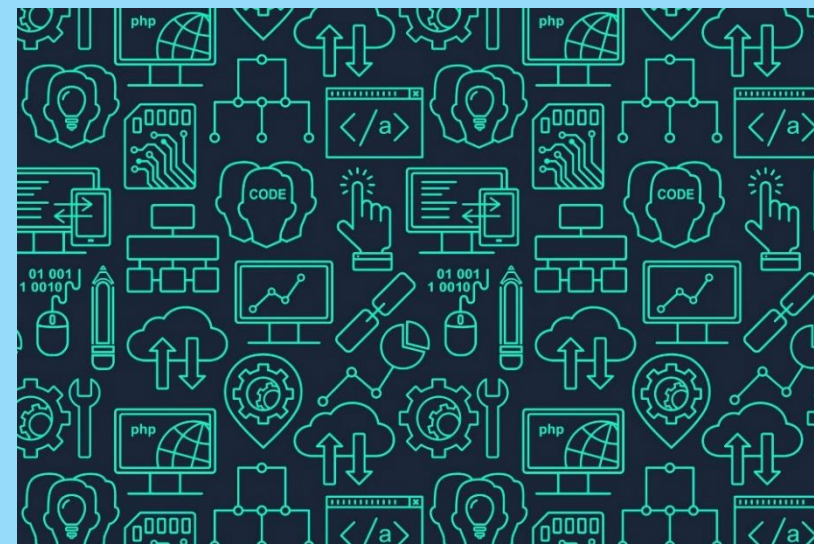2022/23

Curriculum Skills and Progression Map Computing

Old Catton Junior School

Nebula
where stars are born

CHRISTIAN DISTINCTINCTIVENESS STATEMENT
At Old Catton Junior School we enable the children to flourish in our modern and ever-changing world within our Computing curriculum. Through our teaching of E-Safety, we encourage our Christian value of love. We teach the children to treat one-another in a loving way and not treating anyone in an unkind or unfair way. This also links in with our school bible story of the Parable of the Lost Sheep as we are helping the children to understand that no one should feel left out or lost in the online world. As the children learn new skills, we give them hope for their future achievements and provide joy as the children overcome barriers and complete new tasks.

CONTEXT AND INTENT
This document has been rewritten following the trail and adoption of the iLearn2 scheme of work for Computing. The website for ilearn2 can be found here and we have adapted the scheme to suite our setting and pupils.   The intent of our Computing scheme is to help pupils become independent, creative, safe, respectful and problem-solving digital citizens with a broad and transferrable skillset. Our lessons aim to make computing fun for pupils, inspiring them to develop skills beyond the classroom and building an awareness of all the opportunities the subject provides.

COMPUTING: AGE RELATED STATUTORY COVERAGE	
KEY STAGE ONE LEARNING (for reference)	**KEY STAGE TWO LEARNING**
- Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions - Create and debug simple programs - Use logical reasoning to predict the behaviour of simple programs - Use technology purposefully to create, organise, store, manipulate and retrieve digital content - Recognise common uses of information technology beyond school	- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts - Use sequence, selection, and repetition in programs; work with variables and various forms of input and output - Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs - Understand computer networks including the internet; how they can provide multiple services, such as the world wide

- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

Both Key Stages:
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

web; and the opportunities they offer for communication and collaboration
- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- Select, use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content to accomplish given goals

Skills Map – Computing		
Year 3 – Computing		
Computer Science	*Information Technology*	*Digital Literacy*
Design, write and debug programs that accomplish specific goal, including simulating physical systems. *Use sequence and repetition in programs; work with various forms of input.*	*Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals.* *Design and create content that accomplish given goals.* *Collect, classify and present data.*	*Use technology safely, respectfully and responsible.* *Recognise acceptable/unacceptable behaviour.* *Identify a range of ways to report concerns about content and contact.*
Year 3 - Greater Depth		
Can they recognise the impact of keyword choice on search engine results? (e.g. results ranked according to relevance or reliability of content and credibility of sources)		

- Can they use a range of block code to identify and evaluate the most efficient and appropriate use? (e.g. events, motion, sensing, sound, control)
- Can they evaluate content (created/researched) against a given goal?
- Can they discuss some of the protocols involved in transmitting data via the internet?

Skills Map – Computing		
Year 4 – Computing		
Computer Science	*Information Technology*	*Digital Literacy*
Design, write and debug programs that accomplish specific goals. *Use sequence, selection, and repetition in programs; work with various forms of input and output.* *Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.*	*Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals.* *Collecting, analysing, evaluating and presenting data and information.*	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. *Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.*
Year 4 - Greater Depth		

- Can they design and create content on a computer in response to a given goal, paying attention to the needs of a known audience? (e.g. digital artwork linked to their topic, themes or core text)
- Can they can give reasons for errors in programs and explain how they have corrected these through decomposition and debugging?
- Can they explain an algorithm using sequence, repetition and selection in their own words?

