



Computing Curriculum  
Year 3 and 4 – Cycle B

Purpose of study

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:

- ♣ can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- ♣ can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- ♣ can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- ♣ are responsible, competent, confident and creative users of information and communication technology.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study. Schools are not required by law to teach the example content in [square brackets].

Key stage 1 Pupils should be taught to:

- ♣ understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- ♣ create and debug simple programs
- ♣ use logical reasoning to predict the behaviour of simple programs
- ♣ use technology purposefully to create, organise, store, manipulate and retrieve digital content
- ♣ recognise common uses of information technology beyond school
- ♣ use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

Key stage 2 Pupils should be taught to:

- ♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- ♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- ♣ use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- ♣ understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- ♣ use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- ♣ select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- ♣ use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

	Autumn		Spring		Summer	
Non- Negotiables	C12: Contribute to blogs that are moderated by teachers. C13: Give examples of the risks posed by online communications. C15: Understand that comments made online that are hurtful or offensive are the same as bullying. C17: Use some of the advanced features of applications and devices in order to communicate ideas, work or messages professionally.					
	C16: Understand how online services work	C3: Create and edit sounds. C4: Control when they are heard, their volume, duration and rests. C14: Understand the term ‘copyright’.	C5: Control the shade of pens. C14: Understand the term ‘copyright’.	C18: Devise and construct databases using application designed for this purpose in areas across the curriculum.	C1: Use specified screen coordinates to control movement. C2: Set the appearance of objects and create sequences of changes.	C6: Specify conditions to trigger events. C7: Use IF THEN conditions to control events or objects. C8: Create conditions for actions by sensing proximity or by waiting for a user input (such as proximity to a specified colour or a line or responses to questions). C9: Use variables to store a value. C10: Use the functions define, set, change, show and hide to control the variables. C11: Use the Reporter operators () + () () - () () * () () / () to perform calculations
	<a href="#">Computing Networks and Systems – The Internet</a>	<a href="#">Creating Media – Audio Editing</a>	<a href="#">Creating Media -Photo editing</a>	<a href="#">Data and Information – Data-logging</a>	<a href="#">Programming A – Repetition in shapes</a>	<a href="#">Programming B – Repetition in Games</a>

