Delta Computing Overview

Rationale

Our Computing Curriculum intends to develop 'thinkers of the future' through a modern, ambitious and relevant education in computing. We want to equip pupils to use computational thinking and creativity that will enable them to become active participants in the digital world. It is important to us that the children understand how to use the ever-changing technology to express themselves, as tools for learning and as a means to drive their generation forward into the future.

Whilst ensuring they understand the advantages and disadvantages associated with online experiences, we want children to develop as respectful, responsible and confident users of technology, aware of measures that can be taken to keep themselves and others safe online.

Our aim is to provide a computing curriculum that is designed to balance acquiring a broad and deep knowledge alongside opportunities to apply skills in various digital contexts. Beyond teaching computing discreetly, we will give pupils the opportunity to apply and develop what they have learnt across wider learning in the curriculum.

Teach Computing Curriculum

Our scheme of work for Computing is adapted from the 'Teach Computing' Curriculum and covers all aspects of the Computing National Curriculum. This scheme was chosen as it has been created by subject experts and based on the latest pedagogical research and teacher feedback. It provides an innovative progression framework where computing content (concepts, knowledge, skills and objectives) has been organised into interconnected networks called learning graphs.

The curriculum aims to equip young people with the knowledge, skills and understanding they need to thrive in the digital world of today and the future. The curriculum can be broken down into 3 strands: computer science, information technology and digital literacy, with the aims of the curriculum reflecting this distinction. All of the content is free to use, and in formats that make it easy for adaptation.

Resources:

Teachers will first need to register for free at https://ncce.stem.org.uk/user/register?from=NCCE

All learning resources can be accessed at https://teachcomputing.org/curriculum

After registering, teachers will have access to all lesson resources, supporting computing resources.

- Resources include lesson plans, slides, activity sheets, homework, and assessments
- Each key stage has a teacher guide
- Built around an innovative progression framework where computing content has been organised into interconnected networks, called learning graphs

https://teachcomputing.org/curriculum

Teaching Order

The order in which to teach units within a school year is not prescribed, other than for the two 'Programming' units for each year group, which build on each other. It is recommended that the 'Programming' and 'Creating media' units be revisited in two different terms within the school year, so that the concepts and skills can be revisited and consolidated. Otherwise, schools can choose the order in which they teach the units, based on the needs of their pupils and other topics or events that are happening throughout the school year, to make use of cross-curricular links wherever possible.

Teaching & Learning Time

The teaching time required for these lessons is approximately 30 minutes however, some lessons have been combined to 1 hour due to lesson content. N.B. Teaching and activity times shown on resource plans will need adjusting to reflect these timings and that activities in the resources are suggested activities.

Mixed Year Groups

The Teach Computing Curriculum is based on a learning progression from Year 1 through to Year 6 that fits into an overall progression including secondary school. In order to use this progression with mixed year groups, it is advisable for teachers to break up the content as they see fit, based on the learning graphs for the year groups that they are teaching.

Computing Units of Work								
EYFS Units	**EYFS**	**Units**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Autumn: Computer Science	Unplugged Algorithms	**Autumn1:** Computing Systems and Networks	Technology Around Us	Information Technology Around Us	Connecting Computers	The Internet	Systems and Searching	Communication and Collaboration
		Autumn 2: Creating Media	Digital Painting	Digital Photography	Stop-Frame Animation	Audio Production	Video Production	Webpage Creation
Spring: Information Technology	Patterns & Sequences	**Spring 1:** Programming A	Moving a Robot	Robot Algorithms	Sequencing Sounds	Repetition in Shapes	Selection in Physical Computing	Variables in Games
		Spring 2: Data & Information	Grouping Data	Pictograms	Branching Databases	Data Logging	Flat-file Databases	Spreadsheets
Summer: Digital Literacy	Use of IT	**Summer 1: Creating Media**	Digital Writing	Digital Music	Desktop Publishing	Photo Editing	Introduction to Vector Graphics	3D-Modelling
		Summer 2: Programming B	Programming Animation	Programming Quizzes	Events and Actions in Programs	Repetition in Games	Selection in Quizzes	Sensing Movement

Teach Computing and Educated for a Connected World Links

Each half term will have a specific e-safety focus utilising the Project Evolve EFKW resources.

**Unit will be 3 lessons and the rest of the unit will be delivered using Project Evolve resources to deliver e-safety.*

	Autumn 1 7 Weeks	Autumn 2 7 Weeks	Spring 1 6 Weeks	Spring 2 6 Weeks	Summer 1 6 Weeks	Summer 2 7 Weeks
Year 1 Teach Computing Unit Overview	Technology Around Us	Digital Painting	Moving a Robot	Grouping Data	Digital Writing	Programming Animations
Year 1 EFCW Statement https://projectevolve.co.uk/	Online Relationships	Online Reputation	**Safer Internet Day: Tuesday 14th February**		Self-Image and Identity	Online Bullying
Year 2 Teach Computing Unit Overview	Information Technology Around Us	***Digital Photography***	Robot Algorithms	Pictograms	***Digital Music***	Programming Quizzes
Year 2 EFCW Statement https://projectevolve.co.uk/	Online Relationships	***Online Reputation***	**Safer Internet Day: Tuesday 14th February**		***Self-Image and Identity***	Online Bullying
Year 3 Teach Computing Unit Overview	Connecting Computers	***Stop-Frame Animation***	Sequencing Sounds	Branching Databases	Desktop Publishing	Events & Actions in Programs
Year 3 EFCW Statement https://projectevolve.co.uk/	Online Relationships	***Online Reputation***	**Safer Internet Day: Tuesday 14th February**		Health, Well-Being and Lifestyle	Online Bullying
Year 4 Teach Computing Unit Overview	The Internet	Audio Production	Repetition in Shapes	Data Logging	Photo Editing	Repetition in Games
Year 4 EFCW Statement https://projectevolve.co.uk/	Online Relationships	Online Reputation	**Safer Internet Day: Tuesday 14th February**		Privacy & Security	Online Bullying
Year 5 Teach Computing Unit Overview	Systems and Searching	Video Production	Selection in Physical Computing	Flat-file Databases	Introduction to Vector Graphics	Selection in Quizzes
Year 5 EFCW Statement https://projectevolve.co.uk/	Online Relationships	Online Reputation	**Safer Internet Day: Tuesday 14th February**		Health-Wellbeing and Lifestyle	Online Bullying
Year 6 Teach Computing Unit Overview	Communication and Collaboration	Webpage Creation	Variables in Games	Spreadsheets	3D Modelling	Sensing Movement
Year 6 EFCW Statement https://projectevolve.co.uk/	Online Relationships	Online Reputation	**Safer Internet Day: Tuesday 14th February**		Privacy & Security	Online Bullying

Progression:
This unit progresses students' knowledge and understanding of technology and how they interact with it in school (Spring and Summer Term in Reception). 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.

Year 1

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 1: Technology Around Us Technology Around Us - Resources (teachcomputing.org) **Unit Introduction:** Learners will develop their understanding of technology and how it can help them in their everyday lives. They will start to become familiar with the different components of a computer by developing their keyboard and mouse skills. Learners will also consider how to use technology responsibly. ***Note: This lesson has been planned using desktop computers and the (free) program paintz.app, however, it can be taught with laptops. If you are using laptops for this unit, consider spending more time practising and discussing the trackpad.***	**Lesson 1**	What technology is around us?	Learners will become familiar with the term 'technology'. They will classify what is and what is not technology in their school and/or classroom. Learners will demonstrate their understanding of how technology helps us in different ways. Lesson 1 Resources (teachcomputing.org)	To explain technology as something that helps us To locate examples of technology in the classroom To can explain how these technology examples help us
	Lesson 2	How do I use technology?	Learners will get to know the main parts of a desktop or laptop computer. They will practise turning on and logging in to a computer. The learners will apply their knowledge of the different parts of a computer, to complete a mouse-based task. Lesson 2 Resources (teachcomputing.org)	To identify a computer and its main parts To name the main parts of a computer To switch on and log into a computer To use a mouse to click and drag
	Lesson 3	How do I use a computer mouse?	Learners will be building on the mouse skills they were introduced to in Lesson 2. Learners will review images of a computer to explain what each part does. They will develop an understanding that different computers use different mice, but they perform the same function. They will use the mouse to open a program and create a simple picture. Lesson 3 Resources (teachcomputing.org)	To use a mouse in different ways To use a mouse to open a program To click and drag to make objects on a screen To use a mouse to create a picture
	Lesson 4	How do I use a computer keyboard?	Learners will begin to use the computer keyboard for a purpose. They should understand that writing on a keyboard is called typing and will begin to demonstrate their ability to write their name. Learners will then save their work using the save icon and understand that this icon is used in lots of different programs. Lesson 4 Resources (teachcomputing.org)	To use a keyboard to type on a computer To say what a keyboard is for To type my name on a computer To save my work to a file
	Lesson 5	How can I effectively develop keyboard skills?	Learners will begin by opening a file they have previously created. They will demonstrate their ability to use a keyboard to edit text, by writing a sentence and then deleting letters. They will also use the keyboard arrow keys to move the text cursor in their textbox. Lesson 5 Resources (teachcomputing.org)	To use the keyboard to edit text To open my work from a file To use the arrow keys to move the cursor To delete letters
	Lesson 6	How do I use a computer responsibly?	Learners will be introduced to the concept of using computers safely, within the context of a school setting. They will explore why we have rules in school and how those rules help us, and then apply this understanding to rules needed for using computer technology safely. Lesson 6 Resources (teachcomputing.org)	To create rules for using technology responsibly To identify rules to keep us safe and healthy when we are using technology in and beyond the home To give examples of some of these rules To discuss how we benefit from these rules

Progression:
Following the summer term provision in the foundation stage, pupils will apply their understanding of how to switch a device on, input their usernames and passwords. This will be the first time on school devices where they will use a program for digital creation.

Year 1

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 2: Digital Painting Digital Painting - Resources (teachcomputing.org) **Unit Introduction:** 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.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	How can we paint using computers?	This lesson introduces learners to the freehand tools available for digital painting. Lesson 1 Resources (teachcomputing.org)	To describe what different freehand tools do To make marks on a screen and explain which tools I used To draw lines on a screen and explain which tools I used To use the paint tools to draw a picture
		What tools do I use to create shape and lines?	This lesson introduces learners to the line and shape tools and revisits the fill and undo tools used for digital painting. Learners create their own digital painting in the style of an artist. Lesson 2 Resources (teachcomputing.org)	To use the shape tool and the line tools To make marks with the square and line tools To use the shape and line tools effectively To use the shape and line tools to recreate the work of an artist
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	How can I make careful choices in my design?	This lesson introduces learners to a range of shape tools, allowing them to create a painting in the style of an artist. Lesson 3 Resources (teachcomputing.org)	To make careful choices when painting a digital picture To choose appropriate shapes To make appropriate colour choices To create a picture in the style of an artist
		How do I justify my choices in a design?	This lesson increases learners' understanding of the available paint tools and encourages them to select the best tools to create a digital painting in the style of Wassily Kandinsky. Lesson 4 Resources (teachcomputing.org)	To explain why I chose the tools I used To explain that different paint tools do different jobs To choose appropriate paint tools and colours to recreate the work of an artist To say which tools were helpful and why
	Lesson 5	How do I create my own digital picture?	Learners select appropriate colours, brush sizes, and brush tools to independently create their own image in the style of an artist. Lesson 5 Resources (teachcomputing.org)	To use a computer on my own to paint a picture To make dots of colour on the page To change the colour and brush sizes To use dots of colour to create a picture in the style of an artist on my own
	Lesson 6	How does computer art compare to a painting?	Learners compare their preferences when creating paintings on computers and on paper. Lesson 6 Resources (teachcomputing.org)	To compare painting a picture on a computer and on paper To explain that pictures can be made in lots of different ways To spot the differences between painting on a computer and on paper To say whether I prefer painting using a computer or using paper

Progression:
This unit progresses learners' knowledge and understanding of giving and following instructions from the Autumn term in Foundation stage. It moves from giving instructions to each other to giving instructions to a robot by programming it. This will then be built upon later in the year, in the subsequent programming unit.