Skills Map – Computing		
Year 5 – Computing		
Computer Science	*Information Technology*	*Digital Literacy*
Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts including controlling or simulating physical systems *Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.* *Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.* *Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.*	*Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals.* *Collecting, analysing, evaluating and presenting data and information.* *Design and create a range of programs, systems and content that accomplish given goals.*	*Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.* *Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.*
Year 5 - Greater Depth		

- Can evaluate content according to its effectiveness and impact on a target audience?
- Can they write programs that have sequences, repetitions and variables? (e.g. creating a scoring system as part of a Scratch game)
- Do they consider audience when editing media and justify their choices?
- Can they explain in simple terms how computers can generate photorealistic?
- Can they create complex and compound, aesthetically pleasing shapes?

Skills Map – Computing		
Year 6 – Computing		
Computer Science	*Information Technology*	*Digital Literacy*
Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts. *Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.* *Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.*	*Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals.* *Design and create digital content to accomplish goals.* *Use search technologies effectively and be discerning in evaluating digital content.*	*Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.*
Year 6 - Greater Depth		
Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits. (Key Stage 3) *Use a textual programming language to solve a variety of computational problems. (Key Stage 3)*		

Skills Map - Computing
E - Safety
E-Safety is taught discreetly in Computing lessons and is also embedded into our units of work. It is very important to us that we prepare pupils for the challenges of using technology as well as celebrating its many applications. Staff understand that computing is an ever-evolving subject and issues around e-safety also develop and change as technology evolves. Staff may choose to respond to new e-safety challenges as they arise in school or in society as a whole.

Knowledge and Understanding	Skills
• Do they understand the need for rules to keep them safe when exchanging learning and ideas online? • Can they recognise that information on the internet may not be accurate or reliable and may be used for bias, manipulation or persuasion? • Do they understand that the internet contains fact, fiction and opinion and begin to distinguish between them? • Can they use strategies to verify information, e.g. cross-checking? • Do they understand the need for caution when using an internet search for images and what to do if they find an unsuitable image? • Do they understand that copyright exists on most digital images, video and recorded music? • Do they understand the need to keep personal information and passwords private? • Do they understand that if they make personal information available online it may be seen and used by others? • Do they know how to respond if asked for personal information or feel unsafe about content of a message? • Can they recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy? • Do they know how to report an incident of cyber bullying? • Do they know the difference between online communication tools used in school and those used at home? • Do they understand the need to develop an alias for some public online use?	• Do they follow the school's internet rules? • Do they recognise the difference between the work of others which has been copied (plagiarism) and re-structuring and re-presenting materials in ways which are unique and new? • Can they begin to identify when emails should not be opened and when an attachment may not be safe? • Can they explain how to use email safely? • Can they use different search engines?

PROGRAM OF STUDY
Within our Computing curriculum Teachers have a lot of freedom over the units taught, the speed at which they are taught and the order in which these units are completed. Compulsory units are indicated in blue and must be taught during the year. Units in black are relevant for the year group and can be taught if time allows, but can also be missed if needed, as the main curriculum aims are covered within the compulsory units. E-Safety is always the first unit taught in every year group. The units which follow can be taught in any order, although both classes in the year group will follow the same order. The units all differ in length, meaning that some units may take an entire half term to complete whilst others only take a few weeks. This fact, along with each teacher's desire to follow different cross-curricular links means that they can follow the computing curriculum in a way which suits their teaching time, other units the children are learning about and the children's differing abilities and interests. After the 22/23 school year, the aim is to reflect on the units covered and the order in which they were taught in order to develop a more formalised unit order.

YEAR 3 PROGRAM OF STUDY		
Unit	**Learning Intentions and Skill covered**	**Outline of suggested Program of Study. Full plans at ilearn2.co.uk**
3.E E-Safety NC (e, g) Digital Literacy	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.	Use of the resources from the Band Runner series on thinkyouknow.co.uk. Class discussions. Use SMART rules from Childnet.
3.1 Digital Art NC (f) Information Technology	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 graphics.	In this unit there are 3 projects for building skills in creating digital artwork, using an online editor. Each project has videos to for each skill. Activity 1. Use various lines and fill tools plus copy/paste and rotation to create wrapping paper effects. Activity 2. Use various tools to build a city landscape and then use reflective symmetry.

