



Computing Medium Term Planning

Year 4

Key Concepts Overview

Key Concepts	EYFS	Year 1	Year2	Year 3	Year 4	Year 5	Year 6
Computing systems and networks	<p>To know that a computer has a mouse and a keyboard and be able to recognise them (N)</p> <p>To use a mouse to manipulate a program (R)</p> <p>To use a keyboard and understand keys represent letters and numbers (R)</p> <p>To understand that a tablet is different to a computer in some ways (R)</p>	<p>Technology Around Us</p> <ul style="list-style-type: none"> Understand what technology is Know what technology they have in their lives Be able to use a mouse and a keyboard Be able to open a file Be able to create a typed document and save it 	<p>IT Around Us</p> <ul style="list-style-type: none"> Develop the understanding of where technology can be found in the world Be able to name the types of technology found in shops, schools and at home Understand why we use IT Understand how to use IT safely 	<p>Connecting Computers</p> <ul style="list-style-type: none"> Understand how inputs and outputs work in digital technology Understand how to use technology and inputs/outputs to achieve an aim Understand why we choose to use technology Understand the difference between digital and analogue outcomes Understand that technology connects people Begin to understand how networks connect people and how they work 	<p>The Internet</p> <ul style="list-style-type: none"> Understand how computers are physically connected in networks Start to understand the role of some of the devices in a network Know what the internet is Know what the WWW is and it is different from the internet Understand that people create web page Understand that not all information on the WWW is accurate 	<p>Sharing information</p> <ul style="list-style-type: none"> Understand what a digital system is Understand how larger computer systems work(traffic lights) Understand that the internet forms part of some systems Know what an IP address is Be able to work collaboratively online Understand how systems and networks enable collaborative working 	<p>Communication</p> <ul style="list-style-type: none"> Develop from the understanding of the internet to understand what the WWW is Be able to carry out specific searches on the WWW Understand how search engines work Understand what SEO is Know that the internet can be used to communicate Understand how to stay safe when communicating online
Creating media	<ul style="list-style-type: none"> To independently listen to digital audio (N) Take photographs using a digital device (N/R) To record video using a digital device (R) To record audio (R) 	<p>Digital Painting</p> <ul style="list-style-type: none"> To be able to digitally paint Use a range of tools to digitally paint Create a digital painting Compare digital painting to a painting on paper <p>Digital Writing</p> <ul style="list-style-type: none"> Type a document on a computer Be able to use a range of tools to digitally write Select tools to create digital writing Compare digital writing with handwriting 	<p>Digital Photography</p> <ul style="list-style-type: none"> Compose and frame an image Select images Edit images using software Produce a final image too meet a brief <p>Making Music</p> <ul style="list-style-type: none"> Discuss how music makes us feel Understand that music has patterns Create rhythms and patterns in music Use software to compose music 	<p>Stop-Frame Animation</p> <ul style="list-style-type: none"> Understand that animations are a series of photos or drawings Understand movement is a created by a sequence of images Plan/storyboard an animation Create and improve an animation Evaluate an animation <p>Desktop Publishing</p> <ul style="list-style-type: none"> Understand that text and images convey information Consider layout Understand how to create and edit content Use editing tools such as copy and paste to create content Discuss the benefits of desktop publishing 	<p>Audio Editing</p> <ul style="list-style-type: none"> Understand that sound can be digitally recorded Understand what input(microphone) and output devices are speakers) Use a digital recording device Edit a digital sound file <p>Photo Editing</p> <ul style="list-style-type: none"> Understand that an image can be changed Change the composition of an image Use tools to edit images Understand that some images are fake/edited 	<p>Vector Drawing</p> <ul style="list-style-type: none"> Know how to use tools in a vector based drawing program Use tools to create drawings by combining shapes Understand that vector drawing software uses layers Understand how to group objects for easy use <p>Video Editing</p> <ul style="list-style-type: none"> Understand what makes a video effective Record video using a digital device Create a storyboard Improve video by reshooting and editing 	<p>3D Modelling</p> <ul style="list-style-type: none"> Compare 2d and 3D shapes Use modelling software to combine shapes Colour, rotate and resize shapes Design a physical object Improve designs <p>Web Page Creation</p> <ul style="list-style-type: none"> Understand that web pages are written in HTML Plan a web page design Create a web page using software Use navigation paths and consider effective links