Year 1

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 1: Moving a Robot **Unit Introduction:** Learners will be introduced to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each command for the floor robot does, and use that knowledge to start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming, and builds knowledge in a structured manner. Learners are also introduced to the early stages of program design through the introduction of algorithms. There are two Year 1 programming units: Programming A – Moving a robot Programming B – Programming animations **This is unit A, which should be delivered before unit B.**	**Lesson 1**	How do I use buttons to give commands?	Learners will be introduced to floor robots. They will talk about what the buttons on a floor robot might do and then try the buttons out. They will spend time linking an outcome to a button press. Learners will consider the direction command buttons, as well as the 'clear memory' and 'run program' buttons.	To explain what a given command will do To predict the outcome of a command on a device I can match a command to an outcome I can run a command on a device
	Lesson 2	What is needed to give clear directions?	Learners will think about the language used to give directions and how precise it needs to be. They will also work with a partner to give and follow instructions. These real-world activities should, at suitable points during this lesson, be related to the floor robot introduced in Lesson 1.	To act out a given word To follow an instruction To recall words that can be acted out To give directions
	Lesson 3	How do I control an object to move forwards and backwards?	Learners will focus on programming the floor robot to move forwards and backwards. They will see that the robot moves forwards and backwards a fixed distance. This highlights the idea that robots follow a clear, fixed command in a precise and repeatable way. Learners will think about starting the robot from the same place each time. Using the same starting position with fixed commands will allow learners to predict what a program will do. ***Note:*** *This lesson focuses specifically on forward and backward movement only. This is to ensure that learners are developing a depth of knowledge in the concepts surrounding programming, as well as developing their ability to make the robot move. The success criteria for this lesson highlight this and ensure that the learners' knowledge is built in a suitably paced way.*	To combine 'forwards' and 'backwards' commands to make a sequence To compare forward and backward movements To start a sequence from the same place To predict the outcome of a sequence involving 'forwards' and 'backwards' commands
	Lesson 4	How do I control an object to move in four directions?	Learners will use 'left turn' and 'right turn' commands along with 'forwards' and 'backwards' commands. Doing this will allow learners to develop slightly more complex programs. Learners will create their programs in this lesson through trial and error, before moving on to planning out their programs in Lesson 5. In Activity 3, learners will predict where given programs will move the robot to. Learners will make their predictions by looking at the commands and matching the program steps to movements.	To combine four direction commands to make sequences To compare left and right turns To experiment with 'turn' and 'move' commands to move a robot To predict the outcome of a sequence involving up to four commands
	Lesson 5	How do I create a program?	Learners will decide what their program will do. They will then create their program and test it on the robot. Where needed, learners will also debug their program.	To plan a simple program To explain what my program should do To choose the order of commands in a sequence To debug my program
	Lesson 6	How do I programme an object to follow routes?	Learners will be encouraged to plan routes around a mat before they start to write programs for those routes. The activities in this lesson also introduce the concept of there being more than one way to solve a problem. This concept is valid for a lot of programming activities: the same outcome can be achieved through a number of different approaches, and there is not necessarily a 'right' approach. The lesson also introduces the idea of program design, where learners need to plan what they want their program to achieve before they start programming.	To find more than one solution to a problem To identify several possible solutions To plan two programs To use two different programs to get to the same place

Progression:
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.

Year 1

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 2: Grouping Data **Unit Introduction:** This unit introduces learners to data and information. Labelling, grouping, and searching are important aspects of data and information. Searching is a common operation in many applications, and requires an understanding that to search data, it must have labels. This unit of work focuses on assigning data (images) with different labels in order to demonstrate how computers are able to group and present data. During this unit, learners will be logging on to the computers, opening their documents, and saving their documents. Depending on how your school's system is set up, additional support and time may be required to facilitate these steps, and consideration should be given as to how this will impact the timings of activities in each lesson.	**Lesson 1**	How and why do we label and match objects?	Learners will begin to understand that objects have many different labels that can be used to put them into groups. They will name different objects and begin to experiment with placing them into different groups. Learners will also label a group of objects, and begin to understand that an object can fit into more than one group depending on the context.	To label objects To describe objects using labels To match objects to groups To identify the label for a group of objects
	Lesson 2	How and why do we group and count?	Learners will begin to think about grouping objects based on what the objects are. They will demonstrate the ability to count a small number of objects before they group them, and will then begin to show that they can count groups of objects with the same label. Learners will also begin to learn that computers are not intelligent, and require input from humans to perform tasks.	To identify that objects can be counted To count objects To group objects To count a group of objects
	Lesson 3	How do I describe an object?	Learners will begin to understand that objects can be described in many different ways. They will identify the properties of objects and begin to understand that properties can be used to group objects; for example, objects can be grouped by colour or size. Finally, learners will demonstrate their ability to find objects with similar properties and begin to understand the reason that we need to give labels to images on a computer.	To describe objects in different ways To describe an object To describe a property of an object To find objects with similar properties
	Lesson 4	How do I make different groups?	Learners will classify objects based on their properties. They will group objects that have similar properties, and will be able to explain how they have grouped these. Learners will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.	To count objects with the same properties To group similar objects To group objects in more than one way To count how many objects share a property
	Lesson 5	How do I compare groups?	Learners will choose how they want to group different objects by properties. They will begin to compare and describe groups of objects, then they will record the number of objects in each group.	To compare groups of objects To choose how to group objects To describe groups of objects To record how many objects are in a group
	Lesson 6	How can I group objects to answer questions?	Learners will decide how to group objects to answer questions. They will compare their groups by thinking about how they are similar or different, and they will record what they find. They will then share what they have found with their peers.	To answer questions about groups of objects To decide how to group objects to answer a question To compare groups of objects To record and share what I have found

Progression:
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.

Year 1

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 1: Digital Writing **Unit Introduction:** Learners will develop their understanding of the various aspects of using a computer to create and manipulate text. They will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method they prefer and explain their reasoning for choosing this.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	What features are on a keyboard?	Learners will familiarise themselves with a word processor and think about how they might use this application in the future. The learners will also identify and find keys, before adding text to their page by pressing keys on a keyboard.	To use a computer to write To open a word processor To recognise keys on a keyboard To identify and find keys on a keyboard
		How do I add and remove text?	Learners will continue to familiarise themselves with word processors and how they can interact with the computer using a keyboard. The learners will focus on adding text and will explore more of the keys found on a keyboard. Finally, they will begin to use the Backspace key to remove text from the computer.	To add and remove text on a computer To enter text into a computer To use letter, number, and Space keys To use Backspace to remove text
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	What features are on a toolbar?	Learners will begin to explore the different tools that can be used in word processors to change the look of the text. Learners will use the Caps Lock key to add capital letters to their writing and will begin thinking about how to use this successfully. Learners will match simple descriptions to the related keys. Finally, learners will begin exploring the different buttons available on the toolbar in more detail, and use these to change their own text.	To identify that the look of text can be changed on a computer To type capital letters To explain what the keys that I have already learnt about do To identify the toolbar and use bold, italic, and underline
		How do I make changes to text?	Learners will begin to understand when it is best to change the look of their text and which tool will achieve the most appropriate outcome. The learners will begin to use their mouse cursor to select text to enable them to make more efficient changes. They will explore the different fonts available to them and change the font for their lost toy poster.	To make careful choices when changing text To select a word by double-clicking To select all of the text by clicking and dragging To change the font
	Lesson 5	Can I clearly explain my choices?	Learners will begin to justify their use of certain tools when changing text. The learners will decide whether the changes that they have made have improved their writing and will begin to use 'Undo' to remove changes. They will begin to consolidate their ability to select text using the cursor, through double-clicking and clicking and dragging. The learners will be able to explain what tool from the toolbar they have used to change their writing.	To explain why I used the tools that I chose To say what tool I used to change the text To decide if my changes have improved my writing To use 'Undo' to remove changes
	Lesson 6	What comparisons are there between a pencil and a keyboard?	Learners will make comparisons between using a computer for writing and writing on paper. The learners will discuss how the two methods are the same and different and think of examples to explain this. They will demonstrate making changes to writing using a computer to compare the two methods. Finally, the learners will begin to explain which they like best and think about which method would be the best method to use in different situations.	To compare typing on a computer to writing on paper To make changes to text on a computer To explain the differences between typing and writing To say why I prefer typing or writing

Progression:
This unit progresses and extends 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.

Year 1

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 2: Programming Animations **Unit Introduction:** Learners will be introduced to on-screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms. There are two Year 1 programming units: Programming A – Moving a robot Programming B – Programming animations **This is unit B, which should be delivered after unit A.**	**Lesson 1**	How do I use commands?	During this lesson learners will become accustomed to the ScratchJr programming environment. They will discover that they can move characters on-screen using commands, and compare ScratchJr to the Bee-Bots used in the previous unit.	To choose a command for a given purpose To find the commands to move a sprite To use commands to move a sprite I can compare different programming tools
	Lesson 2	How do I join blocks?	During this lesson learners will discover that blocks can be joined together in ScratchJr. They will use a **Start** block to run their programs. They will also learn additional skills such as adding backgrounds and deleting sprites. Learners will follow given algorithms to create simple programs.	To show that a series of commands can be joined together To use more than one block by joining them together To use a **Start** block in a program To run my program
	Lesson 3	How do I make changes?	During this lesson learners will discover that some blocks in ScratchJr have numbers underneath them. They will learn how to change these values and identify the effect on a block of changing a value.	To identify the effect of changing a value To find blocks that have numbers To change the value To say what happens when I change a value
	Lesson 4	How do I add sprites?	During this lesson learners will be taught how to add and delete sprites in ScratchJr. They will discover that each sprite has its own programming area, and learn how to add programming blocks to give instructions to each of the sprites.	To explain that each sprite has its own instructions To show that a project can include more than one sprite To delete a sprite To add blocks to each of my sprites
	Lesson 5	How do I modify my design?	During this lesson learners will choose appropriate backgrounds and sprites for a 'Space race' project. They will decide how each sprite will move, and create an algorithm based on the blocks available in ScratchJr that reflects this.	To design the parts of a project To choose appropriate artwork for my project To decide how each sprite will move To create an algorithm for each sprite
	Lesson 6	How do I know if my algorithms are effective?	During this lesson learners will use their project designs from the previous lesson to create their projects on-screen in ScratchJr. They will use their project design, including algorithms created in the previous lesson, to make programs for each of their rocket sprites. They will test whether their algorithms are effective when their programs are run.	To use my algorithm to create a program To use sprites that match my design To add programming blocks based on my algorithm To test the programs I have created

Progression:
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 from EYFS and Year 1.

Year 2

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 1: Information Technology Around Us IT Around Us - Resources (teachcomputing.org) **Unit Introduction:** Learners will develop their understanding of what information technology (IT) is and will begin to identify examples. They will discuss where they have seen IT in school and beyond, in settings such as shops, hospitals, and libraries. Learners will then investigate how IT improves our world, and they will learn about the importance of using IT responsibly.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	What is IT?	Learners will develop their understanding of what information technology (IT) is. They will identify devices that are computers and consider how IT can help them both at school and beyond. Lesson 1 Resources (teachcomputing.org)	To recognise the uses and features of information technology To identify examples of computers To describe some uses of computers To identify that a computer is a part of IT
		Where is It in school?	Learners will consider common uses of information technology in a context that they are familiar with. They will identify examples of IT and be able to explain the purpose of different examples of IT in the school setting. Lesson 2 Resources (teachcomputing.org)	To identify the uses of information technology in the school To identify examples of IT To sort school IT by what it's used for To identify that some IT can be used in more than one way
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	Where is IT in the world?	Learners will begin to explore IT in environments beyond school, including home and familiar places such as shops. They will talk about the uses of IT in these environments and be able to explain that IT is used in many workplaces. Lesson 3 Resources (teachcomputing.org)	To identify information technology beyond school To find examples of information technology To sort IT by where it is found To talk about uses of information technology
		What are the benefits of IT?	Learners will explore the benefits of using IT in the wider world. They will focus on the use of IT in a shop and how devices can work together. Learners will sort activities based on whether they use IT or not and will be able to say why we use IT. Lesson 4 Resources (teachcomputing.org)	To explain how information technology helps us To recognise common types of technology To demonstrate how IT devices work together To say why we use IT
	Lesson 5	How do I use IT safely?	Learners will consider how they use different forms of information technology safely, in a range of different environments. They will list different uses of IT and talk about the different rules that might be associated with using them. Learners will then say how rules can help keep them safe when using IT. Lesson 5 Resources (teachcomputing.org)	To explain how to use information technology safely To list different uses of information technology To talk about different rules for using IT To say how rules can help keep me safe
	Lesson 6	How can I use IT in different ways?	Learners will think about the choices that are made when using information technology, and the responsibility associated with those choices. They will use IT in different types of activities and explain that sometimes they will need to use IT in different ways. Lesson 6 Resources (teachcomputing.org)	To recognise that choices are made when using information technology To identify the choices that I make when using IT To use IT for different types of activities To explain the need to use IT in different ways

Progression:
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.

Year 2

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 2: Digital Photography Digital Photography - Resources (teachcomputing.org) **Unit Introduction:** 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.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	What can I use to take a photograph?	This lesson introduces the concept that many devices can be used to take photographs. In the lesson, learners begin to capture their own photographs. Lesson 1 Resources (teachcomputing.org)	To use a digital device to take a photograph To recognise what devices can be used to take photographs To talk about how to take a photograph I can explain what I did to capture a digital photo
		What is landscape or portrait in photography? NB: This lesson is an Art lesson but supports later content in Computing.	A photograph can be taken in either portrait or landscape format. In this lesson, learners explore taking photographs in both portrait and landscape formats and explore the reasons why a photographer may favour one over the other. Lesson 2 Resources (teachcomputing.org)	To make choices when taking a photograph To explain the process of taking a good photograph To take photos in both landscape and portrait format To explain why a photo looks better in portrait or landscape format
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	What makes a good photograph? NB: This lesson is an Art lesson but supports later content in Computing.	A photograph is composed by a photographer. In this lesson, learners discover what constitutes good photography composition and put this into practice by composing and capturing photos of their own. Lesson 3 Resources (teachcomputing.org)	To describe what makes a good photograph To identify what is wrong with a photograph To discuss how to take a good photograph To improve a photograph by retaking it
		How does lighting affect a photograph? NB: This lesson is an Art lesson but supports later content in Computing.	This lesson introduces the concepts of light and focus as further important aspects of good photography composition. In this lesson, learners investigate the effect that good lighting has on the quality of the photos they take, and explore what effect using the camera flash and adding an artificial light source have on their photos. They also learn how the camera autofocus tool can be used to make an object in an image stand out. Lesson 4 Resources (teachcomputing.org)	To decide how photographs can be improved To explore the effect that light has on a photo To experiment with different light sources To explain why a picture may be unclear
	Lesson 5 & Lesson 6 ***To be taught as one 1 hour lesson***	How can I edit an image?	This lesson introduces the concept of simple image editing. Learners are introduced to the Pixlr image editing software and use the 'Adjust' tool to change the colour effect of an image. Lesson 5 Resources (teachcomputing.org)	To use tools to change an image To recognise that images can be changed To use a tool to achieve a desired effect To explain my choices
		How can I confirm if a photograph is real?	This lesson introduces the concept that images can be changed for a purpose. Learners are introduced to a range of images that have been changed in different ways and through this, develop an awareness that not all images they see are real. To start the lesson, learners are first challenged to take their best photograph by applying the photography composition skills that they have developed during the unit. Lesson 6 Resources (teachcomputing.org)	To recognise that photos can be changed To apply a range of photography skills to capture a photo To recognise which photos have been changed To identify which photos are real and which have been changed

Progression:
In advance of the lessons in this Year 2 unit, learners should have had some experience of creating short programs using floor robots and predicting the outcome of a simple program, primarily in the Year 1 units. 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.

