Computing

Computer Science	*A Focus on Coding - the writing, use and understanding of algorithms. Development of logical thinking and critical review*
Information Technology	*The teaching of the skills required to use school networks and access the internet and a focus of the use of computing to manage and analyse data.*
Digital Literacy	*A focus developing an understanding the use of computing in the world, including safety issues and the development of critical thinking/review.*

Overview of Units 2023/24

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y1	*Mouse & Keyboard Skills* *E Safety*	*Digital Art Design*	*Introducing Programming*	*Text & Images Comic Creation*	*Music Creation*	(Data Via maths)
Y2	*Recognise Uses of IT E safety* *Internet Research*	*Developing Programming* *Programming with Scratch Jr*	*Digital Art E Book Creation*	*Introduction to Animation*	*Introduction to Data Handling*	*Developing Programming* *Programming with Scratch Jr*
Y3	*E Safety*	*Comic Creation* *Storyboards Digital Art Music Creation*	*Programming in Scratch*	*Programming in Kodu*	*Branching Database*	*Document Editing & Creation* *3D Design Infographics*
Y4	*E Safety*	*Graphic Design Animation* *3D Design*	*Programming in Scratch*	*Video Editing* *E Book Creation*	*Data Handling*	*Internet Research Inside a Computer*
Y5	*App Design* *Computer Networks & The Internet*	*Data Handling*	*Programming in Scratch Text-Based* *Programming*	*Operating Systems E Safety*	*Programming with Microbits* *Physical Devices + typing*	*E Book Creation Music Creation*
Y6	*Binary Code* *Graphic Design Image Editing* *Python Programming Language* *E Safety*	*Programming in Scratch*	*Graphic Design Image Editing (+Microbits DT Applications Y5)* *Data Detectives Computers Past, Present & Future*	*Machine Learning & A.I.* *HTML*	*Graphic Design Image Editing Web Design*	*Virtual Reality*

Computer Science	
Y1	Introduction to Programming • Place instructions into the correct order (sequence) to make something work. • Use direction arrows to move an on-screen object (character/sprite) to achieve an objective. • Predict a route and sequence direction commands (algorithm) to achieve an objective. • Correct the errors if necessary (debug). • Predict a route and sequence distance commands to program an on-screen object to achieve an objective. • Predict and sequence movement and pen commands to program the drawing of different 2D shapes. • Sequence code blocks, including movements and execute (start program) blocks to write a program to achieve an objective.
Y2	Develop Programming • Create and debug simple programs by selecting code blocks, placing them in the correct sequence and executing a program. • Use logical reasoning to predict the behaviour of simple programs. Simplify a program by using a loop. Programming with Scratch Jr • Program movements. • Program outputs for audio or text. • Find errors in a program. • Program inputs. • Program selection/conditions (if one sprite hits another).

Y3	Develop Programming • Design, write and debug programs that accomplish specific goals. (Including outputs) • Use repetition in programs. • Work with various forms of inputs; keyboard, mouse and touch screen. • Write programs to simulate physical systems Programming in Kodu • Create a 3D place using various design tools • Write a program to control a character using inputs • Write a program with conditions to create an if statement (If the character touches an object it will disappear) • Add a multi-player aspect • Write a program with variables (scoring system) • Program operators (equals) to achieve a score and win a game
Y4	Programming in Scratch • Program inputs with loops, selection and sensing for interactions. • Work with variables and various forms of input and output. • Debug programs that accomplish goals. (correcting errors) • Use selection, data variables and operators. • Program a virtual robot using Scratch blocks.
Y5	Programming in Scratch • Program inputs for control, selection (conditions) and sensing for interaction and data variables for scoring and a game timer. • Program distance sensing and movement. • Program Inputs, outputs, loops, conditions, sensing and variables. • Program list variables that chooses randomly. Text-based Programming

