How Our Computing Curriculum is Organised

Substantive Knowledge and Core Concepts

Substantive Knowledge

- Computer science
- Information technology
- Digital literacy

Core Concepts

- Programming
- Organising
- Information technology
- Networks
- Online Safety

Disciplinary Knowledge and Skills – Thinking and Working Like an IT Specialist

Programming
Using and writing codes to produce instructions and algorithms; to solve problems; to test and use logic and sequences against inputs and

Data collection and Presentation
Being able to safely, efficiently and confidently find, evaluate, store, sort and use appropriate data.

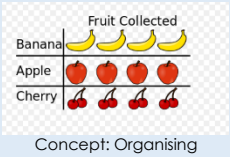
Connect and communicate
Being able to safely, efficiently and confidently digitally connect with others and communicate ideas.

Rationale

At Cornerstone Schools, we provide high-quality computing education which equips children to use computational thinking and creativity to understand and appreciate the world. Our curriculum has been designed to make links with mathematics, science and design technology, and is creative, logical and collaborative. Our four-year rolling curriculum ensures that skills are continually refreshed and built upon in a cyclical way. We ensure that our pupils understand an apply the fundamental principles of computer science, including abstraction, logic, algorithms and representation through a range of plugged and unplugged practical experiences. In doing this we are equipping children with the confidence and ability that will inspire and motivate our children to become responsible, competent and digitally literate, adults.

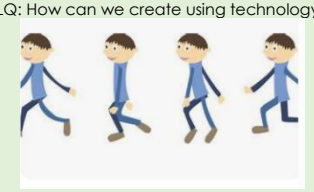
Computing Four-Year Rolling Plan

EYFS/KS1 Topics and Conceptual Overview

	Autumn	Spring	Summer
Year A	**Topic: Technology everywhere!**	**Topic: A work of art**	**Topic: Sort it out**
	LQ: How do computers make our lives easier? Concept: Networks	LQ: How can computers help me to create? Concept: Information Technology	LQ: How can I organise my information? Concept: Organising
Year B	**Topic: Robotics**	**Topic: Fancy writing**	**Topic: left and right**
	LQ: How can I make my robot move? Concept: Programming	LQ: What will make my work look better? Concept: Information Technology	LQ: What does repetition do to my programme? Concept: Programming
Year C	**Topic: Keeping safe**	**Topic: Picture this**	**Topic: How many?**
	LQ: How do computers make our lives easier? Concept Networks	LQ: How can computers help me to create? Concept: Information Technology	LQ: How can I organise my information?  Concept: Organising
Year D	**Topic: Bossy robots**	**Topic: Sounds good**	**Topic: Quiz master**
	LQ: Does the order of my commands matter? Concept: Information Technology, Programming	LQ: How can technology make music? Concept: Information Technology	LQ: Why are my instructions important? Concept: Programming

Computing Four-Year Rolling Plan

KS2 Topics and Conceptual Overview

	Autumn	Spring	Summer
Year A	**Topic : World wide web**	**Topic: Walk me through it**	**Topic: Information Overload**
	LQ: How do computers help us to communicate? Concept: Networks	LQ: How can we create using technology?  Concept: Information Technology	LQ: How can computers help us to organise information? Concept: Organising
Year B	**Topic: Code it!**	**Topic: The camera never lies**	**Topic: I sense a problem**
	LQ: How can I improve my programme? Concept: Programming	LQ: What edits will improve my work? Concept: Information Technology	LQ: What does repetition do to my programme? Concept: Programming
Year C	**Topic: Sharing is caring**	**Topic :**	**Topic: Information overload**
	LQ: How do I know what I can believe online? Concept:Networks	LQ: What will improve the appeal of my document? Concept: Information Technology	LQ: What information will help me to answer a question? Concept: Organising
Year D	**Topic: I hear music**	**Topic Top model**	**Topic: Making it better**
	LQ: How does sound improve my programming? Concept: Programming	LQ: How does grouping my objects help my modelling? Concept: Information Technology	LQ: How does manipulating my video improve it? Concept: Information Technology, Programming