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 1: Robot Algorithms **Unit Introduction:** This unit develops learners' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Learners will use given commands in different orders to investigate how the order affects the outcome. They will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them. There are two Year 2 programming units: Programming A – Robot algorithms Programming B – Programming quizzes **This is unit A, which should be delivered before unit B.**	**Lesson 1**	How do I give precise instructions?	Learners will follow instructions given to them and give instructions to others. They will consider the language used to give instructions, and how that language needs to be clear and precise. Learners will combine several instructions into a sequence that can then be issued to another learner to complete. They will then consider a clear and precise set of instructions in relation to an algorithm, and will think about how computers can only follow clear and unambiguous instructions.	To describe a series of instructions as a sequence To follow instructions given by someone else To choose a series of words that can be acted out as a sequence To give clear instructions
	Lesson 2	Why is the order of instructions important?	Learners will focus on sequences, and consider the importance of the order of instructions within a sequence. They will create sequences using the same instructions in different orders. They will then test these sequences to see how the different orders affect the outcome.	To explain what happens when we change the order of instructions To use the same instructions to create different algorithms To use an algorithm to program a sequence on a floor robot To show the difference in outcomes between two sequences that consist of the same instructions
	Lesson 3	What predictions can I make about a sequence?	Learners will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be. ***Note:*** *Learners may need to be encouraged to think through their predictions and understand that they are reasoned decisions rather than guesses.*	To use logical reasoning to predict the outcome of a program To follow a sequence To predict the outcome of a sequence To compare my prediction to the program outcome
	Lesson 4	How do I create a route for a robot?	Learners will design, create, and test a mat for a floor robot. This will introduce the idea that design in programming not only includes code and algorithms, but also artefacts related to the project, such as artwork. ***Note:*** *The designs in this lesson can be changed to suit a topic or theme that the class is learning about. The ideas included in the slides are examples.*	To explain that programming projects can have code and artwork To explain the choices that I made for my mat design To identify different routes around my mat To test my mat to make sure that it is usable
	Lesson 5	Does my algorithm meet my goal?	Learners will design an algorithm to move their robot around the mat that they designed in Lesson 4. As part of the design process, learners will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that learners clearly understand what they want their program to achieve.	To design an algorithm To explain what my algorithm should achieve To create an algorithm to meet my goal I can use my algorithm to create a program
	Lesson 6	Can I create and debug a program?	Learners will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition' and is covered further in key stage 2. Learners will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'.	To create and debug a program that I have written To test and debug each part of the program To plan algorithms for different parts of a task To put together the different parts of my program

Year 2

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Progression:
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.

Year 2

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 2: Pictograms **Unit Introduction:** Learners will begin to understand what the term data means and how data can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data presented to answer questions. During this unit of work learners will use j2e pictogram tool.	**Lesson 1**	How do I count and compare?	During this lesson learners will begin to understand the importance of organising data effectively for counting and comparing. They will create their own tally charts to organise data, and represent the tally count as a total. Finally, they will answer questions comparing totals in tally charts using vocabulary such as 'more than' and 'less than'.	To recognise that we can count and compare objects using tally charts To record data in a tally chart To represent a tally count as a total To compare totals in a tally chart
	Lesson 2	How do I enter the data?	During this lesson learners will become familiar with the term 'pictogram'. They will create pictograms manually and then progress to creating them using a computer. Learners will begin to understand the advantages of using computers rather than manual methods to create pictograms, and use this to answer simple questions.	To recognise that objects can be represented as pictures To enter data onto a computer To use a computer to view data in a different format To use pictograms to answer simple questions about objects
	Lesson 3	How do I create a pictogram?	During this lesson learners will think about the importance of effective data collection and will consider the benefits of different data collection methods: why, for example, we would use a pictogram to display the data collected. They will collect data to create a tally chart and use this to make a pictogram on a computer. Learners will explain what their finished pictogram shows by writing a range of statements to describe this.	To create a pictogram To organise data in a tally chart To use a tally chart to create a pictogram To explain what the pictogram shows
	Lesson 4	What is an attribute?	During this lesson learners will think about ways in which objects can be grouped by attribute. They will then tally objects using a common attribute and present the data in the form of a pictogram. Learners will answer questions based on their pictograms using mathematical vocabulary such as 'more than'/'less than' and 'most'/'least'.	To select objects by attribute and make comparisons To tally objects using a common attribute To create a pictogram to arrange objects by an attribute To answer 'more than'/'less than' and 'most/least' questions about an attribute
	Lesson 5	How can I use attributes to compare people?	During this lesson learners will understand that people can be described by attributes. They will practise using attributes to describe images of people and the other learners in the class. The learners will collect data needed to organise people using attributes and create a pictogram to show this pictorially. Finally, learners will draw conclusions from their pictograms and share their findings.	To recognise that people can be described by attributes To choose a suitable attribute to compare people To collect the data I need To create a pictogram and draw conclusions from it
	Lesson 6	What is the best way to present data?	During this lesson learners will understand that there are other ways to present data than using tally charts and pictograms. They will use a pre-made tally chart to create a block diagram on their device. Learners will then share their data with a partner and discuss their findings. They will consider whether it is always OK to share data and when it is not OK. They will know that it is alright to say no if someone asks for their data, and how to report their concerns.	To explain that we can present information using a computer To use a computer program to present information in different ways To share what I have found out using a computer To give simple examples of why information should not be shared

Year 2

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 1: Making Music **Unit Introduction:** In this unit, learners will be using a computer to create music. They will listen to a variety of pieces of music and consider how music can make them think and feel. Learners will compare creating music digitally and non-digitally. Learners will look at patterns and purposefully create music.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	How does music makes us feel?	In this lesson learners will listen to and compare two pieces of music from *The Planets* by Gustav Holst. They will then use a musical description word bank to describe how this music generates emotions, i.e. how it makes them feel.	To say how music can make us feel To identify simple differences in pieces of music To describe music using adjectives To say what I do and don't like about a piece of music
		How can I create rhythms and patterns?	In this lesson, learners will explore **rhythm**. They will create patterns and use those patterns as rhythms. They will use untuned percussion instruments and computers to hear the different rhythm patterns that they create.	To identify that there are patterns in music To create a rhythm pattern To play an instrument following a rhythm pattern To explain that music is created and played by humans
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	How can music be used in different ways?	During this lesson, learners will explore how music can be used in different ways to express emotions and to trigger their imaginations. They will experiment with the pitch of notes to create their own piece of music, which they will then associate with a physical object — in this case, an animal.	To experiment with sound using a computer To connect images with sounds To use a computer to experiment with pitch To relate an idea to a piece of music
		Can I identify notes and tempo?	In this lesson, learners will develop their understanding of music. They will use a computer to create and refine musical patterns.	To use a computer to create a musical pattern To identify that music is a sequence of notes To explain how my music can be played in different ways To refine my musical pattern on a computer
	Lesson 5 & Lesson 6 ***To be taught as one 1 hour lesson***	How can I create digital music?	In this lesson, learners will choose an animal and create a piece of music using the animal as inspiration. They will think about their animal moving and create a rhythm pattern from that. Once they have defined a rhythm, they will create a musical pattern (melody) to go with it.	To create music for a purpose To create a rhythm which represents an animal I've chosen To create my animal's rhythm on a computer To add a sequence of notes to my rhythm
		Can I review and edit music?	In this lesson, learners will retrieve and review their work. They will spend time making improvements and then share their work with the class.	To review and refine our computer work To review my work To explain how I changed my work To listen to music and describe how it makes me feel

Progression:
Learners should have experience of making choices on a tablet/computer, and they should be able to navigate within an application. Learners should also have some experience of patterns.

Progression:
This unit progresses learners' knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes.

Year 2

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 2: Programming Quizzes **Unit Introduction:** This unit initially recaps on learning from the Year 1 ScratchJr unit 'Programming B – Programming animations'. Learners begin to understand that sequences of commands have an outcome, and make predictions based on their learning. They use and modify designs to create their own quiz questions in ScratchJr, and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects. There are two Year 2 programming units: Programming A – Robot algorithms Programming B – Programming quizzes This is unit B, which should be delivered after unit A.	**Lesson 1**	What are the features of a command sequence?	During this lesson, learners will recap what they know already about the ScratchJr app. They will begin to identify the start of sequences in real-world scenarios, and learn that sequences need to be started in ScratchJr. Learners will create programs and run them in full-screen mode using the **Green flag**.	To explain that a sequence of commands has a start To identify the start of a sequence To identify that a program needs to be started To show how to run my program
	Lesson 2	What are the outcomes of a command sequence?	During this lesson, learners will discover that a sequence of commands has an 'outcome'. They will predict the outcomes of real-life scenarios and a range of small programs in ScratchJr. Learners will then match programs that produce the same outcome when run, and use a set of blocks to create programs that produce different outcomes when run.	To explain that a sequence of commands has an outcome To predict the outcome of a sequence of commands To match two sequences with the same outcome To change the outcome of a sequence of commands
	Lesson 3	How do I decide what blocks control a sprite?	During this lesson, learners will be taught how to use the **Start on tap** and **Go to page** (**Change background**) blocks. They will use a predefined design to create an animation based on the seasons. Learners will then be introduced to the task for the next lesson. They will predict what a given algorithm might mean.	To create a program using a given design To work out the actions of a sprite in an algorithm To decide which blocks to use to meet the design To build the sequences of blocks I need
	Lesson 4	How do I change a design?	During this lesson, learners will look at an existing quiz design and think about how this can be realised within the ScratchJr app. They will choose backgrounds and characters for their own quiz projects. Learners will modify a given design sheet and create their own quiz questions in ScratchJr.	To change a given design To choose backgrounds for the design To choose characters for the design To create a program based on the new design
	Lesson 5	How do I make my own design?	During this lesson, learners will create their own quiz question designs including their own choices of question, artwork, and algorithms. They will increase the number of blocks used within their sequences to create more complex programs.	To create a program using my own design To choose the images for my own design To create an algorithm To build sequences of blocks to match my design
	Lesson 6	How could I improve my project?	During this lesson, learners will compare their projects to their designs. They will think about how they could improve their designs by adding additional features. They will modify their designs and implement the changes on their devices. Learners will find and correct errors in programs (debug) and discuss whether they debugged errors in their own projects.	To decide how my project can be improved To compare my project to my design To improve my project by adding features To debug my program

Progression:
This unit progresses learners' knowledge and understanding of technology by focusing on digital and non-digital devices, and introducing the concept of computers connected together as a network. Following this unit, learners will explore the internet as a network of networks.

Year 3

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 1: Connecting Computers Connecting Computers Resources (teachcomputing.org) **Unit Introduction:** Learners 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, learners 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.	**Lesson 1**	How does a digital device work?	This lesson introduces the concepts of input, process, and output. These concepts are fundamental to all digital devices. Lesson 1 Resources (teachcomputing.org)	To explain how digital devices function To explain that digital devices accept inputs To explain that digital devices produce outputs To follow a process
	Lesson 2	What parts make up a digital device?	Learners will develop their knowledge of the relationship between inputs, processes, and outputs and apply it to devices and parts of devices that they will be familiar with from their everyday surroundings. Lesson 2 Resources (teachcomputing.org)	To identify input and output devices To classify input and output devices To describe a simple process To design a digital device
	Lesson 3	How do digital devices help us?	Learners will apply their learning from Lessons 1 and 2 by using programs in conjunction with inputs and outputs on a digital device. They will create two pieces of work with the same focus, using digital devices to create one piece of work, and non-digital tools to create the other. Learners will then compare and contrast the two approaches. Lesson 3 Resources (teachcomputing.org)	To recognise how digital devices can change the way that we work To explain how I use digital devices for different activities To recognise similarities between using digital devices and using non-digital tools To suggest differences between using digital devices and using non-digital tools
	Lesson 4	How am I connected?	Many digital devices are now connected to other digital devices, e.g. computers through wires, tablets through Wi-Fi, and smartphones through mobile phone networks. The benefit of connecting digital devices is that it allows information to be shared between users and systems. This lesson introduces the concept of connections and moving information between connected devices. Learners will learn to explain how and why computers are joined together to form networks. Lesson 4 Resources (teachcomputing.org)	To explain how a computer network can be used to share information To recognise different connections To explain how messages are passed through multiple connections To discuss why we need a network switch
	Lesson 5	How are computers connected?	This lesson introduces key network components, including a server and wireless access points. Learners will examine each device's functionality and look at the benefits of networking computers. Lesson 5 Resources (teachcomputing.org)	To explore how digital devices can be connected To recognise that a computer network is made up of a number of devices To demonstrate how information can be passed between devices To explain the role of a switch, server, and wireless access point in a network
	Lesson 6	What does our school network look like?	Learners will further develop their understanding of computer networks. They will see examples of network infrastructure in a real-world setting and relate them to the activities in Lesson 5. Lesson 6 Resources (teachcomputing.org)	To recognise the physical components of a network To identify how devices in a network are connected together To identify networked devices around me To identify the benefits of computer networks

Progression:
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 video editing skills in Year 5.

