bubble sort and insertion sort in Python</u></p> <ul style="list-style-type: none"> - Interpret the code for bubble sort and insertion sort - Trace code for both sorting algorithms with input data - Identify factors that could influence the efficiency of a bubble sort implementation <p><u>To identify pairs of lists to use in a merge sort</u></p> <ul style="list-style-type: none"> - Merge two ordered lists of items into a new ordered list - Describe how merge sort is used for ordering a list of items - Perform a merge sort to order a list containing sample data <p><u>To interpret and analyse algorithms</u></p> <ul style="list-style-type: none"> - Interpret algorithms and suggest improvements - Analyse and fix errors in a flowchart - Perform searching and sorting algorithms on samples of data - Develop a linear search function in Python 			
Progression		This unit progresses pupils' knowledge and understanding of networks.	This unit progresses pupils' knowledge and understanding of algorithms.	This unit progresses pupils' knowledge and understanding of databases and SQL.	This unit progresses pupils' knowledge and understanding of programming.	This unit progresses pupils' knowledge and understanding of programming.
Cross curricular links	<p><u>Education for a Connected World</u></p> <ul style="list-style-type: none"> - I can describe key aspects of the law governing data use (e.g. DPA, GDPR) and can give examples of those laws and the impact they have on a person's data rights (e.g. RTBF, data breaches). - I can contribute to an informed debate concerning the balance between national security and safeguarding as against personal privacy. - I can explain key aspects of copyright law and illustrate where that law has been applied to online content. - I can explain the wider implications of copyright theft on content production and the availability of content (e.g. loss of revenue, emerging artists, new content development). 			-		