		Activity 3. Pupils learn how to design a level for a platform game using stamps and copy/paste to build up the different graphics, then add layers and animate it with multiple frames.
3.2 Programming in Scratch NC (a, c) Computer Science	Design, write and debug programs that accomplish specific goals. (Including outputs) Use repetition in programs. Work with various form of inputs; keyboard, mouse and touch screen. Write programs to simulate physical systems.	Activity 1. Write a simple program with text outputs, wait commands and movement Activity 2. Write a program with movement and repetition. Activity 3. Write programs using different inputs; keyboard, mouse and touch screen. Pupil Activity 4. Write programs with mouse/touch inputs and text outputs Pupil Activity 5. Write a program that simulates physical systems (Traffic lights)
3.3 Music Creation Information Technology	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.	Activity 1. Scales, chords, melodies, rhythm and tempo Use the videos below to help create scales, pitch, chords, melody and rhythm using Music Lab Song Maker. Activity 2. Use mixing tools to build a song using different sampled voices. Activity 3. Build a beat/rhythm, melody and sound effects.
3.4 Programming in Kodu Computer Science	Create a 3D place using various design tools. Write a program to control using keyboard inputs. Write a program with conditions (selection). Write a program with variables	Activity 1. Build a 3D world in Kodu with hills and water. Activity 2. Program Kodu characters with keyboard inputs. Activity 3. Program conditions (selection) and a scoring system. Activity 4, Add multiple players and game over conditions.
3.5 Document Editing and creation Information Technology	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.	Activity 1. Copy and paste text Activity 2. Find and replace text Activity 3. Change the appearance of text Activity 4. Add an image and edit it Activity 5. Bullet Points Activity 6. Keyboard shortcuts

3.6 3D Design NC (f) Information Technology	Understand and use 3D space on a grid. 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.	Activity 1. Understanding 3D Space. Activity 2. Using the different tools of 3D slash and build a 3D table. Activity 3. Using the chisel and extending items.
3.7 Info graphics Information Technology	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.	Pupils learn what an infographic is and how to create one by adding text to graphic elements.
3.8 Branching Databases Information Technology	Add and label objects within a branching database. Ask questions to sort (classify) objects.	Pupils learn how to create a branching database using Junior Tools Website.
3.9 Data Handling Information Technology	Interpret and present data using bar charts, pictograms and tables Solve one-step and two-step questions [for example 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables	*See OneNote for plans and videos* Session 1: Children to create their own pictograms from data presented in a table, then answer one-step and two-step questions with increasing difficulty. Session 2: Children to create their own bar charts from data presented in a table, then answer one-step and two-step questions with increasing difficulty. Session 3: Children to be provided with a bar chart and pictogram and asked to use them to fill in a table of information.
YEAR 4 PROGRAM OF STUDY		
Unit	**Learning Intentions and Skills covered**	**Outline of suggested Program of Study. Full plans at ilearn2.co.uk**
4.E E-Safety NC (e, g)	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.	Use of the resources from the Band Runner series on thinkyouknow.co.uk. Class discussions. Use SMART rules from Childnet.

Digital Literacy	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.	
4.1 Animation NC (f) Information Technology	1. Create a stop-motion video by duplicating slides that include backgrounds and shapes. (Activity 1) 2. Create animation using transition and animation effects (morph, motion paths, pulse etc), including taking and editing a screenshot. (Activity 2-4) 3. Animate individual elements of objects. (Activity 5) 4. Create animated GIF files by animating pixels. (Activity 6)	Activity 1. Create stop motion animation in PowerPoint/Keynote/Google Slides by duplicating slides with background colour and shapes Activity 2 – Use Magic Move in Keynote or Morph Transitions in PowerPoint to create Animations Activity 3- Use Motion Path Animations in PowerPoint/Keynote Activity 4- Use Pulse Animations in PowerPoint/Keynote Activity 5. Animate individual elements of objects Activity 6. Create animated GIF files using moving pixels
4.2 Programming using Scratch NC (a, c) Computer Science	Use sequence, selection, and repetition in programs. 2. Work with variables and various forms of input and output. 3. Debug programs that accomplish goals. (correcting errors) 4. Work with variables and conditions.	Activity 1. Program inputs with loops. Use selection and sensing for interactions. Activity 2. Write a program with audio outputs and inputs. Activity 3. Debug a variety of programs (correcting errors) Activity 4. Program selection with data variables and operators. Activity 5.- Program a Virtual Robot using Scratch blocks.
4.3 Internet Research NC (e) Digital Literacy	Appreciate how search results are selected and ranked and show awareness of different strategies for finding specific information (Teacher input) Understand the features of an Internet Browser (Teacher Input and unplugged task) Use search technologies (different websites) to find specific pieces of information (Activity 1 and 2) Reference the correct source of information (Activity 3) Be discerning in evaluating digital content. (Activity 4)	Activity 1. Pupils use minibeast website to find facts about. Activity 2. Pupils use search engines to find information about their date of birth. Activity 3. Pupils find answers to questions on the internet and cite their sources. Activity 4. Pupils compare information about the same subject from different websites. Activity 5. Pupils learn the importance of finding their information from a credible source.