Year 3

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 2: Stop-Frame Animation Stop-frame Animation - Resources (teachcomputing.org) **Unit Introduction:** 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. It is recommended that you use a tablet for this unit as this makes it simpler for learners to take the photos and do the editing. However, you could use stop-frame animation software on a desktop or laptop if this is what you have available. This unit uses screenshots from iMotion which is an iPad app, but you could also try Stop Motion Studio if you have Android tablets.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	Can a picture move?	Learners will discuss whether they think a picture can move. They will learn about simple animation techniques and create their own animations in the style of flip books (flick books) using sticky notes. Lesson 1 Resources (teachcomputing.org)	To explain that animation is a sequence of drawings or photographs To draw a sequence of pictures To create an effective flip book—style animation To explain how an animation/flip book works
		What changes are made frame-by-frame?	In the previous lesson, learners created their own flip book–style animations. In this lesson, they will develop this knowledge and apply it to make a stop-frame animation using a tablet. Lesson 2 Resources (teachcomputing.org)	To relate animated movement with a sequence of images To predict what an animation will look like To explain why little changes are needed for each frame To create an effective stop-frame animation
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	What are the key parts of the story?	Remind the learners of the animations that we created last week and tell them that next week we will use tablets to animate some of our own stories. Tell the learners that during this lesson they will create a storyboard showing the characters, settings and events that they would like to include in their own stop-frame animation next week. Lesson 3 Resources (teachcomputing.org)	To plan an animation To break down a story into settings, characters and events To describe an animation that is achievable on screen To create a storyboard
		Can I create a stop-frame animation?	In the previous lesson, learners planned out their own stop-frame animations in a storyboard. This lesson, they will use tablets to carefully create stop-frame animations, paying attention to consistency. Lesson 4 Resources (teachcomputing.org)	To identify the need to work consistently and carefully To use onion skinning to help me make small changes between frames To review a sequence of frames to check my work To evaluate the quality of my animation
	Lesson 5 & Lesson 6 ***To be taught as one 1 hour lesson***	How do I refine an animation?	Last lesson, learners created their own stop-frame animations. This lesson, they will evaluate their animations and try to improve them by creating a brand-new animation based on their feedback. Lesson 5 Resources (teachcomputing.org)	To review and improve an animation To explain ways to make my animation better To evaluate another learner's animation To improve my animation based on feedback
		Can I add other media to my animation?	Last lesson, learners perfected their stop-frame animations. This lesson, they will add other media and effects into their animations, such as music and text. Lesson 6 Resources (teachcomputing.org)	To evaluate the impact of adding other media to an animation To add other media to my animation To explain why I added other media to my animation To evaluate my final film

Progression:
This unit assumes that learners will have some prior experience of programming; the KS1 NCCE units cover floor robots and ScratchJr. However, experience of other languages or environments may also be useful.

Year 3

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 1: Sequencing Sounds **Unit Introduction:** 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. There are two Year 3 programming units: Programming A - Sequencing sounds Programming B - Events and actions in programs **This is unit A which should be delivered before unit B.**	**Lesson 1**	How does Scratch work?	This lesson introduces learners to a new programming environment: Scratch. Learners will begin by comparing Scratch to other programming environments they may have experienced, before familiarising themselves with the basic layout of the screen.	To explore a new programming environment To identify the objects in a Scratch project (sprites, backdrops) To explain that objects in Scratch have attributes (linked to) To recognise that commands in Scratch are represented as blocks
	Lesson 2	How do I programme a sprite?	In this lesson, learners will create movement for more than one sprite. In doing this, they will design and implement their code, and then will create code to replicate a given outcome. Finally, they will experiment with new motion blocks.	To identify that commands have an outcome To identify that each sprite is controlled by the commands I choose To choose a word which describes an on-screen action for my plan To create a program following a design
	Lesson 3	How do I create a sequence of commands?	In this lesson, learners will be introduced to the concept of sequences by joining blocks of code together. They will also learn how event blocks can be used to start a project in a variety of different ways. In doing this, they will apply principles of design to plan and create a project.	To explain that a program has a start To start a program in different ways To create a sequence of connected commands To explain that the objects in my project will respond exactly to the code
	Lesson 4	Why is the order of commands important?	This lesson explores sequences, and how they are implemented in a simple program. Learners have the opportunity to experiment with sequences where order is and is not important. They will create their own sequences from given designs.	To recognise that a sequence of commands can have an order To explain what a sequence is To combine sound commands To order notes into a sequence
	Lesson 5	How do I change the appearance of my project?	This lesson develops learners' understanding of sequences by giving them the opportunity to combine motion and sounds in one sequence. They will also learn how to use costumes to change the appearance of a sprite, and backdrops to change the appearance of the stage. They will apply the skills in Activity 1 and 2 to design and create their own project, including sequences, sprites with costumes, and multiple backdrops.	To change the appearance of my project To build a sequence of commands To decide the actions for each sprite in a program To make design choices for my artwork
	Lesson 6	How do I replicate a code and test if it works?	In this lesson, learners will create a musical instrument in Scratch. They will apply the concept of design to help develop programs and use programming blocks — which they have been introduced to throughout the unit. They will learn that code can be copied from one sprite to another, and that projects should be tested to see if they perform as expected.	To create a project from a task description To identify and name the objects I will need for a project To relate a task description to a design To implement my algorithm as code

Progression:
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.

Year 3

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 2: Branching Databases **Unit Introduction:** 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.	**Lesson 1**	How do I create yes or no questions?	Learners will start to explore questions with yes/no answers, and how these can be used to identify and compare objects. They will create their own yes/no questions, before using these to split a collection of objects into groups.	To create questions with yes/no answers To investigate questions with yes/no answers To make up a yes/no question about a collection of objects To create two groups of objects separated by one attribute
	Lesson 2	Why are groups important for data?	Learners will develop their understanding of using questions with yes/no answers to group objects more than once. They will learn how to arrange objects into a tree structure and will continue to think about which attributes the questions are related to.	To identify the attributes needed to collect data about an object To select an attribute to separate objects into groups To create a group of objects within an existing group To arrange objects into a tree structure
	Lesson 3	What is a branching database?	Learners will continue to develop their understanding of ordering objects/images in a branching database structure. They will learn how to use an online database tool to arrange objects into a branching database, and will create their own questions with yes/no answers. Learners will show that their branching database works through testing.	To create a branching database To select objects to arrange in a branching database To group objects using my own yes/no questions To test my branching database to see if it works
	Lesson 4	How do I structure a branching database?	Learners will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes/no answers, and will apply these to given objects. Learners will compare the efficiency of different branching databases, and will be able to explain why questions need to be in a specific order.	To explain why it is helpful for a database to be well structured To create yes/no questions using given attributes To compare two branching database structures To explain that questions need to be ordered carefully to split objects into similarly sized groups
	Lesson 5	What will my own database look like?	Learners will independently plan a branching database by creating a physical representation of one that will identify different types of dinosaur. They will continue to think about the attributes of objects to write questions with yes/no answers, which will enable them to separate a group of objects effectively. Learners will then arrange the questions and objects into a tree structure, before testing the structure.	To plan the structure of a branching database To independently create questions to use in a branching database To create questions that will enable objects to be uniquely identified To create a physical version of a branching database
	Lesson 6	How does a database apply to different objects of groups?	Learners will independently create a branching database to identify different types of dinosaur, based on the paper-based version that they created in Lesson 5. They will then work with a partner to test that their database works, before considering real-world applications for branching databases.	To independently create an identification tool To create a branching database that reflects my plan To work with a partner to test my identification tool I can suggest real-world uses for branching databases

Progression:
This unit progresses learners' knowledge and understanding of using digital devices to combine text and images building on work from the following units; Digital Writing Year 1, Digital painting Year 1, and Digital Photography Year 2.

Year 3

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 1: Desktop Publishing **Unit Introduction:** 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.	**Lesson 1**	Why do we use words and images?	In this lesson, learners will become familiar with the terms 'text' and 'images' and understand that text and images need to be used carefully to communicate messages clearly. Learners will be able to give advantages and disadvantages of using text, images, or both text and images to communicate messages effectively.	To recognise how text and images convey information To explain the difference between text and images To recognise that text and images can communicate messages clearly To identify the advantages and disadvantages of using text and images
	Lesson 2	How do I edit a page?	This lesson will build on last week's lesson, in which we looked at using images and text to communicate a message effectively. In this lesson we will look at desktop publishing. Learners will think about how to make careful choices regarding font size, colour, and type in an invitation. The use of the Return, Backspace, and Shift keys will be explored and learners will be taught how to type age-appropriate punctuation marks. This will build on the typing skills learned in the Year 1 'Digital painting' unit. Learners will understand that once content has been added, it can be rearranged on the page.	To recognise that text and layout can be edited To change font style, size, and colours for a given purpose To edit text To explain that text can be changed to communicate more clearly
	Lesson 3	What are the key page settings?	Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' within desktop publishing software. The learners will create their own magazine template, which they will add content to during the next lesson. This lesson has been designed on a laptop using Adobe Spark and this is reflected in the screenshots and videos. Teachers may decide to use the Adobe Spark app, or other software such as Canva or Microsoft Publisher.	To choose appropriate page settings To explain what 'page orientation' means To recognise placeholders and say why they are important To create a template for a particular purpose
	Lesson 4	How do I add content?	In this lesson, learners will add their own content (text and images) to the magazine templates they created in lesson 3. They will copy the information for the front of their magazine from a prewritten document and paste it into the chosen place on their magazine cover. Images will be added from within the search facility in Adobe Spark.	To add content to a desktop publishing publication To choose the best locations for my content To paste text and images to create a magazine cover To make changes to content after I've added it
	Lesson 5	How do I choose a suitable layout?	In this lesson, learners will think about the different ways information can be laid out on a page. They will look at a range of page layouts such as letters and newspapers, and begin to think about the purpose of each of these.	To consider how different layouts can suit different purposes To identify different layouts To match a layout to a purpose To choose a suitable layout for a given purpose
	Lesson 6	Why would I choose desktop publishing?	In this lesson, learners will explain what desktop publishing means in their own words. They will think about how desktop publishing is used in the wider world and consider the benefits of using desktop publishing applications.	To consider the benefits of desktop publishing To identify the uses of desktop publishing in the real world To say why desktop publishing might be helpful To compare work made on desktop publishing to work created by hand

Progression:
This unit assumes that learners will have some prior experience of programming. The key stage 1 National Centre for Computing Education units focus on floor robots and ScratchJr, however experience of other languages or environments may also be useful. The Year 3 — Programming A unit introduces the Scratch programming environment and the concept of sequences.

Year 3

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 2: Events and Actions in Programs **Unit Introduction:** 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. There are two Year 3 programming units: Programming A – Sequencing sounds Programming B – Events and actions in programs **This is unit B, which should be delivered after unit A.**	**Lesson 1**	How do I move a sprite?	In this lesson, learners will investigate how characters can be moved using 'events'. They will analyse and improve an existing project, and then apply what they have learned to their own projects. They will then extend their learning to control multiple sprites in the same project.	To explain how a sprite moves in an existing project To explain the relationship between an event and an action To choose which keys to use for actions and explain my choices To identify a way to improve a program
	Lesson 2	How do I move a sprite in multiple directions?	In this lesson, learners will program a sprite to move in four directions: up, down, left, and right. They will begin by choosing a sprite and sizing it to fit in with a given background. Learners will then create the code to move the sprite in one direction before duplicating and modifying it to move in all four directions. Finally, they will consider how their project could be extended to prove that their sprite has successfully navigated a maze.	To create a program to move a sprite in four directions To choose a character for my project To choose a suitable size for a character in a maze To program movement
	Lesson 3	How do I use a programme extension?	This lesson will introduce learners to extension blocks in Scratch using the **Pen** extension. Learners will use the pen down block to draw lines, building on the movement they created for their sprite in Lesson 2. Learners will then decide how to set up their project every time it is run.	To adapt a program to a new context To use a programming extension To consider the real world when making design choices To choose blocks to set up my program
	Lesson 4	Can I add features to my programme?	In this lesson, learners will be given the opportunity to use additional **Pen** blocks. They will predict the functions of new blocks and experiment with them, before designing features to add to their own projects. Finally, they will add these features to their projects and test their effectiveness.	To develop my program by adding features To identify additional features (from a given set of blocks) To choose suitable keys to turn on additional features To build more sequences of commands to make my design work
	Lesson 5	Can I identify and fix bugs in my programme?	This lesson explores the process of debugging, specifically looking at how to identify and fix errors in a program. Learners will review an existing project against a given design and identify bugs within it. They will then correct the errors, gaining independence as they do so. Learners will also develop their projects by considering which new setup blocks to use.	To identify and fix bugs in a program To test a program against a given design To match a piece of code to an outcome To modify a program using a design
	Lesson 6	Can I design and create my own project?	In this lesson, learners will design and create their own projects. Using a template (which can be blank or partially completed), learners will complete projects to move a sprite around a maze, with the option to leave a pen trail showing where the sprite has moved. Ideally, projects will include setup blocks to position the sprite at the start of the maze and clear any lines already on the screen.	To design and create a maze-based challenge To make design choices and justify them To implement my design To evaluate my project

Progression:
This unit progresses students' knowledge and understanding of networks in Year 3. In Year 5, they will continue to develop their knowledge and understanding of computing systems and online collaborative working.