	• Change the variables of text-based commands. • Write text-based commands accurately and use fill effects, stamps and functions. • Write text-based commands to program digital art. • Write text commands/functions to program keyboard inputs in a game. (Not compatible with iPad/tablet unless using physical keyboard) • Programming a Logo turtle to move and use pen. • Use co-ordinates in with a Logo turtle. • Print labels in Logo. • Program a loop (repetition) and shapes in Logo Turtle. • Program colours in Logo turtle. • Program variables in Logo turtle. Programming with Sphero • Understanding Bluetooth Technology as Input Device • Write programs for the Sphero using movement and repetition (loops). • Write a program to trace a maze/route with Sphero and De-bug. • Write a program with outputs. • Write a program with random variables
Y6	Programming in Scratch • Program keyboard/touch screen inputs, selection (conditions), loops and random variables for unpredictability (operators). • Program inputs, selection, sensing, random variables, operators for direction and data variables for scoring. • Use inputs, selection, loops, sensing, costume changes and broadcasts. • Work with multiple sprites to send broadcast messages between them. Binary Code • Understand why computers/electronics use binary. • Match a sequence of binary code to create digital art.

	• To convert binary code to denary numbers (decimal numbers) and visa versa. Python Programming Language • Use the PRINT command for text. • Program a simple calculator in Python. • Program loops to repeat text. • Program interactive inputs. • Find errors in a program (debugging) • Program a trivia chatbot using 'send message' functions (challenge) HTML • Add and align text and change colour. • Program background colour. • Add and align images. • Add hyperlinks to other websites. • Add an iframe (such as a Google Map) and adjust the height and width. Virtual Reality • Understand what virtual reality is and how it can be used to help people. • Add, move and resize objects in a virtual reality environment. • Animate objects for realism. • Use code blocks to add movement (with grouping) and interactions (conditions). • Create multiple scenes of VR environments. • Understand how computers use information to learn by solving new problems and following new instructions. • Understand and use examples of machine learning. • Understand how artificial intelligence is used to perform tasks often only performed by humans. • Discuss and show awareness of potential dangers of AI.

Information Technology	
Year 1	**Mouse and Keyboard Skills – EYFS/Year 1** • Move the mouse or trackpad and left click to select an object. • Drag and drop with mouse or trackpad to move objects around the screen. • Find letters or numbers on keyboard. • Begin touch typing with home row keys. **Digital Art** • Change the colour of individual pixels to accurately re-create basic artwork. • Make changes where required. • Change the colour of individual pixels to accurately re-create detailed artwork. • Use zoom controls to help fill small shapes. **Design Activity** • Change the colour and pattern of elements. • Position and rotate objects on a design. • Position objects in relation to each other. • Resize, rotate, flip and arrange objects behind/in front of each other. Text and Images • Change the background colour of a page. • Add, resize and position images (pictures) on a page. • Type and position text on a page, if possible using capital letters and punctuation. • Label pictures with text. • Use word-banks for writing sentences about pictures. Comic Creation • Add, resize and organise colour or picture backgrounds. • Add, resize, organise characters/object to different panels. • Add narration using text and direct speech using speech bubbles. Music Creation • Create a rhythm using a pattern of beats.

	• Create digital sounds using patterns and shapes. • Create a simple melody using patterns and adjust tempo.
Year 2	Digital Art • Use lines and fill tools to make interesting patterns. • Add a variety of shapes (outlines and fill) and label them with text. • Re-create graphics using pixels with different colours. Introduction to Animation • Add a background and objects to a frame (including text) • Copy/clone a frame and move objects to create an animation, including flipping objects. • Create an animation with multiple objects moving simultaneously. • Create screen-recording animation (*optional, requires iPad*). • Create stop-motion animation with photos (*optional, requires iPad*). • Create animated drawings of characters by cropping photos and adjusting points of movement. Introduce Data Handling • Understand what data is and collect it as a tally. • Use software to label a pictogram and add data to each column. • Edit a table with correct titles and numbers. • Use software to create a bar chart/pie chart/line chart suitable for the data. • Interpret a pictogram/bar chart/line chart. Ebook Creation • Add a book cover with title, author, colour and image. • Add multiple pages based on a theme. • Add text on different pages. • Add images on different pages to match the theme/text. • Add voice recordings to match the text and theme.