	Check the internet for fake news by cross-referencing facts (Activity 5)	
4.4 Data Handling NC (f) Information Technology	*From Maths NC expectations* Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	*See OneNote for plans and videos* Session 1: Children to create their own time graph from data presented in a table, then answer simple comparison, sum and difference questions with increasing difficulty. Session 2: Children to create their own discrete and continuous bar charts from data presented in a table, then answer simple comparison, sum and difference questions with increasing difficulty. Session 3: Children to be provided with a time graph, discrete and continuous bar chart and asked to use them to fill in tables of information.
4.5 Graphic Design Information Technology	1. Create an icon using different shapes and fill tools.(Activity 1) 2. Combine shapes and lines, then arrange them in front/behind each other. (Activity 2) 3. Combine shapes, colour and text to re-create an icon. (Activity 3) 4. Change the colour, size and style of text to match an icon, then arrange images and use masking and opacity tools. (Activity 4)	Activity 1. Mail Icon - In this activity you will learn how to add shapes and resize them to create a mail icon. Use the videos for the software you are using below. Activity 2. Clock/watch icon - In this activity you will learn how to resize, fill and arrange shapes to recreate a clock or watch icon. Activity 3. London Underground Logo - In this activity you will learn how to use shapes, fill tools and text to re-create the London Underground logo Activity 4. Google Logo - In this activity you will learn how to re-create the Google logo using text. Then add images behind the logo to create a theme for a famous event. e.g World Book Day. You can choose the theme for your logo.
4.6 Video Editing Information Technology	Add scene images. Add scripted voiceover audio, adjust the volume and crop clips (including splitting a clip). Add more clips and use transition effects.	The activity pack guides pupils through creating a video guide to software such as Scratch, using the built-in image search. Pupils can work at their own pace and should be encouraged to experiment with the different tools.

	Add titles. Use elements such as shapes. Add music background music and adjust the volume. Export a project.	
4.7 Inside a computer NC (d) Digital Literacy	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.	The videos and activities below help pupils understand how important parts inside a computer make it function. The videos cover the CPU, Fan, Hard Drive and RAM. The graphics card is also described.
4.8 Create an Ebook Information Technology	Add page colour and style Add, position and format text on different pages Add and position images from camera/web Add audio, including hiding it behind an object. Add hyperlinks to text and images Add and format shapes Use hyperlinks for navigation Add audio to pages	The activity pack guides pupils through creating an interactive book library of books on any subject the teacher wishes so teachers will need to think about what books they would like to review before they start.
YEAR 5 PROGRAM OF STUDY		
Unit	**Learning Intentions**	**Outline of suggested Program of Study. Full plans at ilearn2.co.uk**
5.E E-Safety NC (e, g) Digital Literacy	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 and where and who can we report concerns we have to?	Children will explore terms relating to online safety, such as Personal information/privacy, Cyber- bullying, Sharing, Digital footprint, Trust and Report. Children will watch age-appropriate clips to find out more about online safety and complete assessments to check their knowledge, which will have built up across the years. Children are reassured what to do if issues occur and are signposted to who to speak to in those situations.

5.1 Programming in Scratch NC (a, b, c) Computer Science	1. Program inputs for control, selection (conditions) and sensing for interaction and data variables for scoring and a game timer. (Activity 1) 2. Program distance sensing and movement. (Activity 2) 3. Program Inputs, outputs, loops, selection, sensing and variables. (Activity 3) 4. Program list variables that chooses randomly. (Activity 4)	Activity 1. Write a program with inputs, movement, selection, sensing and data variables. Activity 2. Program distance sensing and movement (Virtual Robot) Activity 3. Program Inputs, outputs, loops, selection, sensing and variables. (Extension) Activity 4. Program list variables that chooses randomly.
5.2 APP Design NC (f) Information Technology	Use the tools in different presentation software (PowerPoint, Keynote, Google Slides) to design an app about your school with: – *Slide size and background colour* – *Text and Images (including transparent images) on different pages* – *Icons* – *Interactions using hyperlinks*	Activity 1. Slide size and colour Activity 2. Text and Images Activity 3. Icons and Text Activity 4. Other Slides Activity 5. Create navigation using hyperlinks
5.3 Text Based Programming NC (a, b, c) Computer Science	Change the variables of text-based commands. (Activity 1) Write text-based commands accurately and use fill effects, stamps and functions. (Activity 2). Write text-based commands to program digital art. (Activity 3 Write text commands/functions to program keyboard inputs in a game. (Activity 4) Programming a Logo turtle to move and use pen *(Activity 6, lesson 1 an* Use co-ordinates in with a Logo turtle *(Activity 5, lesson 3 and 4* Print labels in Logo. *(Activity 5, lesson 5)* Program a loop (repetition) and shapes in Logo Turtle. *(Activity 5, lesson 6 and 7)* Program colours in Logo turtle. *(Activity 5, lesson 10)* Program variables in Logo turtle. *(Activity 5, lesson 11)*	Pupils are introduced to text-based programming and how it is different to using code blocks (such as Scratch). These activities will prepare pupils for the accuracy required for HTML and Python programming.
5.4	*From Maths NC expectations* Solve comparison, sum and difference problems using	*See OneNote for plans and videos*