Resources	Chrome Music Lab, access to internet, Access to internet, laptops,	Access to internet, laptops, iPads, Audacity,	Access to internet, laptops, paint.net, <a href="http://pixabay.com">pixabay.com</a> ., <a href="http://www.getpaint.net/doc/latest/index.html">www.getpaint.net/doc/latest/index.html</a> .	Access to internet, laptops, iPads, Data loggers	Access to internet, laptops, iPads, You can use Turtle Academy online at <a href="http://turtleacademy.com/playground">turtleacademy.com/playground</a> You can download FMSLogo from <a href="http://fmslogo.sourceforge.net">fmslogo.sourceforge.net</a>	Access to internet, laptops, iPads, <a href="http://Scratch">Scratch</a> ,
Vocabulary	Internet, World Wide Web, e-Safety, fake news, website,	Audio, input, output, record, digital, podcast, copy, paste, time shift, volume, microphone, speakers, copyright, headphones,	Image, digital, crop, editing, magic want tool, clone stamp, recolour tool,	Data points, data logging, sensors, logging intervals, temperature, Celsius, light, lux, sound, decibels,	Repeating, loops, turtle, logo, repeat, algorithm, code, debugging,	Repeat, count-controlled loops,
Lesson 1	<p><b>Year 3:</b></p> <p><b>Year 4:</b> To describe how networks physically connect to other networks</p> <p><b>Activities:</b> 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 then discuss what we should keep in and out of a network to keep safe.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I understand the internet as a network of networks I understand how information is shared across the internet I know why a network needs protecting</p> <p><b>Year 4:</b> I can describe the internet as a network of networks I can demonstrate how information is shared across the internet I can discuss why a network needs protecting</p>	<p><b>Year 3/4:</b> To identify that sound can be digitally recorded:</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can identify digital devices that can record sound and play it back I can identify the inputs and outputs required to play audio or record sound I can recognise the range of sounds that can be recorded</p>	<p><b>Year 3:</b>To know digital images can be changed</p> <p><b>Year 4:</b> To explain that digital images can be changed</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3/ 4:</b> I can identify changes that we can make to an image I can explore how images can be changed in real life I can explain the effect that editing can have on an image</p>	<p><b>Year 3/4:</b> To explain that data gathered over time can be used to answer questions</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can choose a data set to answer a given question I can suggest questions that can be answered using a given data set</p> <p><b>Year 4:</b> I can choose a data set to answer a given question I can suggest questions that can be answered using a given data set I can identify data that can be gathered over time</p>	<p><b>Year 3/4:</b> To identify that accuracy in programming is important</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can program a computer by typing commands I can explain the effect of changing a value of a command</p> <p><b>Year 4:</b> I can program a computer by typing commands I can explain the effect of changing a value of a command I can create a code snippet for a given purpose</p>	<p><b>Year 3/4:</b> To develop the use of count-controlled loops in a different programming environment</p> <p><b>Activities:</b></p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can list an everyday task as a set of instructions including repetition I can modify a snippet of code to create a given outcome</p> <p><b>Year 4:</b> I can list an everyday task as a set of instructions including repetition I can predict the outcome of a snippet of code I can modify a snippet of code to create a given outcome</p>
Lesson 2	<p><b>Year 3/4:</b> To recognise how networked devices make up the internet</p> <p><b>Activities:</b> Learners will describe parts of a network and how they connect to each other to form the internet. They will use this 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can describe the different networked devices I know how the internet allows us to view the World Wide Web I can recognise that the World Wide Web is the part of the internet that contains websites and web pages</p>	<p><b>Year 3/4:</b> To use a digital device to record sound:</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can use a device to record audio and play back sound I can suggest how to improve my recording I can discuss what other people include when recording sound for a podcast</p>	<p><b>Year 3/4:</b> To change the composition of an image</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can explain what has changed in an edited image I can change the composition of an image</p> <p><b>Year 4:</b> I can explain what has changed in an edited image I can change the composition of an image by selecting parts of it I can consider why someone might want to change the composition of an image</p>	<p><b>Year 3/4:</b> To use a digital device to collect data automatically</p> <p><b>Activities:</b></p> <p><b>Outcomes:</b> 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.</p> <p><b>Year 3:</b></p> <p><b>Year 4:</b> I can explain that sensors are input devices</p>	<p><b>Year 3/4:</b> To create a program in a text-based language</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can use a template to draw what I want my program to do I can write an algorithm to produce a given outcome I can test my algorithm</p>	<p><b>Year 3:</b>To know there are infinite loops and count-controlled loops</p> <p><b>Year 4:</b> To explain that in programming there are infinite loops and count-controlled loops</p> <p><b>Activities:</b></p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can modify loops to produce a given outcome I can choose when to use a count-controlled and an infinite loop</p> <p><b>Year 4:</b> I can modify loops to produce a given outcome I can choose when to use a count-controlled and an infinite loop I can recognise that some programming languages enable more than one process to be run at once</p>