Year 3	Comic Creation • Add, resize and organise colour or picture backgrounds. • Add, resize, organise characters/objects to different panels. • Add narration using text and direct speech using speech bubbles. • Save comic with name and title. • Add audio recordings (optional). Storyboards • Add and edit backgrounds. • Add and edit characters, including changing posture, expression and clothing. • Add narration and speech bubbles, including formatting text. • Duplicate objects to match scenes. • Search for objects to use. Digital Art • Use various lines and fill tools plus copy/paste and rotation to create pattern effects. • Use shapes, fill, copy/paste, zoom and flip to create reflective symmetry effects. • Use stamps, copy/paste, layers and multiple frames to create animated GIF computer game graphics. Music Creation • Create ascending and descending scales. • Add chords evenly across the scales. • Add arpeggios and melodies. • Add a steady and even rhythm. • Use sampled sounds to create an effective mix. • Build beats, melody (tones) and effects. Document Editing & Creation • Copy and Paste text and images. • Find and replace words.

	• Format text for a purpose. • Add bullet points to make lists. • Experiment with keyboard shortcuts. 3D Design • Understand and use 3D space on a grid. • Design cities/towns for a purpose and to a budget. • Re-create or design familiar 3D models using cubes, such as tables and chairs. • Use chisel tool to improve and adapt models. • Colour individual blocks or whole models. Infographics • Understand what an infographic is and why we use them. • Search for and add suitable graphic elements. • Add and format suitable titles and text. • Label an image with arrows and text. Branching Database • Add and label objects within a branching database. • Ask questions to sort (classify) objects.
Year 4	Graphic Design • Create an icon using different shapes and fill tools. • Combine shapes and lines, then arrange them in front/behind each other. • Combine shapes, colour and text to re-create an icon. • Change the colour, size and style of text to match an icon, then arrange images and use masking and opacity tools. Animation

	• Create a stop-motion video by duplicating slides that include backgrounds and shapes. • Create animation using transition and animation effects (morph, motion paths, pulse etc), including taking and editing a screenshot. • Animate individual elements of objects. • Create animated GIF files by animating pixels. Data Handling • Change appearance of cells in a spreadsheet (fill colour and border) then add and align text. • Find and add data to a spreadsheet, resize cells and use the software to create a suitable chart with a title. 3D Design • Understand 3D spatial awareness. • Add 3D shapes, resize, adjust height, duplicate and use the different perspective. • Re-create different types of buildings using 3D shapes. • Create roads/paths by adjusting the height of 3D shapes. • Add windows and door shapes. • Add, move, change colour and duplicate a brick. • Rotate bricks. • Use sloping bricks and special bricks for a purpose. • Change the transparency of bricks. Video Editing • Add scene images. • Add scripted voiceover audio, adjust the volume and crop clips (including splitting a clip). • Add more clips and use transition effects. • Add titles. • Use elements such as shapes. • Add music background music and adjust the volume. • Export a project.

	Ebook Creation • Choose a suitable page shape and add a title and subtitle. • Change the background colour/texture of a page. • Add, resize and change the colour of a shape then copy and paste it. • Search for and add suitable images then resize and position them. • Create another page with a background, image, shapes and text. • Add an audio recording of the page text, including hiding it behind an object. • Use hyperlinks for navigation between the pages.
Year 5	App Design • Adjust slide size to mimic a phone/tablet size. • Add text and images to a slide. • Add icons and text to use as navigation. • Duplicate slides to create multiple pages of the app. • Create hyperlinks to create navigation. Data Handling • Select and use non-adjacent cells plus resize multiple cell widths and copy/paste cells. • Use formulae to find totals, averages and maximum/minimum numbers. • Find data and create a spreadsheet to suit it. • Search a database for specific information. EBook Creation • Add page colour and style. • Add, position and format text on different pages. • Add and position images. • Add audio, including hiding it behind an object. • Add hyperlinks to text and images. • Search for shapes. • Lock and arrange shapes (extension task).