Data Handling NC (f) Information Technology	information presented in a line graph Complete, read and interpret information in tables. Search a database for specific information. (Activity 2)	Session 1: Children to create their own line graph from data presented in a table, then answer comparison, sum and difference questions with increasing difficulty. Session 2: As shown on ilearn2. Children to search a database to retrieve answers for questions from a variety of data sources, including tables and pie charts.
5.5 Music Creation Information Technology	Layer tracks using sounds and effects. (BeepBox activity) Create effective instrument tracks. (Sampulator activity and first two GarageBand activities)	This activity pack guides pupils through using two online music creation tools (Beepbox and Sampulator) to create multi-tracked sounds. Beebox also teaches pupils how to add effects.
5.6a Ebook Creation Information Technology	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)	1. Front Cover with background colour, text and an image. 2. Question page 3. Answer pages 4. Hyperlinks
5.6b Video Editing (Y4) (Only used if not studied during Y4) Information Technology	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.	The activity pack guides pupils through creating a video guide to software such as Scratch, using the built-in image search. Pupils can work at their own pace and should be encouraged to experiment with the different tools.
5.7 Computer Networks and the Internet NC (d)	1. Understand Computer Networks, Internet and Cloud Computing and how they help us. 2. What is email and how can we use it safely? 3. Understand how and why we collaborate online (including blogging).	Lesson 1. Understand Computer Networks, Internet and Cloud Computing Lesson 2 – What is email and how can we use it safely? Lesson 3 – How and why can we collaborate online?

Digital Literacy		
5.8. Typing Information Technology	Children learn techniques for more accurate typing, touch typing and keyboard shortcuts. This helps them to become more efficient and accurate with their computer usage.	1. The Computer Keyboard 2. Use correct hand position and fingers for touch typing 3. Develop and assess touch typing skills
YEAR 6 PROGRAM OF STUDY		
Unit	**Learning Intention**	**Outline of suggested Program of Study. Full plans at ilearn2.co.uk**
6.E E-Safety NC (e, g) Digital Literacy	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 and where and who can we report concerns we have to?	Children will explore terms relating to online safety, such as Personal information/privacy, Cyber- bullying, Sharing, Digital footprint, Trust and Report. Children will watch age-appropriate clips to find out more about online safety and complete assessments to check their knowledge, which will have built up across the years. Children are reassured what to do if issues occur and are signposted to who to speak to in those situations.
6.1 Programming in Scratch NC (a, b, c) Computer Science	1. Program inputs, selection, loops and random variables (operators) for unpredictability. (Scratch Space Activity 1) 2. Program inputs, selection (conditions), sensing, random variables, operators for direction and data variables for scoring. (Scratch Tennis Activity 2) 3. Use inputs, selection (conditions), loops, sensing, costume changes and broadcasts. (Scratch Paint Activity 3) 4. Work with multiple sprites to send broadcast messages between them. (Scratch Phone Simulator Activity 4)	Pupil Activity 1. Program inputs, selection (conditions), loops and random variables (operators) for unpredictability. Pupil Activity 2. Program inputs, selection (conditions), sensing, random variables, operators for direction and data variables for scoring. Pupil Activity 3. Use inputs, conditions (selection), loops, sensing, costume changes and broadcasts. Pupil Activity 4. Work with multiple sprites to send broadcast messages between them.

6.2 Computers: Past, Present and Future `Information Technology`	Design and create digital content to accomplish goals Use search technologies effectively and be discerning in evaluating digital content 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.	Pupil Activity 1 – Computers (Present) Pupil Activity 2 – Computers (Past) Pupil Activity 3 – Computers (Future) – Group and class discussion task
6.3 Binary Code NC (d) `Digital Literacy`	1. Understand why computers/electronics use binary. 2. Match a sequence of binary code to create digital art. 3. To convert binary code to denary numbers (decimal numbers) and visa versa.	1. What is Binary Code? 2. Binary Mosaics 3. Cisco Binary 4. Binary Bonanza
6.4 Programming in Python NC (a, b, c) `Computer Science`	Use an online Python editor to program in Python, including: – Write basic python syntax – Print text – Use Python as a calculator – Program loops to repeat text – Program interactive inputs – Program a trivia chatbot using 'send message' functions (challenge)	1. Use Python Syntax 2. Print text 3. Calculator 4. Loops 5. Interactive Inputs 6. Times table input ranges
6.5 HTML `Computer Science`	1. Add and align text and change colour. 2. Program background colour. 3. Add and align images. 4. Add hyperlinks to other websites. 5. Add an iframe (such as a Google Map) and adjust the height and width.	1. Creating a HTML Project and adding the <body> 2. Aligning Text 3. Formatting Text 4. Background Colours 5. Text Colours 6. Hexadecimal Colours 7. Adding Images 8. Hyperlinks 9. Iframes