Year 4

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 1: The Internet The Internet - Resources (teachcomputing.org) **Unit Introduction:** 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.	**Lesson 1**	How are networks connected?	Learners will explore how a network can share messages with another network to form the internet. They will consider some of the network devices involved in this, such as routers, and will also discuss what should be kept in and out of a network to keep safe. Lesson 1 Resources (teachcomputing.org)	To describe how networks physically connect to other networks To describe the internet as a network of networks To demonstrate how information is shared across the internet To discuss why a network needs protecting
	Lesson 2	What is the internet made of?	Learners will describe the parts of a network and how they connect to each other to form the internet. They will use this understanding to help explain how the internet lets us view the World Wide Web and recognise that the World Wide Web is part of the internet which contains websites and web pages. Lesson 2 Resources (teachcomputing.org)	To recognise how networked devices make up the internet To describe networked devices and how they connect To explain that the internet is used to provide many services To recognise that the World Wide Web contains websites and web pages
	Lesson 3	Where are websites stored and how are they accessed?	Learners will explore what can be shared on the World Wide Web and where websites are stored. They will also explore how the World Wide Web can be accessed on a variety of devices. Lesson 3 Resources (teachcomputing.org)	To outline how websites can be shared via the World Wide Web (WWW) To explain the types of media that can be shared on the WWW To describe where websites are stored when uploaded to the WWW To describe how to access websites on the WWW
	Lesson 4	What is a website?	Learners will analyse a website and identify the key parts. They will then consider what content can be added to websites and what factors they should consider before adding content to a website. Finally, they will use a website which enables them to create their own content online. Lesson 4 Resources (teachcomputing.org)	To describe how content can be added and accessed on the World Wide Web (WWW) To explain what media can be found on websites To recognise that I can add content to the WWW To explain that internet services can be used to create content online
	Lesson 5	Who owns the web?	Learners will explore who owns the content on the World Wide Web (or 'web' for short). They will explore a variety of websites and will investigate what they can and cannot do with the content on them. They will also relate this to principles of ownership and sharing in the real world. Lesson 5 Resources (teachcomputing.org)	To recognise how the content of the WWW is created by people To explain that websites and their content are created by people To suggest who owns the content on websites To explain that there are rules to protect content
	Lesson 6	Can I believe what I read?	Learners will gain an appreciation of the fact that not everything they see on the internet is true, honest, or accurate. They will review images and decide whether or not they are real, before looking at why web searches can return ambiguous (and sometimes misleading) results. Finally, learners will complete a practical activity, demonstrating how quickly information can spread beyond their control. Lesson 6 Resources (teachcomputing.org)	To evaluate the consequences of unreliable content To explain that not everything on the World Wide Web is true To explain why some information I find online may not be honest, accurate, or legal To explain why I need to think carefully before I share or reshare content

Progression:
This unit progresses students' knowledge and understanding of creating media, by focusing on the recording and editing of sound to produce a podcast. Following this unit, learners will explore combining audio with video in the 'Video editing' unit in Year 5.

Year 4

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 2: Audio Production **Unit Introduction:** Audio Production - Resources (teachcomputing.org) Learners will identify the input device (microphone) and output devices (speaker or headphones) required to work with sound digitally. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podcast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners will evaluate their work and give feedback to their peers.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	How do I record sound?	In this lesson, learners will identify the input devices used to record sound and output devices needed to listen to it. They will then record their voices using a computer, and reflect on what makes a good audio recording. Lastly, learners will consider ownership and copyright issues related to recordings. Lesson 1 Resources (teachcomputing.org)	To identify that sound can be recorded To identify the input and output devices used to record and play sound To use a computer to record audio To explain that the person who records the sound can say who is allowed to use it
		How do I edit audio?	In this lesson, learners will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Learners will also listen to a range of podcasts and identify the features of a podcast. Lesson 2 Resources (teachcomputing.org)	To explain that audio recordings can be edited To re-record my voice to improve my recording To inspect the soundwave view to know where to trim my recording To discuss what sounds can be added to a podcast
	Lesson 3	What are the key parts of a podcast?	In this lesson, learners will record their voices and then import and align sound effects to create layers in their recordings. Learners will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons. Lesson 3 Resources (teachcomputing.org)	To recognise the different parts of creating a podcast project To explain how sounds can be combined to make a podcast more engaging To save my project so the different parts remain editable To plan appropriate content for a podcast
	Lesson 4	Can I record my own podcast?	In this lesson, learners will record the voice tracks for their podcast. They will review their recordings and re-record if necessary. Learners will edit, trim, and align their voice recordings, and then save their project so they can continue working on it in the next lesson. Lesson 4 Resources (teachcomputing.org)	To apply audio editing skills independently To record content following my plan To review the quality of my recordings To improve my voice recordings
	Lesson 5 & Lesson 6 ***To be taught as one 1 hour lesson***	How do I combine audio to enhance my project?	In this lesson, learners will develop their podcast further by adding content such as sound effects and background music. The audio will be layered with their existing voice recordings and exported as an audio file. Lesson 5 Resources (teachcomputing.org)	To combine audio to enhance my podcast project To open my project to continue working on it To arrange multiple sounds to create the effect I want To explain the difference between saving a project and exporting an audio file
		How effective is my podcast?	In this lesson, learners will evaluate their own podcasts and that of others. After looking at the evaluation, learners will decide if they can improve their podcast and then make any changes they have chosen. Lesson 6 Resources (teachcomputing.org)	To evaluate the effective use of audio To listen to an audio recording to identify its strengths To suggest improvements to an audio recording To choose appropriate edits to improve my podcast

Progression:
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.

Year 4

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 1: Repetition in Shapes **Unit Introduction:** Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming There are two Year 4 programming units: Programming A – Repetition in shapes Programming B – Repetition in games **This is unit A, which should be delivered before unit B.**	**Lesson 1**	What is text-based programming?	This lesson will introduce pupils to programming in Logo. Logo is a text-based programming language where pupils type commands that are then drawn on screen. Pupils will learn the basic Logo commands, and will use their knowledge of them to read and write code.	To identify that accuracy in programming is important To program a computer by typing commands To explain the effect of changing a value of a command To create a code snippet for a given purpose
	Lesson 2	How do I use an algorithm in a text-based program?	In this lesson, pupils will create algorithms (a precise set of ordered instructions, which can be turned into code) for their initials. They will then implement these algorithms by writing them in Logo commands to draw the letter. They will debug their code by finding and fixing any errors that they spot.	To create a program in a text-based language To use a template to draw what I want my program to do To write an algorithm to produce a given outcome To test my algorithm in a text-based language
	Lesson 3	How do I use repetition in a text-based program?	In this lesson, pupils will first look at examples of patterns in everyday life. They will recognise where numbers, shapes, and symbols are repeated, and how many times repeats occur. They will create algorithms for drawing a square, using the same annotated diagram as in Lesson 2. They will use this algorithm to program a square the 'long' way, and recognise the repeated pattern within a square. Once they know the repeated pattern, they will use the repeat command within Logo to program squares the 'short' way.	To explain what 'repeat' means To identify repetition in everyday tasks To identify patterns in a sequence To use a count-controlled loop to produce a given outcome
	Lesson 4	How do I use loops to create shapes?	In this lesson, pupils will work with count-controlled loops in a range of contexts. First, they will think about a real-life example, then they will move on to using count-controlled loops in regular 2D shapes. They will trace code to predict which shapes will be drawn, and they will modify existing code by changing values within the code snippet.	To modify a count-controlled loop to produce a given outcome To identify the effect of changing the number of times a task is repeated To predict the outcome of a program containing a count-controlled loop To choose which values to change in a loop
	Lesson 5	How do I use a procedure in a program?	In this lesson, pupils will focus on decomposition. They will break down everyday tasks into smaller parts and think about how code snippets can be broken down to make them easier to plan and work with. They will learn to create, name, and call procedures in Logo, which are code snippets that can be reused in their programming.	To decompose a task into small steps To identify 'chunks' of actions in the real world To use a procedure in a program To explain that a computer can repeatedly call a procedure
	Lesson 6	Can I design my own program?	In the final lesson, pupils will apply the skills that they have learnt in this unit to create a program containing a count-controlled loop. Over the course of the lesson, they will design wrapping paper using more than one shape, which they will create with a program that uses count-controlled loops. They will begin by creating the algorithm, either as an annotated sketch, or as a sketch and algorithm, and then implement it as code. They will debug their work throughout, and evaluate their programs against the original brief.	To create a program that uses count-controlled loops to produce a given outcome To design a program that includes count-controlled loops To make use of my design to write a program To develop my program by debugging it

Progression:
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).

Year 4

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 2: Data Logging **Unit Introduction:** In this unit, learners will consider how and why data is collected over time. Learners will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Learners will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Learners will spend time using a computer to review and analyse data. Towards the end of the unit, learners will pose questions and then use data loggers to automatically collect the data needed to answer those questions.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	How do we collect data?	Learners will consider what data can be collected and how it is collected. They will think about data being collected over time. Learners will also think about questions that can and can't be answered using available data, and reflect on the importance of collecting the right data to answer questions.	To explain that data gathered over time can be used to answer questions To choose a data set to answer a given question To suggest questions that can be answered using a given data set To identify data that can be gathered over time
		How can I use a digital device to collect data?	Learners will build on the idea of collecting data over time, and be introduced to the idea of collecting data automatically using computers such as data loggers. They will also be introduced to the concept that computers can capture data from the physical world using input devices called 'sensors'. Learners will establish that sensors can be connected to data loggers, which can automatically collect data while not attached to a computer.	To use a digital device to collect data automatically To explain what data can be collected using sensors To use data from a sensor to answer a given question To identify that data from sensors can be recorded
	Lesson 3	What is a data logger and what is it used for?	Learners will explore how data loggers work. They will record data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals. Learners will use data loggers away from a computer, then they will connect the loggers to a computer and download the data.	To explain that a data logger collects 'data points' from sensors over time To recognise that a data logger collects data at given points To identify the intervals used to collect data To talk about the data that I have captured
	Lesson 4	How can a computer analyse data?	Learners will open an existing data file and use software to find out key information. They will analyse a data file which is a five-hour log of hot water cooling to room temperature.	To recognise how a computer can help us analyse data To view data at different levels of detail To sort data to find information To explain that there are different ways to view data
	Lesson 5 & Lesson 6 ***To be taught as one 1 hour lesson***	What data is required to answer given questions?	Learners will think about questions that can be answered using collected data. They will choose a question to focus on and then plan the data logging process that they need to complete. After learners have completed their plan, they will set up the data loggers to check that their plan will work. This setting up is designed to ensure that the data collection will work, and that learners will have data to use in the next lesson.	To identify the data needed to answer questions To propose a question that can be answered using logged data To plan how to collect data using a data logger To use a data logger to collect data
		How do I interpret data which has been collected?	Learners will access and review the data that they have collected using a data logger. They will then use the data collected to answer the question that they selected in the previous lesson. Learners will also reflect on the benefits of using a data logger.	To use data from sensors to answer questions To interpret data that has been collected using a data logger To draw conclusions from the data that I have collected To explain the benefits of using a data logger

Progression:
This unit progresses students' knowledge and understanding of digital photography and using digital devices to create media. Following this unit, learners will further develop their image editing skills in Year 5 – Vector drawing.