	Autumn		Spring		Summer	
Year A EYFS and KS1 Topic	**Topic: Technology Everywhere** LQ: To do computers make our lives easier?		**Topic: Work of art** LQ: How can computers help me to create?		**Topic: Sort it out** LQ: How can I organise my information?	
EYFS Knowledge Blocks	**Age 3/4** Use an ipad to swipe and zoom in U**se a keyboard in role play area**	**EYFS** Use an ipad to take a photograph **Know that a mouse moves a curser on the screen**	**Age 3/4** S**wipe through photographs on an ipad using index finger**	**EYFS** **Use an ipad to create a picture using a paint programme** **Take a photo using an ipad**	**Age 3/4** Sort items by colours	**EYFS** **Group information physically – by sorting, including, shape, size, colour and material**
Core Concept	**Substantive Concept: Networks** Aut1: Technology around us (Computers and networks) *(Lesson 6: Using a Computer Responsibly)* Aut1: IT around us (Computers and networks) *(Lesson 5: Using IT Safely)*		**Substantive Concept: Information Technology** Spr1: Digital painting (Creating media) Spr1: Digital photography (Creating media) *(E-safety lesson – Digi Ducks Big Decision)*		**Substantive Concept:** Organising Sum1: Grouping Data (Data and information) Sum1: Pictograms (Data and information) *(E-Safety lesson – Dogi Ducks Famous Friend)*	
KS1 Vocabulary	**Technology around us (Computers and networks)** Mouse, keyboard, save, file, click, drag, cursor, open (file). **IT around us (Computers and networks)** Information technology, computer, mouse, tower, display, screen, device, digital equipment, input, output		**Digital painting (Creating media)** Line, shape, tool, effective, recreate, style, appropriate, abstraction **Digital photography (Creating media)** Photograph, device, retake, landscape, portrait, light source, print, display, blur, unclear		**Pictograms (Data and information)** Data, attribute, question, response, format, more than, less than, present (share), logic **Grouping Data (Data and information)** Data, information, groups, similar/different, group, match, identify, compare, record	
Rationale	**Technology around us (Computers and networks)** This unit progresses students' 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. This unit directly precedes the Y2 Computer systems and networks unit, IT around us. **IT around us (Computers and networks)** This unit progresses learners' understanding of technology and how they interact with it. They will develop this understanding to become familiar with the term information technology and will be able to identify common features of IT. This unit also builds on the learners' understanding of using technology safely and responsibly.		**Digital painting (Creating media)** Learners should be familiar with: how to switch their device on, usernames, passwords. Learners will develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and without the use of digital devices. **Digital photography (Creating media)** This unit begins the learners' understanding of how photos are captured and can be manipulated for different purposes. Following this unit, learners will develop their photo editing skills in Year 4. Learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real.		**Grouping Data (Data and information)** This unit will introduce learners to data and information. It will introduce learners to the concept of labelling and grouping objects based on their properties. Learners will develop their understanding that objects can be given labels, which is fundamental to their future learning concerning databases and spreadsheets. In addition, learners will begin to improve their ability to use dragging and dropping skills on a device. Following this unit, in year 2, learners will present data graphically in pictograms. **Pictograms (Data and information)** This unit progresses students' knowledge and understanding of grouping data. It builds on the Data and Information unit where learners labelled objects and grouped them based on different properties. In Year 3 learners develop their understanding of attributes (properties) using branching databases to structure data according to different object attributes.	
KS1 Key Learning	**Technology around us (Computers and networks)** I know examples of technology and explain how they can help us I know that a computer is an example of technology know what a keyboard is for I know how to type my name on the computer and delete letters. I know how to use a mouse to click, select and drag. I know how to keep myself safe and healthy when I am using technology **IT around us (Computers and networks)** I know how computers are used I know that computers are a form of IT I know some IT can be used in more than one way. I know how IT devices work together I know how to keep myself safe and healthy when I am using technology		**Digital Painting** I choose appropriate paint tools to recreate a picture I know how to use freehand tools, changing the colour and brush size I know how to use shape and line tools for precision, changing the size, shape and colour I know how to use the undo button to correct mistakes I know how to use the fill tool to colour an enclosed area **Digital photography (Creating media)** I know how to take a digital photograph I know the difference between portrait and landscape I know what makes a good photograph I know the effect that lighting has on a photograph I know that images can be changes and the tools I can use to change it I know how to recognise if a photograph has been changed *(cover AI)*		**Grouping Data (Data and information)** I know how to label objects I know that objects can be counted I know how to describe objects in different ways I know how to count objects with the same properties I know how to compare groups of objects I know how to answer questions about groups of objects **Pictograms (Data and information)** I know how to count and compare objects using tally charts. I know that objects can be represented as pictures. I know how to create a pictogram on the computer. I know why some information should not be shard on computers.	