6.6 Machine Learning and Artificial Intelligence Digital Literacy	1. Understand how computers use information to learn by solving new problems and following new instructions. 2. Understand and use examples of machine learning. 3. Understand how artificial intelligence is used to perform tasks often only performed by humans. 4. Discuss and show awareness of potential dangers of AI.	Activity 1 – Cartoonify Activity 2 – Quick, Draw Activity 3 – Semantris Word Association Activity 4 – AI Piano Duet
6.7 Web design NC (f) Information Technology	1. Create a static homepage. 2. Choose a suitable theme for your website. 3. Change the site identity to a suitable title, tagline and website icon. 4. Upload a suitable header and/or background image. 5. Adjust the website sidebar and add suitable widgets. 6. Add text and images to a page and edit them. 7. Add multiple pages and edit the navigation, including sub-menus. 8. Provide constructive feedback for your classmates' websites.	1. The WordPress dashboard 2. Create a static homepage 3. Themes 4. Site identity 5. Header and background images 6. Sidebars, widgets and mobile view. 7. Text and Images 8. More pages and navigation 9. Feedback
6.8 Graphic design NC (f) Information Technology	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 (Keynote and PowerPoint only) Accurately rotate shapes	Pupil Activity 1. Calculator Icon Pupil Activity 2. Weather Icon Pupil Activity 3. Photos App Icon Challenge Once you have mastered the different skills above, could you design your own app icon for your school, sports team, product etc that includes the following: – Shapes with gradient fill – Transparency/opacity effects – Rotated shapes
6.9 Image Editing	1. Adjust the colours, brightness and contrast to improve a photo. 2. Create a before and after slide in presentation software. 3. Take and crop a screenshot.	1. Adjust colours, contrast and brightness to improve an image 2. Taking a screenshot 3. Import your screenshot, crop and ratios

Information Technology	4. Add drawing and text layers. 5. Import new images as layers and resize them to fit.	4. Add text and drawing layers 5. Add image layers 6. Save
6.10 Data Handling Information Technology	*From Maths NC expectations* Interpret and construct pie charts and line graphs and use these to solve problems Calculate and interpret the mean as an average	*See OneNote for plans and videos* Session 1: Children to create their own line graph from data presented in a table, then interpret and use it to solve problems with increasing difficulty. Session 2: Children to use formula to work out the mean of a data set, with increasing difficulty. Session 3: Children to create their own pie chart from data presented in a table, then interpret and use it to solve problems with increasing difficulty.

Appendix I
Key Subject Specific Vocabulary by Year Group

Year 3

    3.E - personal information, sharing, permission, report, trust, respect

    3.1 – rotation, zoom, flip, symmetry, stamp, gif

    3.2 – sprite, stage, sequence, debug, loops or repetition, inputs

    3.3 – scales, chords, arpeggio, bars and beats, sampled sound, effects

    3.4 – navigate, terrain, object, input, condition, program, selection

    3.5 - word processor, find and replace, format, text wrapping, bullet points, keyboard shortcuts

    3.6 - 3D, rotate, zoom, grid, chisel, hammer and trowel, spray, bucket

    3.7 - infographics, graphic elements, text

    3.8 - branching database, data, sort, classify, yes/no questions

    3.9 – cell, pictogram, data set, bar chart, axis

Year 4

4.E – personal information, sharing, permission, report, trust, respect
4.1 – frame, clone, onion skin, timeline, frame rate, transition, gif
4.2 – inputs, selection, sensing, variables, debug
4.3 – internet browser, search engine, web-address and address bar, www, ranking
4.4 – spreadsheet, cell, bar chart, time graph, discrete, continuous, data
4.5 – shapes, arrange, fill, texto, masking, transparency/opacity
4.6 – clips, timelines, split, transitions, titles, voiceover, export
4.7 – core processing unit (CPU), fan, hard drive, random access memory (RAM), graphics card
4.8 – page shape, content, inspector, hyperlink, preview

Year 5

5.E – personal information, sharing, digital footprint, report, trust, respect, in-app purchasing
5.1 – inputs, selection, sensing, variables, debug
5.2 – screen dimensions, icons, navigation, hyperlinks, duplicate
5.3 – javascript, logo, function, loops or repetition, variables
5.4 – spreadsheet, cell, database, record, field, sort, line graph
5.5 – multi-track, bars and beats, sampled effects, tracks
5.6a – page shape, content, inspector, hyperlink, preview
5.6b - clips, timelines, split, transitions, titles, voiceover, export
5.7 – server, router, firewall, IP address, wireless access point (WAP), cloud computing
5.8 – touch typing, keys, hand position, muscle memory

Year 6

> 6.E – personal information, sharing, digital footprint, report, trust, respect, in-app purchasing
> 6.1 – inputs, operators, sensing, variables, broadcasts
> 6.2 – binary, microchip, Apple, Microsoft
> 6.3 – binary, denary numbers, translate/covert
> 6.4 – syntax, print, range
> 6.5 – hyperlinks, tags, hexadecimal colours
> 6.6 – machine learning, artificial intelligence
> 6.7 – Wordpress, static page, theme, header, sidebar, widgets, navigation, domain name
> 6.8 – grouping, gradient, transparency/opacity, colour picker, arrange
> 6.9 – crop, aspect ratio, filters, colour editing, light editing
> 6.10 – spreadsheet, cell, line graph, interpret, mean, average, formula, pie chart

Appendix II
Examples of Big Questions by Year Group

Teachers will occasionally use higher order questioning during and at the end of units (if and when deemed necessary) to assess the depth of pupil understanding. Below are some examples of the type of 'Big Questions' that teacher may use but these may be changed depending of the interests and level of understanding of the class. These are not expected to be used for every unit.