Program-ming	<ul style="list-style-type: none"> Group objects by type (N) Discuss data and information and understand that things can be categorised using labels (R) Create tally charts (R) 	<p>Floor Robots</p> <ul style="list-style-type: none"> Understand what commands are Use commands to control a floor robot Choose commands to achieve a goal Understand that a program is a set of commands Debug and improve programs <p>Programming Animations</p> <ul style="list-style-type: none"> Compare floor robots to Scratch Jnr Know what block code is Know that an algorithm is a set of instructions Write code (instructions) to control a sprite 	<p>Robot Algorithms</p> <ul style="list-style-type: none"> Understand that an algorithm is a set of instructions Understand that computers read and follow algorithms without thought Make predictions about programs Understand that programs can contain code and artwork Write a program to achieve an aim <p>Programming Quizzes</p> <ul style="list-style-type: none"> Understand that programs have a start and an outcome Incorporate design in a program Edit designs in a program Refine designs in programs to meet the initial brief 	<p>Sequence in Music</p> <ul style="list-style-type: none"> Progress from Sratch Jr to Scratch Understand that commands have outcomes Change the sequence of commands Edit the program appearance Write a program from a task description <p>Events and actions</p> <ul style="list-style-type: none"> Explain how sprites move in a program Be able to move a sprite in four directions using code Adapt an existing program to fit a different context Develop and refine a program by adding features Develop a process for debugging Design and create a program that creates a maze-based challenge 	<p>Repetition in Shapes</p> <ul style="list-style-type: none"> Write code inn a text-based language Understand the role of repetition in programs Understand what a count-controlled loop is Write a program using a count-controlled loop <p>Repetition in Games</p> <ul style="list-style-type: none"> Develop the understanding of a count-controlled loop in a different environment Compare infinite loops and count-controlled loops Use loops in programs 	<p>Selection in Physical Computing</p> <ul style="list-style-type: none"> Control a simple circuit connected to a computer Write programs including controlled loops Understand that a loop can end based on a condition Write a program that includes selection <p>Selection in Quizzes</p> <ul style="list-style-type: none"> Understand that conditions control the flow of programs Link a condition statement to a condition outcome Design and create a program that uses selection 	<p>Variables in Games</p> <ul style="list-style-type: none"> Understand what variables are Know how to use variables in programs Enhance a game code using variables Write a game code using variables Evaluate projects <p>Sensing</p> <ul style="list-style-type: none"> Learn what a Micro bit is Create a program using software Install software onto Micro bit Use variables Write a code to create a compass on a Micro bit Code and debug a step counter
Data and information	<ul style="list-style-type: none"> Program a floor robot to follow a simple set of instructions (N) Completes a simple program on an electronic device to achieve a goal (beebots) (R) 	<p>Grouping Data</p> <ul style="list-style-type: none"> Understand that objects can be labelled and grouped Be able to label and group objects based on properties Choose searches and compare groups Debug and improve 	<p>Pictograms</p> <ul style="list-style-type: none"> Use tally charts to collect data Understand that data can be represented in pictograms Use software to create and analyse pictograms Group object and label groups using attributes Draw conclusions from represented data Be able to present and discuss data 	<p>Databases</p> <ul style="list-style-type: none"> Understand how 'yes'no' can sort data Understand that attributes can be used to refine data Select appropriate attributes required to find desired data Understand what a branching database is Use a branching database to sort information Compare branching databases to pictograms 	<p>Data Logging</p> <ul style="list-style-type: none"> Understand that data can be collected over time Be able to use a datalogger Know that dataloggers collect data points from sensors Select what data need to be collected Answer question using data 	<p>Flat File Databases</p> <ul style="list-style-type: none"> Create paper file databases Understand how computers file records Group data Search records Compare data using charts Select flights based on search criteria 	<p>Spreadsheets</p> <ul style="list-style-type: none"> Understand how spreadsheets ordanise data Manipulate data sets using spreadsheets Write and use formulas Calculate using spreadsheets Plan a budget