Year 4

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 1: Photo Editing **Unit Introduction:** 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. Throughout this unit, there are opportunities to model with photo editing applications or to demonstrate a concept using the included screen recordings. Pedagogically, it is more beneficial to model the concepts and skills to the learners, which allows for easier questioning and understanding. We recommend that you use the screen recordings to see what needs to be modelled, but give a live demonstration within the lesson. However, the videos are provided on the slides if you wish to use them instead.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	How do I change a digital image?	In this lesson, you will introduce learners to the concept of editing images. They will go on to explore when we need to rotate and crop an image as well as how to use an image editor to make these changes. Learners will then discuss image composition.	To explain that the composition of digital images can be changed To improve an image by rotating it To explain why I might crop an image To use photo editing software to crop an image
		How does a colour of an image change the overall effect?	In this lesson, learners will look at the effect that different colours and filters can have on an image. They will choose appropriate effects to fit a scenario, and explain how they made their choices. They will then edit the images using different effects to suit two different scenarios.	To explain that colours can be changed in digital images To explain that different colour effects make you think and feel different things To experiment with different colour effects To explain why I chose certain colour effects
	Lesson 3	What is cloning and how is it used in photo editing?	In this lesson, learners will be introduced to the cloning tool and its use in both changing the composition of a photo and photo retouching. They will see how parts of a photo can be removed or duplicated using cloning. Learners will consider what parts of an image can be retouched and learn techniques to make this as unnoticeable as possible. Finally, they will consider when it is necessary to edit photographs in this way.	To explain how cloning can be used in photo editing To add to the composition of an image by cloning To identify how a photo edit can be improved To remove parts of an image using cloning
	Lesson 4	How do I combine images?	In this lesson, students learn how to use different tools to select areas of an image. Learners then use copy and paste within one image and between two images to produce a combined image. Finally, learners will consider when it's appropriate to edit an image and discuss some of the ethics around retouching photos.	To explain that images can be combined To experiment with tools to select and copy part of an image To use a range of tools to copy between images To explain why photos might be edited
	Lesson 5 & Lesson 6 ***To be taught as one 1 hour lesson***	Can I create an image for a purpose?	In this lesson, learners will apply all the skills they have learnt in the unit so far. They will start by reviewing some images and considering what makes an image look real or made up. Learners will then plan their own image. They will choose from a selection of images, open them and edit them to create their own project.	To combine images for a purpose To describe the image I want to create To choose suitable images for my project To create a project that is a combination of other images
		How could I improve my image?	This lesson is the final lesson in the unit on photo editing. Learners will review the image that they created in Lesson 5. After they have reviewed their image, they will have the opportunity to make changes to their image based on their review. Learners will then add text to their image to complete it as a publication.	To evaluate how changes can improve an image To review images against a given criteria To use feedback to guide making changes To combine text and my image to complete the project

Progression:
This unit assumes that learners will have some prior experience of programming. The KS1 NCCE units cover floor robots and ScratchJr, and Scratch is introduced in the Year 3 programming units. However, experience of other languages or environments may also be useful.

Year 4

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 2: Repetition in Games **Unit Introduction:** 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. There are two Year 4 programming units: Programming A — Repetition in shapes Programming B — Repetition in games **This is unit B, which should be delivered after unit A.**	**Lesson 1**	How are loops used to create repetition?	In the first lesson, learners look at real-life examples of repetition, and identify which parts of instructions are repeated. Learners then use Scratch, a block-based programming environment, to create shapes using count-controlled loops. They consider what the different values in each loop signify, then use existing code to modify and create new code, and work on reading code and predicting what the output will be once the code is run.	To develop the use of count-controlled loops in a different programming environment To list an everyday task as a set of instructions including repetition To predict the outcome of a snippet of code To modify a snippet of code to create a given outcome
	Lesson 2	What are the different types of loops I can use in a program?	In this lesson, learners look at different types of loops: infinite loops and count-controlled loops. They practise using these within Scratch and think about which might be more suitable for different purposes.	To explain that in programming there are infinite loops and count-controlled loops To modify loops to produce a given outcome To choose when to use a count-controlled and an infinite loop To recognise that some programming languages enable more than one process to be run at once
	Lesson 3	What are the repeated sequences within a program?	In this lesson, learners create designs for an animation of the letters in their names. The animation uses repetition to change the costume (appearance) of the sprite. The letter sprites will all animate together when the **event** block (**green flag**) is clicked. When they have designed their animations, the learners will program them in Scratch. After programming, learners then evaluate their work, considering how effectively they used repetition in their code.	To develop a design that includes two or more loops which run at the same time To choose which action will be repeated for each object To explain what the outcome of the repeated action should be To evaluate the effectiveness of the repeated sequences used in my program
	Lesson 4	How can I modify a game?	In this lesson, learners look at an existing game and match parts of the game with the design. They make changes to a sprite in the existing game to match the design. They then look at a completed design, and implement the remaining changes in the Scratch game. They add a sprite, re-use and modify code blocks within loops, and explain the changes made.	To modify an infinite loop in a given program To identify which parts of a loop can be changed To explain the effect of my changes To re-use existing code snippets on new sprites
	Lesson 5	How do I use repetition in my own project?	In this lesson, learners look at a model project that uses repetition. They then design their own games based on the model project, producing designs and algorithms for sprites in the game. They share these designs with a partner and have time to make any changes to their design as required.	To design a project that includes repetition To evaluate the use of repetition in a project To select key parts of a given project to use in my own design To develop my own design explaining what my project will do
	Lesson 6	How do I design and evaluate my own project?	In this lesson, learners build their games, using the designs they created in Lesson 5. They follow their algorithms, fix mistakes, and refine designs in their work as they build. They evaluate their work once it is completed, and showcase their games at the end.	To create a project that includes repetition To refine the algorithm in my design To build a program that follows my design To evaluate the steps I followed when building my project

Progression:
This unit progresses learners' knowledge and understanding of computing systems.

Year 5

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 1: Systems and Searching Systems and Searching - Resources (teachcomputing.org) **Unit Introduction:** 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.	**Lesson 1**	What is a computer system?	Learners are introduced to the concept of a system. They begin to understand that components can work together to perform a task. Finally, learners explore how digital systems can work and learn about physical and electronic connections. Lesson 1 Resources (teachcomputing.org)	To explain that computers can be connected together to form systems To explain that systems are built using a number of parts To describe the input, process, and output of a digital system To explain that computer systems communicate with other devices
	Lesson 2	How do computer systems support the world we live in?	Learners consider how larger computer systems work. They see how devices and processes are connected, and reflect on how computer systems can help them. Lesson 2 Resources (teachcomputing.org)	To recognise the role of computer systems in our lives To identify tasks that are managed by computer systems To identify the human elements of a computer system To explain the benefits of a given computer system
	Lesson 3	How do I search the web?	Learners are introduced to a range of search engines. They are given the opportunity to explain how to search, before they write and test instructions. Next, they learn that searches do not always return the results that someone is looking for, and refine their searches accordingly. Finally, learners are introduced to the two most common methods of searching: using a search engine and using the address bar. Lesson 3 Resources (teachcomputing.org)	To identify how to use a search engine To make use of a web search to find specific information To refine my web search To compare results from different search engines
	Lesson 4	Why does my web search appear in that order?	Learners gain an understanding of why search engines are necessary to help them find things on the World Wide Web. They conduct their own searches and break down, in detail, the steps needed to find things on the web. Learners then emulate web crawlers to create an index of their own classroom. Finally, they consider why some searches return more results than others. Lesson 4 Resources (teachcomputing.org)	To describe how search engines select results To explain why we need tools to find things online To recognise the role of web crawlers in creating an index To relate a search term to the search engine's index
	Lesson 5	How are search results ranked?	Learners take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results. In groups, learners create paper-based webpages on a topic that they are familiar with. They then discover how their webpages would rank when searching for keywords relating to their content. Lesson 5 Resources (teachcomputing.org)	To explain how search results are ranked To order a list by rank To explain that a search engine follows rules to rank results To give examples of criteria used by search engines to rank results
	Lesson 6	How are searches influenced?	Learners explore how someone performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. They also explore some of the limitations of searching and discuss what cannot be searched. Lesson 6 Resources (teachcomputing.org)	To recognise why the order of results is important, and to whom To describe some of the ways that search results can be influenced To recognise some of the limitations of search engines To explain how search engines make money

Progression:
This unit progresses learners' knowledge and understanding of creating media by guiding them systematically through the process involved in creating a video. The unit builds on the Year 4 unit 'Photo editing' where composition is introduced and the Year 3 unit 'Stop-frame animation' where learners explored some of the features of video production. By the end of this unit, learners will have developed the skills required to plan, record, edit, and share a video.

Year 5

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 2: Video Production Video Production - Resources (teachcomputing.org) **Unit Introduction:** 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.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	What is video?	Learners will be introduced to video as a media format. They will see examples of videos featuring production and editing techniques that they will work towards using their own videos. Learners will begin by explaining what the medium of video is before analysing and comparing examples of videos. Lesson 1 Resources (teachcomputing.org)	To explain what makes a video effective To explain that video is a visual media format To identify features of videos To compare features in different videos
		What are different filming techniques?	Learners will explore the capabilities of a digital device that can be used to record video. Once they are familiar with their device, learners will experiment with different camera angles, considering how different camera angles can be used for different purposes. Lesson 2 Resources (teachcomputing.org)	To use a digital device to record video To identify and find features on a digital video recording device To experiment with different camera angles To make use of a microphone
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	What is a storyboard?	Learners will use a storyboard to explore a variety of filming techniques, some of which they will use in their own video project later in the unit. They will evaluate the effectiveness of these techniques before offering feedback on others' work. Lesson 3 Resources (teachcomputing.org)	To capture video using a range of techniques To suggest filming techniques for a given purpose To capture video using a range of filming techniques To review how effective my video is
		How I plan a video project?	Learners will plan a video by creating a storyboard. Their storyboard will describe each scene, and will include a script, camera angles, and filming techniques. Learners will use their storyboards to film the first scene of their videos. Lesson 4 Resources (teachcomputing.org)	To create a storyboard To outline the scenes of my video To decide which filming techniques I will use To create and save video content
	Lesson 5	What happens after a video is recorded?	Learners will film the remaining scenes of their video, and then import their content to video editing software. They will then explore key editing techniques and decide whether sections of their video can be edited or need to be shot again. Lesson 5 Resources (teachcomputing.org)	To identify that video can be improved through reshooting and editing To store, retrieve, and export my recording to a computer To explain how to improve a video by reshooting and editing To select the correct tools to make edits to my video
	Lesson 6	How effective is my video project?	Learners will complete their video by removing unwanted content and reordering their clips. They will then export their finished video and evaluate the effectiveness of their edits. Finally, they will consider how they could share their video with others. Lesson 6 Resources (teachcomputing.org)	To consider the impact of the choices made when making and sharing a video To make edits to my video and improve the final outcome To recognise that my choices when making a video will impact the quality of the final outcome To evaluate my video and share my opinions

Progression:
This unit assumes that learners will have prior experience of programming using a block-based language (eg Scratch) and understand the concepts of sequence and repetition. The National Centre for Computing Education key stage 1 units focus on floor robots and ScratchJr, however, experience of other languages or environments may also be useful.

Year 5

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 1: Selection in Physical Computing **Unit Introduction:** 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 it to control components (including output devices — LEDs and motors). Learners will be introduced to conditions as a means of controlling the flow of actions in a program. Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if...then...' structure) and write algorithms and programs that utilise this concept. To conclude the unit, learners will design and make a working model of a fairground carousel that will demonstrate their understanding of how the microcontroller and its components are connected, and how selection can be used to control the operation of the model. Throughout this unit, learners will apply the stages of programming design. There are two Year 5 programming units: Programming A – Selection in physical computing Programming B – Selection in quizzes **This is unit A, which should be delivered before unit B.**	**Lesson 1**	What is a Crumble?	In this lesson, your learners will become familiar with the Crumble controller and the programming environment used to control it. Learners will connect a Sparkle to a Crumble and then program the Crumble to make the Sparkle flash different colour patterns. Learners will also use infinite loops, which were introduced to the learners in the previous school year.	To control a simple circuit connected to a computer To create a simple circuit and connect it to a microcontroller To program a microcontroller to make an LED switch on To explain what an infinite loop does
	Lesson 2	How do I combine output components?	In this lesson, learners will connect a Sparkle and a motor to the Crumble controller. Learners will design sequences of actions for these components. They will then apply their understanding of repetition by using count-controlled loops when implementing their design as a program.	To write a program that includes count-controlled loops To connect more than one output component to a microcontroller To use a count-controlled loop to control outputs To design sequences that use count-controlled loops
	Lesson 3	How do I control with conditions?	In this lesson, learners will be introduced to conditions, and how they can be used in programs to control their flow. They will identify conditions in statements, stating if they are true or false. Learners will be introduced to a Crumble switch, and learn how it can provide the Crumble controller with an input that can be used as a condition. They will explore how to write programs that use an input as a condition.	To explain that a loop can stop when a condition is met To explain that a condition is either true or false To design a conditional loop To program a microcontroller to respond to an input
	Lesson 4	How do I use selections in my program?	In this lesson, learners will develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions. They will be introduced to selection and then represent conditions and actions using the 'if…then…' structure. Learners will create algorithms that include selection. They will use their algorithms to guide their program writing. Learners will see that infinite repetition is required to repeatedly check if a condition has been met.	To explain that a loop can be used to repeatedly check whether a condition has been met To explain that a condition being met can start an action To identify a condition and an action in my project To use selection (an 'if…then…' statement) to direct the flow of a program
	Lesson 5	How do I design a microcontroller?	In this lesson, learners will apply their understanding of microcontrollers and selection when designing a project to meet the requirements of a given task. To support their understanding, learners will identify how selection might be used in real-world situations, then they will consider how they can apply this knowledge to design their project. Learners will produce design sketches to show how their model will be made and how they will connect the microcontroller to its components.	To design a physical project that includes selection To identify a real-world example of a condition starting an action To describe what my project will do To create a detailed drawing of my project
	Lesson 6	How do I write and test my own algorithms?	In this final lesson of the unit, learners will develop Crumble programs to control the model of a fairground ride they built in Lesson 5. First, learners will identify how they are going to use selection before writing an algorithm to meet the requirements of the given task. They will then implement their algorithms as code. Learners will run their programs to identify any bugs, and then return to the code or algorithm to debug it where necessary. Finally, to conclude the unit, learners will evaluate their designs.	To create a program that controls a physical computing project To write an algorithm that describes what my model will do To use selection to produce an intended outcome To test and debug my project

Progression:
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.