Year 3

Communication and E-Safety

Why do you need to tell an adult if you feel uncomfortable with something online?

How is a face to face conversation different to a text conversation?

Describe acceptable and unacceptable online behaviour? Why?

Programming

What happens if you make a mistake when you are coding?

What might happen if the mars rover has an error in its programming?

Arts and Music

Why is it entertaining to watch people play a game?

Why is playing a game a good way of learning?

Which games are educational?

Can games ever be a waste of time?

Year 4

Communication and E-Safety

How might you keep your identity safe online?

Why might someone try to get hold of your details?

How might technology make our lives easier in the future?

Programming

How might you realise that you've made an error in programming?

What's better, pre-programming or controlling in real time?

Arts and Music

Should people have to tell people if they have edited an image of themselves?

Is live music better than recorded?

Who owns music?

What is lost in recorded music?

Year 5

Communication and E-Safety

Will we need teachers in the future?

Is it okay to take and post pictures of people without them know? Why?

How would you explain e-safety to a younger child?

Why is it important to understand what is happening to our data?

What is the internet?

Programming

How can you make this programme more efficient?

How might an over reliance on robots be a problem?

Would it be okay to make robot clones of yourself to do the things you don't want to do?

Could you be tricked into believing a robot is a person?

Arts and Music

Can nature be equalled by a programme?

Who owns art?

Can an art be produced by a computer?

Is architecture art?

Can you live in an online world?

Year 6

Communication and E-Safety

How might technology change our lives for the worse?

Is it okay to use other people's images? Why?

Should everything online be permanent or disappear?

How might filters be useful?

Programming

Are robots alive?

If you replace the parts of a person with robotic parts will they still be human?

How does autonomous programming effect our lives?

Arts and Music

Is there artistry in game play?

Why do we advertise?

What are the advantages and disadvantages of making APPs free to all?

What are the ethics around tracking others using GPS?

Suggested Possible Subject Links
Below are ideas for cross- curriculum links to other subjects. Teachers know their classes the best and will choose when these links are meaningful and timely. Some links may be made explicitly whereas others may be more implicit. Possible writing opportunities are highlighted in blue,
Year 3

- Art and DT
    - o Children design their own wrapping paper (3.1). This could link into Art and DT lessons as they could link designs to previous art work or use the wrapping paper they create within a DT project.
- Maths
    - o The use of rotation, transformation and symmetry (3.1) links in to Maths lessons on shape. Children can draw on their previous skills and knowledge from these areas and link them to this Computing unit and some Maths units.
    - o The use of 3D modelling (3.6) can aid children's understanding of 2D and 3D shapes and the uses they have.
    - o Unit 3.9 (Data handling) has been specifically created to match up with the Maths Curriculum and aid in the coverage of the statistics objectives.
- Geography
    - o Children have the opportunity to create their own interactive map (3.2) which could be linked back to their Geography units. This could be used as a way to assess the level of children's knowledge and retention of key geographical facts.
- PSHE
    - o Children have the opportunity to create programs within Scratch which link to real-life scenarios (3.2). This could link to discussions and learning about friendships and events in the real world.
    - o E-Safety plays a vital role in our PSHE curriculum, encouraging them to use the internet and electronics safely and educating them on where to go if they are unsure (3.E)
- Music
    - o Unit 3.3 links directly to the music curriculum. Children learn technical vocabulary which can then be used and referred to within music lessons.
- English
    - o Children learn how to type and present pieces of writing effectively (3.5). These skills can then be used to type up pieces of writing completed with English sessions.
    - o Children can use their spoken language skills to perform the poems which they have processed on word, building on their confidence and performance skills.
- Science
    - o Links can be made to the requirement for working scientifically (3.8); in particular, making systematic and careful observations, along with classifying different organisms.
- Unit 3.7 can have many cross-curricular links as children can use these skills to demonstrate their knowledge and retention of facts from units across the entire curriculum.
- Programming within both Scratch and Kodu present many applications and uses across much of the curriculum, due to the range of processes and applications within these programs.