Year 4 Computing Yearly Overview

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Computing systems and networks	Creating media	Programming Data and information	Creating media	Programming

Autumn Term 2—The Internet

<i>Prior Learning</i>	Children should know about: How information is routed around the internet How the WWW is part of the internet The difference between the WWW and the internet The meanings of the vocabulary in red below			
<i>End Points</i>	<u>Pupils will be able to answer a series of questions and complete a quiz about the Internet.</u>			
<i>Vocabulary</i>	Internet, network, router, network security, network switch, server, wireless access point (WAP), router, website, web page, web address, routing, web browser, use, content, download, sharing, ownership, permission, information, sharing, accurate, honest, content, adverts			
Key Concept	Second Order Concepts	Lesson Sequence	Learning Objectives	Resources
Computing systems and networks	Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyber-bullying) Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions) Cause and consequence: (inputs and outputs, programming) Significance: (significant inventions, significant figures from the world of computing) Chronology: (changes in technology over time, inventions, future technology)	Lesson1	I can describe how networks physically connect to other networks 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	L1 Slides A1 Handout – Connecting networks (an additional copy will be required for activity 2) A2 Pieces of string to represent network cables A2 Resource – submarinemap.com A3 Activity sheet – Network security L1 Homework – Keeping networks safe (Optional)
		Lesson 2	I can recognise how networked devices make up the internet 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.	L2 Slides A1 Activity sheet – Finding routes A2 Activity sheet – Exploring websites A2 – Links for ‘Exploring websites’ activity www.bbc.co.uk/newsround and www.horrible-histories.co.uk
		Lesson 3	I can outline how websites can be shared via the World Wide Web (WWW) 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.	L3 Slides A1 Whiteboards and whiteboard pens A3 Activity sheet – How can I access the World Wide Web L3 Homework – World Wide Web device trail (Optional)
		Lesson 4	I can describe how content can be added and accessed on the World Wide Web (WWW) 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.	L4 Slides A1 Individual whiteboards and whiteboard pens A1 Activity sheet – Features of a website A1 Resource – www.bbc.co.uk/cbbc/joinin/bp-children-in-need-bring-and-buy-sales A2 Activity sheet – Adding your own content to the web Plenary Resource – nce.io/paintbox
		Lesson 5	I can recognise how the content of the WWW is created by people 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.	Internet access to display websites A1 Activity sheet – Who does this belong to? A1 Solutions – Who does this belong to? A2 Activity sheet – Sharing things A3 Individual whiteboards for ‘Who owns this?’ activity
		Lesson 6	I can evaluate the consequences of unreliable content 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	L6 Slides A1 Large whiteboard or flipchart A2 Individual whiteboards A3 Activity sheet – How does information spread A3 Scissors