Year A KS2 Topic	Topic LQ: How do computers help us to communicate?	Topic LQ: How can we create on technology?	Topic LQ: How can computers help us to organise information?
Core Concept	**Substantive Concept: Computers and networks**	**Substantive Concept: Creating Media**	**Substantive Concept: Data and Information**
KS2 Vocabulary	**Connecting Computers** Input, process, output, digital/non-digital, secure, connections, networks, server, wireless access point **Communication** Search engine, compare, influence, advertised, limitation, relevant	**Stop Frame Animation** Sequence, draw, animate, flip, setting, character, onion skinning, evaluate **Vector drawing** Vector, line, draw, group/ungroup, layer, handle, resize, element, outcome	**Branching databases** Binary trees, attributes, grouped data, parameters **Spreadsheets** Chart, formula, information, data, input, output, cell, calculate, overview, heading, subheading
Rationale	**Connecting Computers** Children will develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. They will also compare digital and non-digital devices. Next, children will be introduced to computer networks, including devices that make up a network's infrastructure, such as wireless access points and switches. Finally, learners will discover the benefits of connecting devices in a network. This will lead on to the following unit of communication. **Communication and Collaboration** This unit progresses students' knowledge and understanding of computing systems and online collaborative working. Learners explore how data is transferred over the internet. Learners initially focus on addressing, before they move on to the makeup and structure of data packets. Learners then look at how the internet facilitates online communication and collaboration; they complete shared projects online and evaluate different methods of communication. Finally, they learn how to communicate responsibly by considering what should and should not be shared on the internet.	**Stop Frame Animation** This unit progresses students' 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 media skills in vector drawing. Learners will use a range of techniques to create a stop-frame animation using tablets. Next, they will apply those skills to create a story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text. **Vector drawing** This unit progresses learners' knowledge and understanding of digital painting by creating images that can be used in desktop publishing, building on their work in KS1. It will allow them to build their knowledge ready for further development over the next few years, manipulating drawings for use in publishing documents.	**Branching databases** Learners will develop their understanding of what a branching database is and how to create one. They will use yes/no questions to gain an understanding of what attributes are and how to use them to sort groups of objects. Learners will create physical and on-screen branching databases. To conclude the unit, they will create an identification tool using a branching database, which they will test by using it. They will also consider real-world applications for branching databases. This unit progresses learners' knowledge and understanding of the categories of data handling, with a particular focus on implementation. It builds on their knowledge of data and information from key stage 1. They will continue to develop their understanding of attributes and begin to construct and interrogate branching databases as a means of displaying and retrieving information. **Spreadsheets** This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets. Specifically, children will have collected data and organised it in preparation for this learning.
KS2 Learning	**Connecting Computers** (Painting Program) I know that digital devices accept inputs and produce outputs I can describe a simple process I know how digital devices can change the way we work. I know how a computer network can be used to share information. I know how digital devices can be connected. I know the physical components of a network. **Communication and Collaboration** (Microsoft PowerPoint or Padlet)) ● I know the importance of internet addresses ● I know how data is transferred across the internet ● I know how sharing information online can help people work together ● I know different ways of working together online ● I know how we communicate using technology ● I know what information should and shouldn't be shared ● I know that communication on the internet may not be private ● I know how to report inappropriate content.	**Stop Frame Animation** (iMotion) • I know that animations follow a storyboard • I know how to ensure movement between frames is smooth • I know how to add additional media such as music and text. **Vector drawing** (Microsoft PowerPoint) • I know how to add and remove objects to create a drawing of a chosen artefact • I know how to use copy and paste to maintain consistency within the drawing • I know how to manipulate an object's size, colour, and proportion to represent a chosen artefact • I know how to purposefully position and rotate objects • I know how to move objects to different layers to create a specific aspect of a drawing • I know how to group objects to make them easier to work with	**Branching databases** (J2data branch and Pictogram) ● I know how to create a branching database on the computer. ● I know why it is helpful for a database to be well structured. ● I know how data bases are useful for real-world uses. **Spreadsheets** (Microsoft Excel) ● I know how to input data into a spreadsheet ● I know how to format a cell ● I know how to create and apply a formula ● I know how to duplicate a formula ● I know a suitable way to present data using IT