Year 4

- English
  - o Children are able to use their story-telling skills (4.1).
  - o They could use animation skills to retell a story they are studying in English lessons (4.1).
  - o As with any text-based coding, spelling, punctuation and grammar are important. (4.2).
  - o Children can use their research skills to create a presentation on a topic of their choice. Presenting this to the class could link in with their verbal and oral literary skills (4.3)
  - o Children write their own script to work as a voiceover for a film (4.6).
  - o Children have the opportunity to write their own eBook. In this they will need to carefully consider their spelling, punctuation and grammar (4.8).
- Science
  - o Children can use animation skills to capture different processes within Science, such as life cycles (4.1)
  - o Work can be linked to the beating heart (4.1), linking to Science work on the human body and other animals.
  - o Children have the opportunity to research areas of interest and study, linked to their Science work (4.3)
  - o Children have the opportunity to complete activities linked to animals and their habitats (4.4)
- Humanities
  - o Children have the opportunity to create an animated map (4.1), this could link in with an area of study within Geography.
  - o Children have the opportunity to research areas of interest and study, linked to their Humanities work (4.3)
- Maths
  - o Children have the opportunity to create games and activities linked to their times tables (4.4).
  - o Data is a key part of the Maths curriculum. Work across Computing (4.4) and Maths can link back and forth here.
  - o Unit 4.4 (Data handling) has been specifically created to match up with the Maths Curriculum and aid in the coverage of the statistics objectives.

- PSHE
  - o E-Safety plays a vital role in our PSHE curriculum, encouraging them to use the internet and electronics safely and educating them on where to go if they are unsure (4.E)
  - o Children have the opportunity to participate in activities linked to real-life scenarios (4.7)
- Unit 4.8 can have many cross-curricular links as children can use these skills to demonstrate their knowledge and retention of facts from units across the entire curriculum.
- Programming within Scratch presents many applications and uses across much of the curriculum, due to the range of processes and applications within it.

Year 5

- PSHE
    - o E-Safety plays a vital role in our PSHE curriculum, encouraging them to use the internet and electronics safely and educating them on where to go if they are unsure (5.E). In particular, Year 5 go into the specifics of the safety of sharing photos and what to do if they see something online which makes the feel uncomfortable within the compulsory RSE curriculum.
    - o Through their work in Computer Networks (5.7) children grasp a wider understanding of what is happening within their devices and develop further understanding about why e-safety and being cautious with devices is so important.
- English
    - o As with any text-based coding, spelling, punctuation and grammar are important (5.1, 5.3).
    - o Children have the opportunity to create information pages for the creation of an app (5.2).
    - o Children have the opportunity to write their own eBook. In this they will need to carefully consider their spelling, punctuation and grammar (5.6a)
    - o Children working on improving their typing skills (5.8) allows them to become increasingly more skilled at different ways of presenting English work in addition to preparing them for future online work.
- Maths
    - o Children use their sequencing skills to create a written program (5.3)
    - o Data is a key part of the Maths curriculum. Work across Computing (5.4) and Maths can link back and forth here.
- PE
    - o Children have the opportunity to explore and analyse route maps and other details about famous sporting events, such as the Tour De France (5.4)
- Music
    - o Children have the opportunity to create their own pieces of music from the production aspect (5.5).
    - o Unit 5.4 (Data handling) has been specifically created to match up with the Maths Curriculum and aid in the coverage of the statistics objectives.
- Humanities
    - o Children have the opportunity to research areas of interest and study, linked to their Humanities work (5.6a)

- Unit 5.6a can have many cross-curricular links as children can use these skills to demonstrate their knowledge and retention of facts from units across the entire curriculum.
- Programming within Scratch (5.1) and other text based programming (5.3) presents many applications and uses across much of the curriculum, due to the range of processes and applications within it.

Year 6

- PSHE
    - o E-Safety plays a vital role in our PSHE curriculum, encouraging them to use the internet and electronics safely and educating them on where to go if they are unsure (6.E).
    - o Through unit 6.6, children are able to have discussions and increase their awareness of Artificial Intelligence and the potential dangers of it.
- English
    - o As with any text-based coding, spelling, punctuation and grammar are important (6.1, 6.4).
    - o Children have multiple opportunities to create their own website and have to compose their own information to post on this. In addition, they are required to think creatively for a catchy title and tagline for these websites. (6.5, 6.7)

- PE
    - o Children are given the opportunity to use their knowledge of various different sports to create their own online versions of these games, thinking carefully about the layout of pitches and how players move (6.1)

- Humanities
    - o Children learn about the history of technology and how Computing has changed over time since their initial creation, along with predicting what could be in store for the future (6.2)

- Art and DT
    - o Children have the opportunity to create digital art using binary code (6.3)
    - o Children have the opportunity to learn all about Graphic Design and what it entails. They recreate their own app icons using online technology (6.8)
    - o Children have the opportunity to use their artistic eye to edit an image to improve it. They adjust colour and brightness, crop images and add drawing and text layers (6.9)

- Maths
    - o Children learn how to convert binary code to denary (decimal) numbers and vice versa (6.3)
    - o Unit 6.10 (Data handling) has been specifically created to match up with the Maths Curriculum and aid in the coverage of the statistics objectives.

- Programming within Scratch (6.1) and other text based programming (6.4) presents many applications and uses across much of the curriculum, due to the range of processes and applications within it.