Spring Term 1—Audio Editing

Prior Learning	Children should know about: Digital media and how technology can be used to create content How software and apps include tools that can be used to edit and improve projects How to evaluate outcomes			
End Points	To be able to: Record a Podcast that meets a specific set of requirements. Edit and evaluate recordings.			
Vocabulary	Audio, record, playback, microphone, speaker, headphones, input, output, audio, sound, record, playback, start, pause, stop, podcast, podcast, save, file, edit, selection, mixing, time shift, export, MP3, audio, editing, evaluate, feedback,			
Key Concept	Second Order Concepts	Lesson Sequence	Learning Objectives	Resources
Creating media	<p>Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying)</p> <p>Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions)</p> <p>Cause and consequence: (inputs and outputs, programming)</p> <p>Significance: (significant inventions, significant figures from the world of computing)</p> <p>Chronology: (changes in technology over time, inventions, future technology)</p>	Lesson 1	I can identify that sound can be digitally recorded In this lesson, learners will familiarise themselves with digital devices capable of recording sound and/or playing audio. Learners will identify devices' inputs (microphone) and outputs (headphones or speakers). Learners will consider ownership and copyright issues relating to the recording of audio.	<p>Slides (ncce.io/cm4a-1-s)</p> <p>A device capable of recording sound and playing back audio; this could be a laptop using the Audacity software, or a voice memo recorder on a tablet</p> <p>Optional: Headphones for each device, to enable individual playback of recordings.</p> <p>Sorting images handout (ncce.io/cm4a-1-a1-h)</p> <p>Individual whiteboards, pens, and erasers</p> <p>If possible, physical digital devices capable of recording sound, such as a laptop, tablet, phone, voice recorder, and answerphone, for use during the first activity</p>
		Lesson 2	I can use a digital device to record sound In this lesson, learners will record their own sounds and play back the recorded audio. They will also listen to a range of podcasts and identify the features of a podcast.	<p>Slides (ncce.io/cm4a-2-s)</p> <p>A device capable of recording sound and playing back audio; this could be a laptop using the Audacity software, or a voice memo recorder on a tablet</p> <p>Individual whiteboards, pens, and erasers</p> <p>Features of podcasts handout (ncce.io/cm4a-2-a1-h)</p> <p>Optional: Headphones for each device, to enable individual playback of recordings</p> <p>Optional: A section of text for pupils to read out when recording their voice</p> <p>Optional: A selection of musical instruments for pupils to play and record</p> <p>The following videos need to be accessible: https://www.youtube.com/watch?v=H56oewP63t8 https://www.youtube.com/watch?v=jD2fRpP6Hhg&list=PLJ5GVOXc8N97XH83kJhy95MA8KrpI8zt3&index=6 https://www.youtube.com/watch?v=LvENIdEuf0A</p>
		Lesson 3	I can explain that a digital recording is stored as a file In this lesson, learners will plan and begin recording their own podcast. They will also discuss the importance of saving their work and save their recordings as a file.	<p>Slides (ncce.io/cm4a-3-s)</p> <p>A device capable of recording sound and playing back audio; this could be a laptop using the Audacity software, or a voice memo recorder on a tablet</p> <p>Podcast planning document (ncce.io/cm4a-3-a1-h)</p> <p>Recording new tracks handout (ncce.io/cm4a-3-a2-h)</p> <p>Learners need to have a folder available to save their work, so they can continue it in subsequent lessons</p>
		Lesson 4	I can explain that audio can be changed through editing In this lesson, learners will open their existing work and continue recording their podcast content. Learners will also edit their recordings, for example by changing the volume of the recording or making the recording fade in or out.	<p>Slides (ncce.io/cm4a-4-s)</p> <p>A device capable of recording sound and playing back audio; this could be a laptop using the Audacity software, or a voice memo recorder on a tablet</p> <p>Completed podcast planning document from the previous lesson</p> <p>An audio recording (ncce.io/cm4a-4-a2-rp) containing a number of sections that need editing</p>
		Lesson 5	I can show that different types of audio can be combined and played together In this lesson, learners will record additional content for their podcast, such as sound effects or background music. The audio will be combined, or mixed, with their existing digital recordings and exported as an audio file.	<p>Slides (ncce.io/cm4a-5-s)</p> <p>A device capable of recording sound and playing back audio; this could be a laptop using the Audacity software, or a voice memo recorder on a tablet</p> <p>To ensure the following videos are accessible: https://www.youtube.com/watch?v=H56oewP63t8</p> <p>Planning document completed from previous lesson</p>
		Lesson 6	I can evaluate editing choices made In this lesson, learners will export their digital recordings so that they can be listened to on a range of digital devices. Learners will give feedback on their own and their peers' podcasts, including areas for improvement.	<p>Slides (ncce.io/cm4a-6-s)</p> <p>A device capable of recording sound and playing back audio; this could be a laptop using the Audacity software, or a voice memo recorder on a tablet</p> <p>Feedback recording sheet (ncce.io/cm4a-6-a2-w)</p>