Year 5

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 2: Flat-File Databases **Unit Introduction:** This unit looks at how a flat-file database can be used to organise data in records. Learners will use tools within a database to order and answer questions about data. They will create graphs and charts from their data to help solve problems. They will also use a real-life database to answer a question, and present their work to others.	**Lesson 1**	How do I create a paper-based database?	In this lesson, learners will create a paper version of a record card database. Using a card template, they will create a data set, with each learner creating eight to ten cards linked to a theme, e.g. animals. They will complete records for each of the animals in their database and then they will physically sort the cards to answer questions about the data.	To use a form to record information To create a database using cards To explain how information can be recorded To order, sort, and group my data cards
	Lesson 2	What are computer databases?	In this lesson, learners will use a computer-based database to examine how data can be recorded and viewed. They will learn that a database consists of 'records', and that each record contains 'fields'. In addition, they will order records in different ways and compare this database to the paper database they created in Lesson 1.	To compare paper and computer-based databases To explain what a field and a record is in a database To navigate a flat-file database to compare different views of information To choose which field to sort data by to answer a given question
	Lesson 3	How do I use a database?	In this lesson, learners will investigate how records can be grouped, using both the paper record cards created in Lesson 1 and a computer-based database from J2E. They will use 'grouping' and 'sorting' to answer questions about the data.	To outline how you can answer questions by grouping and then sorting data To explain that data can be grouped using chosen values To group information using a database To combine grouping and sorting to answer specific questions
	Lesson 4	How do I search a database?	In this lesson, learners will develop their search techniques to answer questions about the data. They will use advanced techniques to search for more than one field, and will practise doing this through both unplugged methods (without using computers), and using a computer database.	To explain that tools can be used to select specific data To choose which field and value are required to answer a given question To outline how 'AND' and 'OR' can be used to refine data selection To choose multiple criteria to answer a given question
	Lesson 5	How do I visually compare data?	In this lesson, learners will consider what makes a useful chart, and how charts can be used to compare data. They will create charts from their data in order to answer questions about it.	To explain that computer programs can be used to compare data visually To select an appropriate chart to visually compare data To refine a chart by selecting a particular filter To explain the benefits of using a computer to create charts
	Lesson 6	What databases are used in the real-world?	The final lesson requires learners to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They will take on the role of a travel agent and present their findings, showing how they arrived at their chosen options. Presentations may be given between groups of learners, or by each group to the whole class, depending on the time available.	To use a real-world database to answer questions To ask questions that will need more than one field to answer To refine a search in a real-world context To present my findings to a group

Progression:
This unit progresses learners' knowledge and understanding of digital painting and has some links to the Year 3 'Creating media – Desktop publishing' unit, in which learners used digital images. In this Year 5 unit, learners create images that could be used in desktop publishing documents.

Year 5

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 1: Vector Drawing **Unit Introduction:** In this unit, learners start to create vector drawings. They learn how to use different drawing tools to help them create images. Learners recognise that images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. Learners layer their objects and begin grouping and duplicating them to support the creation of more complex pieces of work.	**Lesson 1**	What are vector drawings and how are they made?	Learners are introduced to vector drawings and begin to understand that they are made up of simple shapes and lines. They use the main drawing tools within the Google Drawings application to create their own vector drawings. Learners discuss how vector drawings differ from paper-based drawings.	To identify that drawing tools can be used to produce different outcomes To recognise that vector drawings are made using shapes To experiment with the shape and line tools To discuss how vector drawings are different from paper-based drawings
	Lesson 2	How do I create a vector drawing?	Learners begin to identify the shapes that are used to make vector drawings. They are able to explain that each element of a vector drawing is called an object. Learners create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They also learn how to duplicate the objects to save time.	To create a vector drawing by combining shapes To identify the shapes used to make a vector drawing To explain that each element added to a vector drawing is an object To move, resize, and rotate objects I have duplicated
	Lesson 3	What tools can I use to improve my vector drawing?	Learners increase the complexity of their vector drawings and use the zoom tool to add detail to their work. They are shown how grids and resize handles can improve the consistency of their drawings. Learners also use tools to modify objects to create a new image.	To use tools to achieve a desired effect To use the zoom tool to help me add detail to my drawings To explain how alignment grids and resize handles can be used to improve consistency To modify objects to create a new image
	Lesson 4	How do I add layers and objects to my vector drawing?	Learners gain an understanding of layers and how they are used in vector drawings. They discover that each object is built on a new layer and that these layers can be moved forwards and backwards to create effective vector drawings.	To recognise that vector drawings consist of layers To identify that each added object creates a new layer in the drawing To change the order of layers in a vector drawing To use layering to create an image
	Lesson 5	How do I manipulate objects in my vector drawing?	Learners find out how to select and duplicate multiple objects at a single time. They develop this skill further by learning how to group multiple objects to make them easier to work with. Learners then use this knowledge to group and ungroup objects, in order to make changes to and develop their vector drawings.	To group objects to make them easier to work with To copy part of a drawing by duplicating several objects To recognise when I need to group and ungroup objects To reuse a group of objects to further develop my vector drawing
	Lesson 6	How do I create a vector drawing for a specific purpose?	Learners use the skills they have gained in this unit to create a vector drawing for a specific purpose. They reflect on the skills they have used to create the vector drawing and think about why they used the skills they did. Learners then begin to compare vector drawings to freehand paint program drawings.	To apply what I have learned about vector drawings To create a vector drawing for a specific purpose To reflect on the skills I have used and why I have used them To compare vector drawings to freehand paint drawings

Progression:
This unit assumes that learners will have prior experience of programming using block-based construction (e.g. Scratch), understand the concepts of 'sequence' and 'repetition', and have some experience of using 'selection'. Ideally, learners will have completed 'Programming A – Selection in physical computing' before undertaking this unit, as this will provide them with the required knowledge of 'selection'.

Year 5

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 2: Selection in Quizzes **Unit Introduction:** Learners will develop their knowledge of 'selection' by revisiting how 'conditions' can be used in programming, 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 in the Scratch programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. They use this knowledge to design a quiz in response to a given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying how it meets the requirements of the task, the ways they have improved it, and further ways it could be improved. **There are two Year 5 programming units:** **Programming A – Selection in physical computing** **Programming B – Selection in quizzes** **This is unit B, which should be delivered after unit A.**	**Lesson 1**	How are conditions used within a selection?	In this lesson, learners revisit previous learning on 'selection' and identify how 'conditions' are used to control the flow of actions in a program. They are introduced to the blocks for using conditions in programs using the Scratch programming environment. They modify the conditions in an existing program and identify the impact this has.	To explain how selection is used in computer programs To recall how conditions are used in selection To identify conditions in a program To modify a condition in a program
	Lesson 2	How does a condition inform the outcome of a program?	In this lesson, learners will develop their understanding of selection by using the 'if… then… else...' structure in algorithms and programs. They will revisit the need to use repetition in selection to ensure that conditions are repeatedly checked. They identify the two outcomes in given programs and how the condition informs which outcome will be selected. Learners use this knowledge to write their own programs that use selection with two outcomes.	To relate that a conditional statement connects a condition to an outcome To use selection in an infinite loop to check a condition To identify the condition and outcomes in an 'if… then… else…' statement To create a program that uses selection to produce different outcomes
	Lesson 3	How does an answer inform the outcome?	In this lesson, learners consider how the 'if… then... else…' structure can be used to identify two responses to a binary question (one with a 'yes or no' answer). They identify that the answer to the question is the 'condition', and use algorithms with a branching structure to represent the actions that will be carried out if the condition is true or false. They learn how questions can be asked in Scratch, and how the answer, supplied by the user, is used in the condition to control the outcomes. They use an algorithm to design a program that uses selection to direct the flow of the program based on the answer provided. They implement their algorithm as a program and test whether both outcomes can be achieved.	To explain how selection directs the flow of a program To explain that program flow can branch according to a condition To design the flow of a program that contains 'if… then… else…' To show that a condition can direct program flow in one of two ways
	Lesson 4	How do I design a quiz?	In this lesson, learners will be provided with a task: to use selection to control the outcomes in an interactive quiz. They will outline the requirements of the task and use an algorithm to show how they will use selection in the quiz to control the outcomes based on the answer given. Learners will complete their designs by using design templates to identify the questions that will be asked, and the outcomes for both correct and incorrect answers. To demonstrate their understanding of how they are using selection to control the flow of the program, learners will identify which outcomes will be selected based on given responses.	To design a program that uses selection To outline a given task To use a design format to outline my project To identify the outcome of user input in an algorithm
	Lesson 5	How do I test a quiz?	In this lesson, learners will use the Scratch programming environment to implement the first section of their algorithm as a program. They will run the first section of their program to test whether they have correctly used selection to control the outcomes, and debug their program if required. They will then continue implementing their algorithm as a program. Once completed, they will consider the value of sharing their program with others so that they can receive feedback. Learners conclude the lesson by using another learner's quiz and providing feedback on it.	To create a program that uses selection To implement my algorithm to create the first section of my program To test my program To share my program with others
	Lesson 6	How effective is my quiz?	In this lesson, learners will return to their completed programs and identify ways in which the program can be improved. They will focus on issues where answers similar to those in the condition are given as inputs, and identify ways to avoid such problems. Learners will also consider how the outcomes may change the program for subsequent users, and identify how they can make use of 'setup' to provide all users with the same experience. They will implement their identified improvements by returning to the Scratch programming environment and adding to their programs. They conclude the unit by identifying how they met the requirements of the given task, and identifying the aspects of the program that worked well, those they improved, and areas that could improve further.	To evaluate my program To identify ways the program could be improved To identify the setup code I need in my program To extend my program further

Progression:
This unit progresses learners' knowledge and understanding of computing systems and online collaborative working.

Year 6

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 1: Communication and Collaboration Communication and Collaboration Resources (teachcomputing.org) **Unit Introduction:** In this unit 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.	**Lesson 1**	What is the importance of an internet address?	Learners explore what is necessary for effective communication and the importance of agreed protocols. They apply this understanding to IP addresses and the rules (protocols) that computers have for communicating with one another. Learners also use a Domain Name Server (DNS) to translate web addresses into IP addresses. Lesson 1 Resources (teachcomputing.org)	To explain the importance of internet addresses To recognise that data is transferred using agreed methods To explain that internet devices have addresses To describe how computers use addresses to access websites
	Lesson 2	How is data transferred over the internet?	Learners are introduced to the concept of packets. They complete an activity based on transferring an image across the internet, to see that as well as messages (text), other types of data (images, video, and audio) are also transferred over the internet. They gain an understanding of the key parts of a packet: the header and the data payload. Lesson 2 Resources (teachcomputing.org)	To recognise how data is transferred across the internet To identify and explain the main parts of a data packet To explain that data is transferred over networks in packets To explain that all data transferred over the internet is in packets
	Lesson 3	What type of information can be shared on the internet?	Learners consider how people can work together when they are not in the same location. They discuss ways of working and complete a collaborative online project. The online activity assumes that learners can make simple slides, including text and images. If your learners are unsure how to do this, you may wish to spend some time on the Year 3 – 'Desktop publishing' unit before this lesson. Lesson 3 Resources (teachcomputing.org)	To explain how sharing information online can help people to work together To recognise how to access shared files stored online To send information over the internet in different ways To explain that the internet allows different media to be shared
	Lesson 4	How do people work together online?	Learners are introduced to another approach to online working: reusing and modifying work done by someone else. (**Note:** Using someone else's work needs to be within the bounds of copyright and with the relevant permissions.) This lesson involves the Scratch programming tool, which allows learners to use other people's work. Lesson 4 Resources (teachcomputing.org)	To evaluate different ways of working together online To identify different ways of working together online To recognise that working together on the internet can be public or private To explain how the internet enables effective collaboration
	Lesson 5	How do people communicate online?	Learners deepen their understanding of the term 'communication'. They explore different methods of communication, before they consider internet-based communication in more detail. Finally, learners evaluate which methods of communication suit particular purposes. Lesson 5 Resources (teachcomputing.org)	To recognise how we communicate using technology To explain the different ways in which people communicate To identify that there are a variety of ways to communicate over the internet To choose methods of communication to suit particular purposes
	Lesson 6	How do we communicate responsibly online?	Learners use information provided in the lesson and their own prior knowledge to categorise different forms of internet communication. They then choose which method(s) they would use for the scenarios discussed in the previous lesson. Through these activities, learners explore issues around privacy and information security. Lesson 6 Resources (teachcomputing.org)	To evaluate different methods of online communication To compare different methods of communicating on the internet To decide when I should and should not share information online To explain that communication on the internet may not be private

Progression:
This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing.