Year B KS1 and EYFS Topic	Topic: Robotics LQ: How can I make my robot move?		Topic: Fancy Writing LQ: What will make my work look better?		Topic: Left and Right LQ: What makes my sprite move about?	
EYFS Knowledge Blocks	**Age 3/ 4** Know that beebots are a robot that can be made to move around a space	**EYFS** Use the beebots to investigate moving them around a space	**Age 3/4** To use electronic equipment to make music such as keyboards	**EYFS** Type name onto a computer using a keyboard To use an ipad to create music using a suitable programme	**Age 3 / 4**	**EYFS**
Core Concept	**Substantive Concept: Programming** Aut2: Moving a robot (Creating media) Aut2: Robot algorithms (Programming) *(E-Safety lesson – Detective Digi Duck)*		**Substantive Concept: Information Technology** Sum2: Digital writing (Creating media) Sum2: Making music (Creating media *(E-Safety lesson – Digi Duck and the Magic Castle*		**Substantive Concept: Programming** Spr2: Introduction to animation (Programming) Spr2: An introduction to quizzes (Programming) *(E-Safety lesson – Digi Duck Saves the Day*)	
KS1 Vocabulary	**Moving a robot (Creating media)** Program, sequence, debug, order, command, route, turn, instruct, outcome **Robot algorithms (Programming)** Series, sequence, outcome, route, program, algorithm, debug		**Digital writing (Creating media)** Type, text, improve, edit, change, drag, click, press, bold, italic, underline, backspace, space **Making music (Creating media)** Notes, sound, sequence, rhythm, differences, pattern, create		**Introduction to animation (Programming)** Algorithm, sprite, code, program, start, value, move, command **An introduction to quizzes (Programming)** Design, algorithm, features, sequences, command, background, actions	
Rationale	**Moving a robot (Creating media)** This unit progresses learners' 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. **Robot algorithms (Programming)** This unit builds on Moving a Robot done this term. It progresses learners' knowledge and understanding of algorithms and how they are implemented as programs on digital devices. Learners will spend time looking at how the order of commands affects outcomes. Learners will use this knowledge and logical reasoning to trace programs and predict outcomes.		**Digital writing (Creating media)** This unit progresses the learners' 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. Following this unit, learners will further develop their digital writing skills in the Year 3 – 'Desktop publishing' unit and the Year 6 – 'Web page development' unit. **Making music (Creating media)** Having developed children's ability in using word processing tool, and making changes, children will need to build on their use of devices to beginning to make digital music. They will be listening to music and considering how music can affect how we think and feel. Learners will then purposefully create rhythm patterns and music.		**Introduction to animation (Programming)** This unit progresses learners' knowledge and understanding of programming and follows on from 'Programming A – Moving a robot' in the Autumn term, where children will have learned to program a floor robot using instructions. **An introduction to quizzes (Programming)** This unit progresses learners' knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Learning focuses on developing learners' understanding of computer programming. It highlights that algorithms are a set of clear, precise, and ordered instructions, and that a computer program is the implementation of an algorithm on a digital device. The unit also introduces reading 'code' to predict what a program will do. Learners will engage in aspects of program design, including outlining the project task and creating algorithms.	
KS1 Key Learning	**Moving a robot (Creating media)** • I know what a given command does • I know what the outcome of a sequence involving up to four commands • I know what outcome will happen after a given command to an outcome • I know that a program is a set of commands that a computer can run • I know that a series of instructions can be issued before they are enacted • I know how to debug a program to remove errors. **Robot algorithms (Programming)**		**Digital writing (Creating media)** • I know a keyboard is used to enter text into a computer • I know the appearance of text can be changed • I know some keys and use them to enter text on to a computer/device including some basic punctuation • I know how to add spaces between most words using a space bar • I know to use the backspace key to delete text only as far as the section to be edited • I know to use the toolbar to find and use the bold, italic, and underline tool		**Introduction to animation (Programming)** • I know what a sprite is • I know what different programming blocks can do • I know a series of commands can be joined together to form a program • I know a program is a set of commands a computer can run **An introduction to quizzes (Programming)**	

	● I know what a series of instructions will do ● I know what an algorithm is ● I know algorithms can be changed by the changing the sequence of commands ● I know how to plan an execute a program to reach a goal and debug as needed.	**Making music (Creating media)** ● I know that a computer can generate different sounds ● I know that a computer can be used to make a sequence of notes ● I know the computer can be used to generate different sounds. ● I know that software can be used to create a sequence of notes to create a piece of music.	● I know that a sequence can be started using a variety of event blocks ● I know that a sequence has an outcome, and identify different programs that have the same outcome ● I know the backgrounds can be changed through the programming blocks ● I know the role of the numbers on ScratchJr blocks
Year B KS2 Topic	**Topic** LQ: What does repetition do to my programme?	**Topic** LQ: What edits will improve my work?	**Topic** LQ: How can I improve my programme?
Core Concept	**Substantive Concept: Programming**	**Substantive Concept: Information Technology**	**Substantive Concept: Programming**
KS2 Vocabulary	**Repetition in shapes** Count controlled loop, program, debug, repeat, procedure, repeat, template, code snippet, command **Scratch + Raspberry Pi (Programming)** Improve, variable, code, identify, value, placeholder	**Photo Editing (Creating media)** Concept, edit, composition, digital image, crop, rotate, clone, combine **Web page creation (Creating media)** Media, HTML, features, web page, address, navigate, copyright, hyperlink, digital literacy	**Programming Kodu (Programming)** Program, decompose, instruct, adapt, analyse, control, automatic **Sensing - Selection in Physical Computing (Programming)** Task, design, build, microcontroller, crumble, sparkle, circuit, repetition, infinite loop, condition-controlled loop, count-controlled loop, selection
Rationale	**Repetition in shapes** This unit progresses students' 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. Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. It looks at repetition and loops within programming. **Repetition in Games** Focussing on scratch, which some children will have used but younger children will not. Learners will explore the concept of repetition in programming using the Scratch environment. The unit begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.	**Photo Editing** This unit progresses students' knowledge and understanding of digital photography and using digital devices to create media. Learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices. This will support their learning in the next unit. **Web page creation** This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing. Learners will be introduced to creating websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process, learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths.	**Events and actions in Programs** This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. Learners begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of **Pen** blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze-tracing program. **Computing** In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program components (including output devices- LEDs and motors) through the application of their existing programming knowledge. Learners are introduced to conditions as a means of controlling the flow of actions and make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the if, then structure). This unit builds on programming using a block-based language (eg Scratch) and understand the concepts of sequence and repetition. Previous learning from key stage 1 units focus on floor robots and Scratch Jr, however, experience of other languages or environments may also be useful.