Spring Term 2 — Photo Editing

<i>Prior Learning</i>	Children should know about: Digital media and how technology can be used to create content How software and apps include tools that can be used to edit and improve projects How to evaluate outcomes			
<i>End Points</i>	Create an advert for a destination or product that includes an image that has been manipulated to convince the audience.			
<i>Vocabulary</i>	Image, edit, arrange, select, digital, crop, undo, save, search, save, copyright, composition, edit, pixels, crop, rotate, flip, adjustments, effects, colours, hue/saturation, sepia, save, version, illustrator, vignette, retouch, clone, recolour, magic wand, select, adjust, sharpen, brighten, fake, real, composite, cut, copy, paste, alter, background, foreground, publication, elements, original, font style, shapes, border, layer			
Key Concept	Second Order Concepts	Lesson Sequence	Learning Objectives	Resources
Creating media	<p>Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying)</p> <p>Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions)</p> <p>Cause and consequence: (inputs and outputs, programming)</p> <p>Significance: (significant inventions, significant figures from the world of computing)</p> <p>Chronology: (changes in technology over time, inventions, future technology)</p>	Lesson1	I can explain that digital images can be changed In this lesson, learners will be introduced to the online editor, and changes that can be made to images using a range of tools. They will look at changing the composition of images using the 'crop' tool, and evaluate the effect that this can have on an image.	<p>Slides (nccce.io/cm4p-1-s)</p> <p>Whiteboards</p> <p>Paper copies of magazines/flyers/cards/packaging with images on them</p> <p>One pair of scissors per learner</p> <p>Printouts:</p> <p style="padding-left: 20px;">A printed and enlarged copy of the first image in the activity sheet (nccce.io/cm4p-1-a1-r), referred to as 'Woods walk'</p> <p style="padding-left: 20px;">A selection of printed copies of the other images in the activity sheet (enough for one image per learner)</p> <p style="padding-left: 20px;">Printouts of slide 14 for the 'Evaluation' activity, if needed (slides: nccce.io/cm4p-1-s)</p> <p>An image editing program, for example:</p> <p style="padding-left: 20px;">paint.net (www.getpaint.net)</p> <p style="padding-left: 20px;">BeFunky app (www.befunky.com)</p> <p style="padding-left: 20px;">LunaPic (www341.lunapic.com/editor)</p> <p>A selection of images for the learners to edit in a folder that they can access (note: you may wish to link the images with an existing classroom theme or topic, e.g. local area images, settings in geography, portraits in art, etc.)</p>
		Lesson 2	I can change the composition of an image In this lesson, learners will identify changes that have been made to edited images. They will search for and save images from a copyright-free website. Learners will then use an image editor to make a new image composition linked to a cross-curricular theme.	<p>Slides (nccce.io/cm4p-2-s)</p> <p>Activity sheet (nccce.io/cm4p-2-a1-r)</p> <p>An image editing program, for example:</p> <p style="padding-left: 20px;">paint.net (www.getpaint.net)</p> <p style="padding-left: 20px;">BeFunky app (www.befunky.com)</p> <p style="padding-left: 20px;">LunaPic (www341.lunapic.com/editor)</p> <p>A digital image of each learner in a folder that they can access. You may have these on your information management system, or learners could take photos of each other before the lesson.</p> <p>A folder or area for learners to save their images into</p> <p>Printouts of slides 8 and 9 (optional)</p>
		Lesson 3	I can describe how images can be changed for different uses 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 same original image using different effects to suit two different scenarios, and compare the two versions.	<p>Slides (nccce.io/cm4p-3-s)</p> <p>Two versions of a children's book with different illustrations — for example, you could use hard copies, or the examples on slide 3, or illustrations of the Grimm tales from www.brainpickings.org/2015/07/20/best-brothers-grimm-illustrations</p> <p>Whiteboards</p> <p>An image editing program, for example:</p> <p style="padding-left: 20px;">paint.net (www.getpaint.net)</p> <p style="padding-left: 20px;">BeFunky app (www.befunky.com)</p> <p style="padding-left: 20px;">LunaPic (www341.lunapic.com/editor)</p> <p>A folder containing 5/6 images for learners to edit</p> <p>A folder or area for learners to save their images into</p> <p>Optional activities:</p> <p style="padding-left: 20px;">Evaluate your choices: learner activity sheet (nccce.io/cm4p-3-a3-w)</p>

Creating media	<p>Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying)</p> <p>Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions)</p> <p>Cause and consequence: (inputs and outputs, programming)</p> <p>Significance: (significant inventions, significant figures from the world of computing)</p> <p>Chronology: (changes in technology over time, inventions, future technology)</p>	Lesson 4	<p>I can make good choices when selecting different tools</p> <p>This lesson is based on editing images by using retouching tools. Learners will consider why people may choose to retouch images, and the positive and negative effects that retouching can have on images. They will use retouching tools to improve images, and consider which tools are appropriate for retouching.</p>	<p>Slides (nccce.io/cm4p-4-s)</p> <p>Whiteboards</p> <p>An image editing program, for example:</p> <p> paint.net (www.getpaint.net)</p> <p> BeFunky app (www.befunky.com)</p> <p> LunaPic (www341.lunapic.com/editor)</p> <p>A selection of images for the learners to edit in a folder that they can access, for example:</p> <p> The activity sheet (nccce.io/cm4p-4-a2-r) includes links to some images of fruit</p> <p> The learners could use cameras to take their own images and download them onto the computer</p> <p> Note: You may wish to link the images with an existing classroom theme or topic instead of using fruit, etc. It is probably best to avoid learners retouching images of themselves or each other, to avoid promoting this.</p> <p>Tools help sheet (nccce.io/cm4p-4-a2-h)</p>
		Lesson 5	<p>I can recognise that not all images are real</p> <p>This lesson is based on the concept of fake images. Learners will sort images into 'fake' and 'real', and give reasons for their decisions. They will create their own fake images and reflect on how easy it is to digitally alter images, and what this might mean for the images that they see around them.</p>	<p>Slides (nccce.io/cm4p-5-s)</p> <p>Paper and pencils for planning images</p> <p>Starter activity sheet (nccce.io/cm4p-5-a0-r) — print enough for one between two</p> <p>An image editing program, for example:</p> <p> paint.net (www.getpaint.net)</p> <p> BeFunky app (www.befunky.com)</p> <p> LunaPic (www341.lunapic.com/editor)</p> <p>Folders for learners to save their images from Pixabay into</p>
		Lesson 6	<p>I can evaluate how changes can improve an image</p> <p>This lesson is the final lesson in the unit on photo editing. Learners will use the 'fake' image that they created in lesson 5 to make a publication designed to advertise their imaginary place. They will add elements such as text, shapes, and borders. They will design a survey for gaining feedback on their work, and compare their completed publications with the original images.</p>	<p>Slides (nccce.io/cm4p-6-s)</p> <p>Activity sheet (nccce.io/cm4p-6-a1-w) — print 1 copy per learner</p> <p>An image editing program, for example:</p> <p> paint.net (www.getpaint.net)</p> <p> BeFunky app (www.befunky.com)</p> <p> LunaPic (www341.lunapic.com/editor)</p> <p>A shared folder for learners to save their images into</p> <p>Edited images saved in lesson 5</p>