	Music Creation • Layer tracks using sounds and effects. • Use various online samplers and sequencers to create drums patterns and scales. • Create effective instrument tracks. • Edit tracks and effectively adjust volume and add effects. Operating Systems • Understand the importance of an operating system and its key features. • Demonstrate important operating system skills (organising files etc), if possible, across multiple operating systems.
Year 6	Graphic Design • Add, adjust and fill shapes. • Group shapes to improve accuracy and speed. • Add and customise gradient effects. • Adjust transparency/opacity for a purpose. • Use a colour picker correctly. • Accurately rotate shapes. Computers: Past, Present and Future • Show awareness of how computers and digital technology helps us today. • Understand how technology has changed over time and represent it as an interactive timeline. • Understand the impact (positive/negative) technological changes have on society. • Predict how technology will change in the future. Image Editing • Adjust the colours, brightness and contrast to improve a photo. • Create a before and after slide in presentation software. • Take and crop a screenshot. • Add drawing and text layers. • Import new images as layers and resize them to fit.

	• Add colour elements to a black and white image using layers and eraser tools. Web Design • Create a static homepage. • Choose a suitable theme for your website. • Change the site identity to a suitable title, tagline and website icon. • Upload a suitable header and/or background image. • Adjust the website sidebar and add suitable widgets. • Add text and images to a page and edit them. • Add multiple pages and edit the navigation, including sub-menus. • Provide constructive feedback for your classmates' websites. Data Detectives • Use comprehension skills to find clues that match the column headings of a spreadsheet. • Use spreadsheet tools (filters and conditional formatting) to find the specific data to match the clues.
Digital Literacy	
Y1	E-safety • Understand what the internet is and how people use it. • Understand what personal information is and why we keep personal information private. • Why do websites want personal information. • Identify when and where to go for help when concerned. Recognise uses of IT • Understand what makes a computer a computer. • Understand computers store and follow instructions. • Spot digital technology in school. • Understand how different technology helps us.
Y2	E-safety • What are the dangers of sharing photos online? • People online are not always who they say they are.

	• Trusting information online. • Using the Internet responsibly. • Being respectful. Internet Research • Understand how a web-page displays information in different ways; text, images, videos and interactive elements. • Use a web-page to answer questions.
Y3	E-safety • Understand what to do if something upsets you online. • Understand why and how people can be nasty online. • Describe the term 'sharing online' and why we need to get permission to share photos and videos of other people. • Understand why people pretend to be someone else online. • Understand why we only talk to people we know in the real world, when online. • Understand why we should not always trust what we read online and how to check • Understand the importance of being kind in the real world and also online. • Understand how to protect digital content with a strong password. • Understand the importance of using avatars and how to make them.
Y4	Internet Research • Use search technologies to find specific pieces of information. • Understand features of an Internet Browser. • Reference the correct source of information. • Be discerning in evaluating digital content. • Check the internet for fake news by cross-referencing facts. E-safety • Understand what to do if something upsets you online. • Understand why and how people can be nasty online.

	• Describe the term 'sharing online' and why we need to get permission to share photos and videos of other people. • Understand why people pretend to be someone else online. • Understand why we only talk to people we know in the real world, when online. • Understand why we should not always trust what we read online and how to check • Understand the importance of being kind in the real world and also online. • Understand how to protect digital content with a strong password. • Understand the importance of using avatars and how to make them. Inside a Computer • Understand what important parts of inside a computer or mobile device do to help with the performance (CPU, Fan, Hard Drive, RAM, Graphics Card). • Understand that memory is measured in bytes and gigabytes. • Use search filters on websites to find suitable information.
Y5	Computer Networks & the Internet • Understand Computer Networks, Internet and Cloud Computing and how they help us. • What is email and how can we use it safely? • Understand how and why we collaborate online (including blogging). Physical Devices • Understand that computers use physical inputs and outputs and give examples. • Program physical inputs, outputs (e.g program LED lights) and random variables. • Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems. E-Safety • Keep personal information private. • Respect and protect again online bullies. • Understand the consequences of sharing photo/videos online. • Understand the term digital footprint.

	• How can we check online content is trustworthy. • How and where and who can we report concerns we have to. • Understand the pitfalls of in-app purchases.
Y6	E-Safety • Keep personal information private. • Respect and protect against online bullies. • Understand the consequences of sharing photo/videos online. • Understand the term digital footprint. • How can we check online content is trustworthy. • How, where and who can we report concerns we have to. • Use suitable usernames and passwords for online accounts. • Understand the pitfalls of in-app purchases. • Understand how and why companies/people track our online behaviour and how we can prevent it.