<table>
<tr><td>KS2
Key Learning</td><td colspan="2">Repetition in shapes (FMS Logo)
I know that accuracy in programming is important
I know how to create a program in a text-based language
I know what 'repeat' means
I know how to modify a count-controlled loop to produce a given outcome
I know how to decompose a task into small steps
I know how to create a program that uses count-controlled loops to produce a given outcome

Repetition in Games (Scratch)
I know count-controlled loops are used in programming.
I know infinite loops are used in programming
I know what the outcome of a repeated action will be.
I know how to use repetition in a project.
I know how to build and refine a program</td><td colspan="2">Photo editing inc. AI (Paint.NET)
I know that the composition of digital images can be changed
I know that colours can be changed in digital images
I know how cloning can be used in photo editing
I know that images can be combined
I know how to combine images for a purpose
I know how to evaluate how changes can improve an image

Web page creation (Google slides)
I know a website contains multiple sections.
I know a website layout in influenced by its purpose/audience
I know how to add internal and external hyperlinks
I know about ownership and the use of images (copyright)
I know what a navigation path is.
I know the implications of linking to content owned by other people</td><td colspan="2">Events and actions in Programs (Scratch)
I know the relationship between an event and an action
I know how to make a sprite move up, down, left and right.
I know a program can be adapted to a new context.
I know how to develop a program by adding features.
I know how to identify and fix bugs in a programme.
Selection in Physical Computing (Crumble)
I know how to create a simple circuit and connect it to a microcontroller.
I know a program can include count-controlled loops.
I know that a loop can stop when a condition it met.
I know that a loop can be used to repeatedly check that a condition has been met.
I know how to create a project that includes selection</td></tr>
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KS1 and
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Aut1: Technology around us
(Lesson 6: Using a Computer Responsibly)
Aut1: IT around us
(Lesson 5: Using IT Safely)</td><td colspan="2">Creating Media

Spr1: Digital painting

Spr2: Digital photography

(E-safety lesson – Digi Ducks Big Decision)</td><td colspan="2">Data and Information

Sum1: Grouping Data

Sum2: Pictograms

(E-Safety lesson – Dogi Ducks Famous Friend)</td></tr>
<tr><td>KS1
Vocabulary</td><td colspan="2">Technology around us
Mouse, keyboard, save, file, click, drag, cursor, open (file).

IT around us
Information technology, computer, mouse, tower, display, screen, device, digital equipment, input, output</td><td colspan="2">Digital painting
Line, shape, tool, effective, recreate, style, appropriate, abstraction

Digital photography
Photograph, device, retake, landscape, portrait, light source, print, display, blur, unclear</td><td colspan="2">Pictograms
Data, attribute, question, response, format, more than, less than, present (share), logic