Spring Term 2—Data Logging

Prior Learning	Children should know about: That objects can be described using characteristics and labels Data and what types of data exist How data can be collected and grouped How questions can be answered by analysing data			
End Points	Answer a series of questions about data after systematically collecting data and analysing it			
Vocabulary	Data, table (layout), input device, sensor, data logger, logging, data point, interval, logged, collection, analyse, data set, import, export, review, conclusion,			
Key Concept	Second Order Concepts	Lesson Sequence	Learning Objectives	Resources
Data and information	<p>Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying)</p> <p>Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions)</p> <p>Cause and consequence: (inputs and outputs, programming)</p> <p>Significance: (significant inventions, significant figures from the world of computing)</p> <p>Chronology: (changes in technology over time, inventions, future technology)</p>	Lesson1	I can explain that data gathered over time can be used to answer questions This lesson will set the scene for the unit of work. Pupils will consider what data can be collected and how it is collected. They will think about data being collected over time. Pupils 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. Later in the unit, pupils will put into practice the ideas that they have thought about in this lesson.	Slides (ncce.io/dat4-1-s) Activities: Data tables: ‘Which data?’ activity sheet (ncce.io/dat4-1-a1-ww) ‘Which data?’ solutions (ncce.io/dat4-1-a1-sw) Data gathered over time: ‘Data that is collected regularly’ activity sheet (ncce.io/dat4-1-a4-wd)
		Lesson 2	I can use a digital device to collect data automatically This lesson will build on the idea of collecting data over time, and introduce the idea of collecting data automatically using computers. Computers can capture data from the physical world using input devices called ‘sensors’. Sensors can be connected to data loggers, which can collect data while not attached to a computer. Data collected by a data logger can be downloaded for use later.	Slides (ncce.io/dat4-2-s) Activities: Data loggers: ‘Input/output data collection’ activity sheet (ncce.io/dat4-2-a1-w) ‘Input/output data collection’ solutions (ncce.io/dat4-2-a1-s) Recording data: ‘Classroom data collection’ activity sheet (ncce.io/dat4-2-a2-w) Data loggers
		Lesson 3	I can explain that a data logger collects ‘data points’ from sensors over time In this lesson, pupils will explore how data loggers work. Pupils will try recording data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals. Pupils will use data loggers independently from a computer, then they will connect the loggers to a computer and download the data.	Slides (ncce.io/dat4-3-s) ‘Temperature log’ activity sheet (ncce.io/dat4-3-a1-hd) — one copy for five pupils Data loggers
		Lesson 4	I can use data collected over a long duration to find information In this lesson, pupils will open an existing data file and use software to find out key information. The data file is a five-hour log of hot water cooling to room temperature.	Slides (ncce.io/dat4-4-s) Activities: Importing data: ‘Cooling experiment’ activity sheet (ncce.io/dat4-4-a1-w) ‘Cooling experiment’ solutions (ncce.io/dat4-4-a1-s) ‘Cooling experiment’ data file (ncce.io/dat4-4-a1-r) Note: If you have different data loggers to the ones used in this unit, you may wish to record a similar cooling experiment and allow pupils to access that data for this lesson. Finding information: ‘Light levels’ activity sheet (ncce.io/dat4-4-a2-w) ‘Light levels’ solutions (ncce.io/dat4-4-a2-s) Viewing data: ‘Cooling data’ spreadsheet (ncce.io/dat4-4-a3-rc)
		Lesson 5	I can identify data needed to answer questions In this lesson, pupils will think about questions that can be answered using collected data. Pupils will choose a question to focus on and then plan the data logging process that they need to complete. After they 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 pupils will have data to use in Lesson 6.	Slides (ncce.io/dat4-5-s) Activities: Asking questions: ‘Thinking of questions’ activity sheet (ncce.io/dat4-5-a1-w) Data collection plan: activity sheet (ncce.io/dat4-5-a2-w)
		Lesson 6	I can use collected data to answer questions In this lesson, pupils 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 Lesson 5. Pupils will also reflect on the benefits of using a data logger.	Slides (ncce.io/dat4-6-s) ‘Interpreting data’ activity: ‘Data collection report’ activity sheet (ncce.io/dat4-6-a1-w)