Year 6

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Autumn 2: Webpage Creation Web Page Creation - Resources (teachcomputing.org) **Unit Introduction:** 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.	**Lesson 1 & Lesson 2** ***To be taught as one 1 hour lesson***	What makes a good website?	In this lesson, learners will explore and review existing websites and evaluate their content. They will have some understanding that websites are created by using HTML code. Lesson 1 Resources (teachcomputing.org)	To review an existing website and consider its structure To explore a website To discuss the different types of media used on websites To know that websites are written in HTML
		How would you lay out your web page?	Learners will look at the different layout features available in Google Sites and plan their own web page on paper. **Homework:** Learners will look at two of their favourite websites and sketch them on the worksheet provided, detailing the similarities and differences. **Note:** For the homework activity, teachers could provide printed 'home page' images for anyone who doesn't have internet access at home. Lesson 2 Resources (teachcomputing.org)	To plan the features of a web page To recognise the common features of a web page To suggest media to include on my page To draw a web page layout that suits my purpose
	Lesson 3	What is a copyright?	During this lesson learners will become familiar with the terms 'fair use' and 'copyright'. They will gain an understanding of why they should only use copyright-free images and will find appropriate images to use in their work from suggested sources. **Homework:** Learners answer a series of questions based on copyright and fair use. Lesson 3 Resources (teachcomputing.org)	To consider the ownership and use of images (copyright) To say why I should use copyright-free images To find copyright-free images To describe what is meant by the term 'fair use'
	Lesson 4	Why is it important to preview a webpage?	Today learners will revise how to create their own web page in Google Sites. Using their plan from previous lessons, learners will create their own web page/home page. They will preview their web page as it will appear on different devices and suggest or make edits to improve the user experience on each device. Lesson 4 Resources (teachcomputing.org)	To recognise the need to preview pages To add content to my own web page To preview what my web page looks like To evaluate what my web page looks like on different devices and suggest/make edits.
	Lesson 5	What is a navigation path and why is it important?	During this lesson learners will begin to appreciate the need to plan the structure of a website carefully. They will plan their website, paying attention to the navigation paths (the way that pages are linked together). They will then create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning. Lesson 5 Resources (teachcomputing.org)	To outline the need for a navigation path To explain what a navigation path is To describe why navigation paths are useful To make multiple web pages and link them using hyperlinks
	Lesson 6	How and why do I ensure that I link content appropriately?	Learners will consider the implications of linking to content owned by other people and create hyperlinks on their own websites that link to other people's work. They will then evaluate the user experience when using their own website and that of another learner. Lesson 6 Resources (teachcomputing.org)	To recognise the implications of linking to content owned by other people To explain the implication of linking to content owned by others To create hyperlinks to link to other people's work To evaluate the user experience of a website

Progression:
This unit assumes that learners have some prior experience of programming in Scratch. Specifically, they should be familiar with the programming constructs of sequence, repetition, and selection. These constructs are covered in the Year 3, 4, and 5 National Centre for Computing Education programming units respectively. Each year group includes at least one unit that focuses on Scratch.

Year 6

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Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Spring 1: Variables in Games **Unit Introduction:** 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. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, learners experiment with variables in an existing project, then modify them, before they create their own project. In Lesson 4, learners focus on design. Finally, in Lesson 6, learners apply their knowledge of variables and design to improve their games in Scratch. There are two Year 6 programming units: Programming A – Variables in games Programming B – Sensing **This is unit A, which should be delivered before unit B.**	**Lesson 1**	What is a variable?	Learners are introduced to variables. They see examples of real-world variables (score and time in a football match) before they explore them in a Scratch project. Learners then design and make their own project that includes variables. Finally, learners identify that variables are named and that they can be letters (strings) as well as numbers.	To define a 'variable' as something that is changeable To identify examples of information that is variable To explain that the way a variable changes can be defined To identify that variables can hold numbers or letters
	Lesson 2	How are variables used in programming?	Learners understand that variables are used in programs, and that they can only hold a single value at a time. They complete an unplugged task that demonstrates the process of changing variables. Then, learners explore why it is important to name variables and apply their learning in a Scratch project in which they make, name, and update variables.	To explain why a variable is used in a program To identify a program variable as a placeholder in memory for a single value To explain that a variable has a name and a value To recognise that the value of a variable can be changed
	Lesson 3	How do I improve a game using variables?	Learners apply the concept of variables to enhance an existing game in Scratch. They predict the outcome of changing the same change score block in different parts of a program, then they test their predictions in Scratch. Learners also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they add comments to their project to explain how they have met the objectives of the lesson.	To choose how to improve a game by using variables To decide where in a program to change a variable To make use of an event in a program to set a variable To recognise that the value of a variable can be used by a program
	Lesson 4	What do I need to design my own game?	Learners work at the 'design' level of abstraction, where they create their artwork and algorithms. Learners first design the sprites and backgrounds for their project, then they design their algorithms to create their program flow.	To design a project that builds on a given example To choose the artwork for my project To create algorithms for my project To explain my design choices
	Lesson 5	How do I code my own game?	Learners implement the algorithms that they created in Lesson 4. In doing this, they identify variables in an unfamiliar project and learn the importance of naming variables. They also have the opportunity to add another variable to enhance their project.	To use my design to create a project To create the artwork for my project To choose a name that identifies the role of a variable To test the code that I have written
	Lesson 6	How I improve and edit my program?	Learners build on the project that they created in Lesson 5. They consider how they could improve their own projects and make small changes to achieve this. Learners then have the opportunity to add a variable independently. Finally, learners evaluate each other's projects; they identify features that they liked and features that could be improved.	To evaluate my project To identify ways that my game could be improved To use variables to extend my game To share my game with others

Progression:
This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets. Specifically, learners will have experienced data in tables and charts in the Y4 data logging and Y5 branching database units.

Year 6

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Spring 2: Introduction to Spreadsheets **Unit Introduction:** This unit introduces the learners to spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, learners will create charts, and evaluate their results in comparison to questions asked.	**Lesson 1**	How do I collect data and input this to a spreadsheet?	Learners will collect and organise data in a format of their choice. They will then explore how data can be structured in a table. Finally they will input data into a spreadsheet.	To create a data set in a spreadsheet To collect data To suggest how to structure my data To enter data into a spreadsheet
	Lesson 2	How do I format a spreadsheet?	Learners will develop their understanding of the structure of a spreadsheet. They will be introduced to cell references, data items and the concept of formatting cells. Learners will see data items formatted in different ways, they will then choose formats for data items before applying formats in their own spreadsheet.	To build a data set in a spreadsheet To explain what an item of data is To choose an appropriate format for a cell To apply an appropriate format to a cell
	Lesson 3 & Lesson 4 ***To be taught as one 1 hour lesson***	What is formula and how is it used in a spreadsheet?	Learners will begin to use formulas to produce calculated data. They will understand that the type of data in a cell is important (e.g. numbers can be used in calculations whereas words cannot). Learners will create formulas to use in a spreadsheet using cell references and identify that changing inputs will change the output of the calculation.	To explain that formulas can be used to produce calculated data To explain which data types can be used in calculations To construct a formula in a spreadsheet To identify that changing inputs changes outputs
		How do I calculate data?	Learners will calculate data using the operations of multiplication, subtraction, division, and addition. They will use these operations to create formulas in a spreadsheet. Learners will then begin to understand the importance of creating formulas that include a range of cells and the advantage of duplicating in order to apply formulas to multiple cells.	To apply formulas to data To calculate data using different operations To create a formula which includes a range of cells To apply a formula to multiple cells by duplicating it
	Lesson 5	How do I use a spreadsheet to plan an event?	Learners will plan and calculate the cost of an event using a spreadsheet. They will use a predefined list to choose what they would like to include in their event, and use their spreadsheet to answer questions on the data they have selected. Learners will be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event.	To create a spreadsheet to plan an event To use a spreadsheet to answer questions To explain why data should be organised To apply a formula to calculate the data I need to answer questions
	Lesson 6	What ways can I present my data?	Learners will gain skills to create charts in Google Sheets. They will evaluate the results from their charts to answer questions. Finally, learners will show they understand that there are different software tools available within spreadsheet applications to present data.	To choose suitable ways to present data To produce a chart To use a chart to show the answer to a question To suggest when to use a table or chart

Progression:
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.

Year 6

DELTA Academies Trust

Unit Title		Lesson Question	Lesson Overview	Lesson Takeaways
Summer 1: 3D Modelling **Unit Introduction:** 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.	**Lesson 1**	What is 3D modelling?	Learners will be introduced to the concept of 3D modelling by creating a range of 3D shapes that they select and move. Learners also examine shapes from a variety of views within the 3D space.	To recognise that you can work in three dimensions on a computer To add 3D shapes to a project To view 3D shapes from different perspectives To move 3D shapes relative to one another
	Lesson 2	How do I modify 3D objects?	Learners will manipulate 3D objects digitally. They will resize objects in one, two, and three dimensions. They will also lift and lower 3D objects relative to the workplane, and combine two 3D objects to make a new shape. Finally learners will recolour 3D objects.	To identify that digital 3D objects can be modified To resize an object in three dimensions To lift/lower 3D objects To recolour a 3D object
	Lesson 3	How do I manipulate 3D objects?	Learners will develop their understanding of manipulating digital 3D objects. They will rotate objects in three dimensions, duplicate objects, and then use grouping and ungrouping to manipulate many objects at once. They will combine these skills to create their own 3D name badge. Finally, learners will consider the practicality of 3D printing the objects they have made.	To recognise that objects can be combined in a 3D model To rotate objects in three dimensions To duplicate 3D objects To group 3D objects
	Lesson 4	How do I make a 3D model for a given purpose?	Learners will be introduced to the dimensions of shapes in Tinkercad which will enable them to accurately resize and move shapes. Learners will then be introduced to placeholders which can be used to create holes in objects. Finally learners will duplicate, then resize multiple objects to create a meaningful 3D object.	To create a 3D model for a given purpose To accurately size 3D objects To show that placeholders can create holes in 3D objects To combine a number of 3D objects
	Lesson 5	How do I plan my own 3D model?	Learners will see how computer-based 3D design is used in architecture to plan buildings. They will explode 3D models of buildings to see what shapes they comprise of. Learners will then look at real world structures and identify the shapes that they include. They will then plan their own 3D building design.	To plan my own 3D model To analyse a 3D model To choose objects to use in a 3D model To combine objects in a design
	Lesson 6	How do I make my own 3D model?	Learners will create a computer 3D model based on their design. They will then evaluate their model and that of another learner, before modifying their own model to improve it.	To create my own digital 3D model To construct a 3D model based on a design To explain how my 3D model could be improved To modify my 3D model to improve it

Progression:
This unit presumes that pupils are already confident in their understanding of sequence, repetition and selection independently within programming. If pupils are not yet ready for this, you may wish to revisit earlier programming units where these constructs are introduced.

Year 6

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Summer 2: Sensing **Unit Introduction:** This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables (introduced in Year 6 – 'Programming A'. It offers pupils the opportunity to use all of these constructs in a different, but still familiar environment, while also utilising a physical device — the micro:bit. The unit begins with a simple program for pupils to build in and test within the new programming environment, before transferring it to their micro:bit. Pupils then take on three new projects in Lessons 2, 3, and 4, with each lesson adding more depth. Design features prominently in this unit. A design template is introduced in Lesson 3, initially scaffolded to give pupils the opportunity to create code from a given design. In Lesson 4 that scaffolding is gradually reduced, then in Lesson 5, pupils create their own design, using the same template. In the final lesson, pupils will apply their knowledge of the programming constructs and use their design to create their own micro:bit-based step counter. There are two Year 6 programming units: Programming A – Variables in games Programming B – Sensing **This is unit B, which should be delivered after unit A.**	**Lesson 1**	What is a micro:bit and how do I programme it?	Pupils will be introduced to the micro:bit as an input, process, output device that can be programmed. Pupils will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then run their programs on the device. **Note:** This unit is written assuming that you will be using a desktop or laptop computer (not a tablet) to connect micro:bits.	To create a program to run on a controllable device To apply my knowledge of programming to a new environment To test my program on an emulator To transfer my program to a controllable device
	Lesson 2	How does a selection control the flow of a program?	Pupils will explore how if, then, else statements are used to direct the flow of a program. They will initially relate if, then, else statements to real-world situations, before creating programs in MakeCode. They will apply their knowledge of if, then, else statements to create a program that features selection influenced by a random number to create a micro:bit fortune teller project.	To explain that selection can control the flow of a program To identify examples of conditions in the real world To use a variable in an if, then, else statement to select the flow of a program To determine the flow of a program using selection
	Lesson 3	Does the value of a variable change?	Pupils will initially use the buttons to change the value of a variable using selection. They will then develop their programs to update the variable by moving their micro:bit using the accelerometer to sense motion. Finally, they will learn that a variable's value remains the same after it has been checked by the program.	To update a variable with a user input To use a condition to change a variable To experiment with different physical inputs To explain that checking a variable doesn't change its value
	Lesson 4	How do I adapt code to change the function of a device?	Pupils will apply their understanding of the importance of order in programs. They will then use operands in selection to determine the flow of a program. Pupils will then modify a program which will enable the micro:bit to be used as a navigational device. To code this, they will adapt the code they completed to make a basic compass.	To use an conditional statement to compare a variable to a value To use an operand (e.g. <>=) in an if, then statement To explain the importance of the order of conditions in else, if statements To modify a program to achieve a different outcome
	Lesson 5	How do I design a step-counter?	Pupils will be working at the design level. They will pick out features of a step counter, a piece of technology with which they are likely to be familiar. They will then relate those features to the sensors on a micro:bit. In the main activity, pupils will design the algorithm and program flow for their step counter project.	To design a project that uses inputs and outputs on a controllable device To decide what variables to include in a project To design the algorithm for my project To design the program flow for my project
	Lesson 6	How do I make a step-counter?	Pupils will use the design that they have created in Lesson 5 to make a micro:bit-based step counter. First they will review their plans, followed by creating their code. Pupils will test and debug their code, using the emulator and then the physical device. To successfully complete this project, Pupils will need to demonstrate their understanding of all the programming lessons they've had so far.	To develop a program to use inputs and outputs on a controllable device To create a program based on my design To test my program against my design To use a range of approaches to find and fix bugs