Grouping Data
Data, information, groups, similar/different, group, match, identify, compare, record</td></tr>
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Rationale	**Technology around us** This unit progresses students' 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. This unit directly precedes the Y2 Computer systems and networks unit, IT around us. **IT around us** This unit progresses learners' understanding of technology and how they interact with it. They will develop this understanding to become familiar with the term information technology and will be able to identify common features of IT. This unit also builds on the learners' understanding of using technology safely and responsibly.	**Digital painting** Learners should be familiar with: how to switch their device on, usernames, passwords. Learners will develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and without the use of digital devices. **Digital photography** This unit begins the learners' understanding of how photos are captured and can be manipulated for different purposes. Following this unit, learners will develop their photo editing skills in Year 4. Learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real.	**Grouping Data** This unit will introduce learners to data and information. It will introduce learners to the concept of labelling and grouping objects based on their properties. Learners will develop their understanding that objects can be given labels, which is fundamental to their future learning concerning databases and spreadsheets. In addition, learners will begin to improve their ability to use dragging and dropping skills on a device. Following this unit, in year 2, learners will present data graphically in pictograms. **Pictograms** This unit progresses students' knowledge and understanding of grouping data. It builds on the Year 1 Data and Information unit where learners labelled objects and grouped them based on different properties. In Year 3 learners develop their understanding of attributes (properties) using branching databases to structure data according to different object attributes.
KS1 Key Learning	**Technology around us** (Paintz.app) I know examples of technology and explain how they can help us I know that a computer is an example of technology know what a keyboard is for I know how to type my name on the computer and delete letters. I know how to use a mouse to click, select and drag. I know how to keep myself safe and healthy when I am using technology **IT around us** (Microsoft PowerPoint) I know how computers are used I know that computers are a form of IT I know some IT can be used in more than one way. I know how IT devices work together I know how to keep myself safe and healthy when I am using technology	**Digital Painting** (Paint) I choose appropriate paint tools to recreate a picture I know how to use freehand tools, changing the colour and brush size I know how to use shape and line tools for precision, changing the size, shape and colour I know how to use the undo button to correct mistakes I know how to use the fill tool to colour an enclosed area **Digital photography** (digital camera/ipad) I know how to take a digital photograph I know the difference between portrait and landscape I know what makes a good photograph I know the effect that lighting has on a photograph I know that images can be changes and the tools I can use to change it I know how to recognise if a photograph has been changed *(cover AI)*	**Grouping Data** (Microsoft PowerPoint) I know how to label objects I know that objects can be counted I know how to describe objects in different ways I know how to count objects with the same properties I know how to compare groups of objects I know how to answer questions about groups of objects **Pictograms** (J2data Pictograms) I know how to count and compare objects using tally charts. I know that objects can be represented as pictures. I know how to create a pictogram on the computer. I know why some information should not be shard on computers.
Year C KS2 Topic	**Topic** LQ: How do I know what I can believe online?	**Topic** LQ: What will improve the appeal of my document?	**Topic** LQ: What information will help me to answer a question?
Core Concept	**Computers and Networks**	**Creating Media**	**Data and Information**
Vocabulary	**The Internet** Information, networks, shared, transferred, upload, download, access, protect, reliable **Sharing information** Limitation, sponsored, index, web crawlers, manage, process, information technology, digital literacy	**Desktop publishing** Publish, layout, purpose, template, communicate, orientation, font, cut, copy, paste	**Data logging** Data, log, capture, sensor, record, logger, display **Flat File Databases** Findings, chart, present, flat-file database, sort, group, field, information technology

Rationale	**The Internet** This unit progresses students' knowledge and understanding of networks. Learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet and will be given opportunities to explore the World Wide Web for themselves in order to learn about who owns content and what they can access, add, and create. Finally, they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information. **Systems and Searching** This unit follows on from 'The Internet'. Learners develop their understanding of computer systems and how information is transferred between systems and devices. Learners consider small-scale systems as well as large-scale systems. They explain the input, output, and process aspects of a variety of different real-world systems. Learners discover how information is found on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines.	**Desktop publishing** This unit progresses learners' knowledge and understanding of using digital devices to combine text and images building on work from key stage 1 units of Digital Writing , Digital painting and Digital Photography. Learners will become familiar with the terms 'text' and 'images' and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' and begin to understand how these can support them in making their own template for a magazine front cover. They will start to add text and images to create their own pieces of work using desktop publishing software. Learners will look at a range of page layouts thinking carefully about the purpose of these and evaluate how and why desktop publishing is used in the real world.	**Data logging** This unit progresses learners' knowledge and understanding of data and how it can be collected over time to answer questions. Specifically, it builds on the concept of answering questions with data which is first introduced in the KS1 data and information units. The unit also introduces the idea of automatic data collection. Learners are also introduced to data in tables and graphs, knowledge they will build on in the Year 5 unit (flat file databases) and the Year 6 unit (spreadsheets). **Flat File Databases (Data and information)** This unit progresses learners' 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 databases can be used to help us solve problems. Finally, the learners create a presentation showing understanding and application of all the tools used within the unit.
KS2 Key Learning	**The Internet** (Various Websites) I know networks physically connect to other networks I know networked devices make up the internet I know websites can be shared via the World Wide Web (WWW) I know content can be added and accessed on the World Wide Web (WWW) I know the content of the WWW is created by people I know how to evaluate the consequences of unreliable content **Systems and Searching** (Google Slides) I know that computers can be connected to form systems. I know the role of computer systems in our lives. I know how to use search engine I know how a search engine works. I know how to recognise a trustworthy website I know how search engines select results I know that search results are ranked	**Desktop Publishing** (Canva) I know text and images convey information I know how to change the font style, size and colour considering audience. I know how to edit text to make it clearer for the audience I know page orientation means the I know why placeholders are important I know how to paste text and images I know why desktop publishing might be helpful.	**Data logging** (EasySense2 App) I know that data gathered over time can be used to answer questions I know how to use a digital device to collect data automatically I know that a data logger collects 'data points' from sensors over time I know how a computer can help us analyse data I know how to identify the data needed to answer questions I know how to use data from sensors to answer questions **Flat file databases** (J2e data platform) I know how to use a form to record information I know how to compare paper and computer-based databases I know how to answer questions by grouping and then sorting data I know that tools can be used to select specific data I know that computer programs can be used to compare data visually I know how to use a real-world database to answer questionS
Year D KS1 and EYFS Topic	**Topic: Bossy robots** LQ: Does the order of my commands matter?	**Topic: Sounds good** LQ: How can technology make music?	**Topic: Quiz master** LQ: Why are my instructions important?