Summer Term 2—Repetition in Shapes

Prior Learning	Children should know about: A coding How an algorithm can be written to achieve a specific aim How to debug a program			
End Points	Create a design and program a turtle to draw the shape by following a program			
Vocabulary	Program, turtle, commands, code snippet — this could be the same as a program; it can have several sets of commands in one program, algorithm, design, debug, logo command, pattern, repeat, repetition, count-controlled loop, algorithm, value, debug, decompose, procedure, count-controlled loop, trace, value			
Key Concept	Second Order Concepts	Lesson Sequence	Learning Objectives	Resources
Programming	<p>Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying)</p> <p>Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions)</p> <p>Cause and consequence: (inputs and outputs, programming)</p> <p>Significance: (significant inventions, significant figures from the world of computing)</p> <p>Chronology: (changes in technology over time, inventions, future technology)</p>	Lesson1	I can identify that accuracy in programming is important 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.	Slides 'Basic commands' activity: activity sheet Lesson 1 'Glossary' handout A version of Logo, for example: You can use Turtle Academy online at turtleacademy.com/playground You can download FMSLogo from fmslogo.sourceforge.net You can use Logotacular for iPad Mini whiteboards and pens
		Lesson 2	I can create a program in a text-based language 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.	Slides Activities: Activity sheet — this sheet is used for the 'Drawing initials' and 'Writing algorithms' activities 'Letters' handout — optional; this handout provides support for the 'Drawing initials' activity Lesson 2 'Glossary' handout A version of Logo, for example: You can use Turtle Academy online at turtleacademy.com/playground You can download FMSLogo from fmslogo.sourceforge.net You can use Logotacular for iPad Mini whiteboards and pens
		Lesson 3	I can explain what 'repeat' means 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.	Slides Activities: Repeating patterns: activity sheet Writing algorithms: activity sheet Lessons 3–6 'Glossary' handout A version of Logo, for example: You can use Turtle Academy online at turtleacademy.com/playground You can download FMSLogo from fmslogo.sourceforge.net You can use Logotacular for iPad
		Lesson 4	I can modify a count-controlled loop to produce a given outcome 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.	Slides Activity sheet Lessons 3–6 'Glossary' handout A version of Logo, for example: You can use Turtle Academy online at turtleacademy.com/playground You can download FMSLogo from fmslogo.sourceforge.net You can use Logotacular for iPad

Programming	Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying) Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions) Cause and consequence: (inputs and outputs, programming) Significance: (significant inventions, significant figures from the world of computing) Chronology: (changes in technology over time, inventions, future technology)	Lesson 5	<p>I can decompose a task into small steps</p> <p>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.</p>	<p>Slides</p> <p>Activities:</p> <p>Creating procedures: ‘Angles for regular polygons’ handout</p> <p>Using procedures: activity sheet — if this is completed electronically, pupils can include a screenshot of their work in the sheet</p> <p>Lessons 3–6 ‘Glossary’ handout</p> <p>A version of Logo, for example:</p> <p>You can use Turtle Academy online at turtleacademy.com/playground</p> <p>You can download FMSLogo from fmslogo.sourceforge.net</p> <p>You can use Logotacular for iPad</p> <p>Mini whiteboards and pens</p>
		Lesson 6	<p>I can create a program that uses count-controlled loops to produce a given outcome</p> <p>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.</p>	<p>Slides</p> <p>Activities:</p> <p>Designing patterns: activity sheet</p> <p>Evaluation: activity sheet</p> <p>Lessons 3–6 ‘Glossary’ handout</p> <p>A version of Logo, for example:</p> <p>You can use Turtle Academy online at turtleacademy.com/playground</p> <p>You can download FMSLogo from fmslogo.sourceforge.net</p> <p>You can use Logotacular for iPad</p> <p>Coloured pencils for debugging</p> <p>Mini whiteboards and pens</p>