EYFS Knowledge Blocks	Age 3/ 4 **Know that beebots are a robot that can be made to move around a space**	EYFS **Use the beebots to investigate moving them around a space**	Age 3/4 **To use electronic equipment to make music such as keyboards**	EYFS **Type name onto a computer using a keyboard** To use an ipad to create music using a suitable programme	Age 3 / 4	EYFS
Core Concept	**Substantive Concept:** Aut2: Moving a robot (Creating media) Aut2: Robot algorithms (Programming) *(E-Safety lesson – Detective Digi Duck)*		**Substantive Concept:** Sum2: Digital writing (Creating media) Sum2: Making music (Creating media *(E-Safety lesson – Digi Duck and the Magic Castle)*		**Substantive Concept:** Sum1: Grouping Data (Data and information) Sum1: Pictograms (Data and information) *(E-Safety lesson – Dogi Ducks Famous Friend)*	
KS1 vocabulary	**Moving a robot (Creating media)** Program, sequence, debug, order, command, route, turn, instruct, outcome **Robot algorithms (Programming)** Series, sequence, outcome, route, program, algorithm, debug		**Digital writing (Creating media)** Type, text, improve, edit, change, drag, click, press, bold, italic, underline, backspace, space **Making music (Creating media)** Notes, sound, sequence, rhythm, differences, pattern, create		**Introduction to animation (Programming)** Algorithm, sprite, code, program, start, value, move, command **An introduction to quizzes (Programming)** Design, algorithm, features, sequences, command, background, actions	
Rationale	**Moving a robot (Creating media)** This unit progresses learners' 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. **Robot algorithms (Programming)** In advance of these lessons, learners will have had some experience of creating short programs using floor robots and predicting the outcome of a simple program. This unit progresses learners' knowledge and understanding of algorithms and how they are implemented as programs on digital devices. Learners will spend time looking at how the order of commands affects outcomes. Learners will use this knowledge and logical reasoning to trace programs and predict outcomes.		**Digital writing (Creating media)** This unit progresses the learners' 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. Following this unit, learners will further develop their digital writing skills in the Year 3 – 'Desktop publishing' unit and the Year 6 – 'Web page development' unit. **Making music (Creating media)** Learners have had 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. This unit progresses students' 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.		**Introduction to animation (Programming)** This unit progresses learners' knowledge and understanding of programming and follows on from 'Programming A – Moving a robot', where children will have learned to program a floor robot using instructions. **An introduction to quizzes (Programming)** This unit progresses learners' knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Learning focuses on developing learners' understanding of computer programming. It highlights that algorithms are a set of clear, precise, and ordered instructions, and that a computer program is the implementation of an algorithm on a digital device. The unit also introduces reading 'code' to predict what a program will do. Learners will engage in aspects of program design, including outlining the project task and creating algorithms.	
KS1 Learning	**Moving a robot** (Bee-bot) ● I know what a given command does ● I know what the outcome of a sequence involving up to four commands ● I know what outcome will happen after a given command to an outcome ● I know that a program is a set of commands that a computer can run ● I know that a series of instructions can be issued before they are enacted ● I know how to debug a program to remove errors. **Robot algorithms** (Bee-bot)		**Digital writing** (Microsoft Word) ● I know a keyboard is used to enter text into a computer ● I know the appearance of text can be changed ● I know some keys and use them to enter text on to a computer/device including some basic punctuation ● I know how to add spaces between most words using a space bar ● I know to use the backspace key to delete text only as far as the section to be edited ● I know to use the toolbar to find and use the bold, italic, and underline tool		**Introduction to animation (Programming)** ● I know what a sprite is ● I know what different programming blocks can do ● I know a series of commands can be joined together to form a program ● I know a program is a set of commands a computer can run **An introduction to quizzes (Programming)**	