Summer Term 1—Repetition in Games

Prior Learning	Children should know about: The Scratch coding environment and how to write block code Algorithms and that they are a set of instructions How to debug a program How repetition can play a role in a program			
End Points	Design and create a game in Scratch that involves two sprites, debugging algorithms to ensure that the code works accurately			
Vocabulary	Scratch, programming, sprite, blocks, code, loop, repeat, value, block, repeat, forever, infinite loop, count-controlled loop, costume, repetition, forever, infinite loop, count-controlled loop, animate, costume, event block, duplicate, infinite loop, count-controlled loop, repetition, design, sprite, algorithm, repetition, design, algorithm, duplicate, debug, refine, evaluate			
Key Concept	Second Order Concepts	Lesson Sequence	Learning Objectives	Resources—access to a PC with internet connection is required for each session
Creating media	<p>Responsibility: (being safe online, using social media responsibly and respectfully, privacy, cyberbullying)</p> <p>Similarity and difference: (making comparisons, finding patterns, noting differences and drawing conclusions)</p> <p>Cause and consequence: (inputs and outputs, programming)</p> <p>Significance: (significant inventions, significant figures from the world of computing)</p> <p>Chronology: (changes in technology over time, inventions, future technology)</p>	Lesson 1	I can develop the use of count-controlled loops in a different programming environment This lesson introduces learners to the concept of a system. Learners will develop their understanding of components working together to make a whole. They will outline how digital systems might work and the physical and electronic connections that exist.	L1 Slides A1 Worksheet – Code blocks in Scratch A2 Resource: Creating a triangle (ncce.io/pg4b-1-a2-c) Internet-enabled devices to access the Scratch website. If possible, these should be PC-type devices. Scratch will work on tablets, but the lack of a separate keyboard can restrict some functions. Mini whiteboards and pens. This lesson assumes that learners have prior experience of Scratch for programming activities.
		Lesson 2	I can explain that in programming there are infinite loops and count-controlled loops In this lesson, learners will consider how larger computer systems work. Learners will consider how devices and processes are connected. They will also reflect on how computer systems can help us.	L2 Slides A1 Worksheet – Dancing dinosaurs A1 Answers – Dancing dinosaurs A1 Code: Dancing dinosaurs A2 Worksheet – Modifying code A2 Answers – Modifying code Internet-enabled devices to access scratch.mit.edu . If possible, these should be PC-type devices. Scratch will work on tablets, but the lack of a separate keyboard can restrict some functions. L2 Homework (optional)
		Lesson 3	I can develop a design that includes two or more loops which run at the same time This lesson introduces the idea that parts of a computer system are not always in the same place or country. Instead, those parts of a system must transfer information using the internet. This lesson builds on the introduction to the internet in the Year 4 ‘What is the internet?’ unit, adding awareness of IP addresses and the rules (protocols) that computers have for communicating with one another.	L3 Slides Internet-enabled devices to access scratch.mit.edu . If possible, these should be PC-type devices. Scratch will work on tablets, but the lack of a separate keyboard can restrict some functions. A1 Worksheet – Project design A1 Worksheet – Example project design A2 Resource: Copying code support video A3 Worksheet – Evaluation
		Lesson 4	I can modify an infinite loop in a given program In this lesson, learners will consider how people can work together when they are not in the same location. They will discuss ways of working and start 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	L5 Slides A0 Code: Bat catching game (ncce.io/46bat) https://scratch.mit.edu/projects/411997958/ A1 Design template A1 Design template example Mini whiteboards and pens
		Lesson 5	I can design a project that includes repetition In this lesson, learners will reflect on how they worked together in the previous lesson and how their working together might be improved. Learners will work together on an unplugged activity and use that experience to develop their own ideas of good collective working practices.	L5 Slides A0 Code: Bat catching game (ncce.io/46bat) https://scratch.mit.edu/projects/411997958/ A1 Design template A1 Design template example Mini whiteboards and pens
		Lesson 6	I can create a project that includes repetition In the previous two lessons, learners worked together online on a shared project. This lesson introduces another approach to online working: reusing and modifying work done by someone else. (Using someone else’s work needs to be done within the bounds of copyright and with the relevant permissions.) This lesson uses the Scratch programming tool, which allows learners to use other people’s work.	L6 Slides Learners’ completed design sheets from Lesson 5 Enough small objects for one per learner, eg counters, multilink cubes, etc A3 evaluation worksheet