	● I know what a series of instructions will do ● I know what an algorithm is ● I know algorithms can be changed by the changing the sequence of commands ● I know how to plan an execute a program to reach a goal and debug as needed.	**Digital Music** (Chome Music Lab) ● I know that a computer can generate different sounds ● I know that a computer can be used to make a sequence of notes ● I know the computer can be used to generate different sounds. ● I know that software can be used to create a sequence of notes to create a piece of music.	● I know that a sequence can be started using a variety of event blocks ● I know that a sequence has an outcome, and identify different programs that have the same outcome ● I know the backgrounds can be changed through the programming blocks ● I know the role of the numbers on ScratchJr blocks
Year D **KS2 Topic**	**Topic** LQ: How does sound improve my programming?	**Topic** LQ: How does grouping my objects help my modelling?	**Topic** LQ: How does manipulating my video improve it?
Core Concept	**Programming**	**Creating Media**	**Creating Media** **Programming**
KS2 Vocabulary	**Sequencing Sounds** Task, algorithm, command, project, design, action, sequence, represent, attributes **Selection in Quizzes** Test, program, algorithm, if, then, else, flow, outcome, input, code, exten	**3D Modelling** Holes, combine, placeholders, dimensions, 3D model, modify, construct/deconstruct, analyse, duplicate	**Video Production** Retrieve, record, reproduce, broadcast, zoom, download content, shot types, export, format **Raspberry Pi HTML and Sonic Pi** Define, argument, sleep, loop, check, algorithm, evaluate
Rationale	**Sequencing Sounds** This unit builds on prior experience of programming; the KS1 units cover floor robots and ScratchJr. This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. Learners also apply stages of program design through this unit. **Selection in Quizzes** In this unit, pupils develop their knowledge of selection by revisiting how conditions can be used in programs and then learning how the If… Then… Else structure can be used to select different outcomes depending on whether a condition is true or false. They represent this understanding in algorithms and then by constructing programs using the Scratch programming environment. They use their knowledge of writing programs and using selection to control outcomes to design a quiz in response to a given task and implement it as a program.	**3D Modelling** This unit progresses students' knowledge and understanding of creating 3D graphics using a computer. Prior to undertaking this unit, learners should have worked with 2D graphics applications. Learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, moving, resizing, and duplicating objects. They will then create hollow objects using placeholders and combine multiple objects to create a model of a desk tidy. Finally, learners will examine the benefits of grouping and ungrouping 3D objects, then go on to plan, develop, and evaluate their own 3D model of a building.	**Video Production** This unit progresses learners' knowledge and understanding of creating media by guiding them systematically through the process involved in creating a video. Learners will learn how to create short videos by working in pairs or groups. As they progress through this unit, they will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. Learners are guided with step-by-step support to take their idea from conception to completion. At the conclusion of the unit, learners have the opportunity to reflect on and assess their progress in creating a video. **Variables in Games** This unit explores the concept of variables in programming through games in Scratch. First, learners find out what variables are and relate them to real-world examples of values that can be set and changed. Then they use variables to create a simulation of a scoreboard.

KS2 Learning	**Sequencing Sounds** (Scratch) I know the objects in scratch (sprites,backdrops) I know objects have attributes (linked to) I know commands have an outcome I know a program has a start I know a sequence of commands can have an order I know how to change the appearance of my project I know how to create a project from a task description **Selection in quizzes** (Scratch) I know selection is used in computer programs I know a conditional statement connects a condition to an outcome I know selection directs the flow of a program I know how to create a program that uses selection I know the set up code I need in a program	**3D modelling** (TinkerCAD) I know you can work in three dimensions on a computer I know digital 3D objects can be modified I know objects can be combined in a 3D model I know that placeholders can create holes in £D objects I know how to combine objects	**Video Production** (iMovie/Canva Video Editor) I know what makes a video effective I know you can use different camera angles for different purposes. I know which filming technique to use for a certain purpose I know sometimes videos need to be improved by reshooting. I know which tools to use to edit a video **Variables in games** (Scratch) I know a 'variable' is something that is changeable I know why a variable is used in a program I know how to choose how to improve a game by using variables I know the algorithm needed to get the desired effect I know variables can be added to extend a game.