	<p><b>Year 4:</b> I can describe the different networked devices and how they connect</p> <p>I can explain how the internet allows us to view the World Wide Web</p> <p>I can recognise that the World Wide Web is the part of the internet that contains websites and web pages</p>			<p>I can use data from a sensor to answer a given question</p> <p>I can identify that data from sensors can be recorded</p>	<p><b>Year 4:</b> I can use a template to draw what I want my program to do</p> <p>I can write an algorithm to produce a given outcome</p> <p>I can test my algorithm in a text-based language</p>	
Lesson 3	<p><b>Year 3/4:</b> To outline how websites can be shared via the World Wide Web</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I know types of media that can be shared on the World Wide Web (WWW)</p> <p>I can describe where websites are stored when uploaded to the WWW</p> <p>I can access websites on the WWW</p> <p><b>Year 4:</b> I can explain the types of media that can be shared on the World Wide Web (WWW)</p> <p>I can describe where websites are stored when uploaded to the WWW</p> <p>I can describe how to access websites on the WWW</p>	<p><b>Year 3/4</b> To explain that a digital recording is stored as a file:</p> <p><b>Activities:</b> 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> <p><b>Note:</b> Due to the amount of time required to plan the podcast content, the written parts of the planning template could be completed in a different subject’s lesson (e.g. English, or a subject related to the podcast content).</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can plan the content for a podcast</p> <p>I understand why it is useful to be able to save digital recordings</p> <p>I can save a digital recording as a file</p> <p><b>Year 4:</b> I can plan and write the content for a podcast</p> <p>I can discuss why it is useful to be able to save digital recordings</p> <p>I can save a digital recording as a file</p>	<p><b>Year 3/4:</b> To describe how images can be changed for different uses</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can talk about changes made to images</p> <p>I can choose effects</p> <p>I can explain my choices</p> <p><b>Year 4:</b> I can talk about changes made to images</p> <p>I can choose effects to make my image fit a scenario</p> <p>I can explain why my choices fit a scenario</p>	<p><b>Year 3/ 4:</b> To explain that a data logger collects ‘data points’ from sensors over time</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can identify a suitable place to collect data</p> <p>I can identify the intervals used to collect data</p> <p>I can talk about the data that I have captured</p>	<p><b>Year 3/4:</b> To explain what ‘repeat’ means</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b></p> <p><b>Year 4:</b> I can identify repetition in everyday tasks</p> <p>I can identify patterns in a sequence</p> <p>I can use a count-controlled loop to produce a given outcome</p>	<p><b>Year 3:</b> To develop a design that includes two or more loops</p> <p><b>Year 4:</b> To develop a design that includes two or more loops which run at the same time</p> <p><b>Activities:</b> 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 <b>event</b> block (<b>green flag</b>) 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can choose which action will be repeated for each object</p> <p>I can explain what the outcome of the repeated action should be.</p> <p><b>Year 4:</b> I can choose which action will be repeated for each object</p> <p>I can explain what the outcome of the repeated action should be</p> <p>I can evaluate the effectiveness of the repeated sequences used in my program</p>
Lesson 4	<p><b>Year 3/4:</b> To describe how content can be added and accessed on the World Wide Web</p> <p><b>Activities:</b> Learners will analyse the contents of websites, before designing their own website, offline. They will consider the content they would like to include on a website of their own, and then decide how they could create that content. They will then use an existing website to create some of their own content online, using tools introduced in Year 2.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can create media which can be found on websites</p>	<p><b>Year 3/4:</b> To explain that audio can be changed through editing:</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can open a digital recording from a file</p> <p>I can discuss ways in which audio recordings can be altered</p> <p>I can edit sections of an audio recording</p>	<p><b>Year 3:</b> To begin to make good choices when selecting different tools</p> <p><b>Year 4:</b> To make good choices when selecting different tools</p> <p><b>Activities:</b> 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><b>Outcomes:</b></p> <p><b>Year 3:</b> I can identify how an image has been retouched</p>	<p><b>Year 3/4:</b> To use data collected over a long duration to find information</p> <p><b>Activities:</b> 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.</p> <p><b>Note:</b> The logged activity can’t be done safely in school due to the high starting temperature. Later in the unit, pupils may choose to complete a warming experiment, starting with ice and allowing it to warm to room temperature.</p> <p><b>Outcomes:</b></p>	<p><b>Year 3/4:</b> To modify a count-controlled loop to produce a given outcome</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I can identify the effect of changing the number of times a task is repeated</p>	<p><b>Year 3/4:</b> To modify an infinite loop in a given program</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can identify which parts of a loop can be changed</p> <p>I can explain the effect of my changes</p>



	<p>I can recognise that I can add content to the WWW</p> <p><b>Year 4:</b> I can create media which can be found on websites</p> <p>I can recognise that I can add content to the WWW</p> <p>I can explain that new content can be created online</p>		<p>I can give examples of that retouching can have on an image</p> <p>I am beginning choose appropriate tools to retouch an image</p> <p><b>Year 4:</b> I can identify how an image has been retouched</p> <p>I can give examples of positive and negative effects that retouching can have on an image</p> <p>I can choose appropriate tools to retouch an image</p>	<p><b>Year 3:</b> I can import a data set with support</p> <p>I can use a computer to view data in different ways</p> <p><b>Year 4:</b> I can import a data set</p> <p>I can use a computer to view data in different ways</p> <p>I can use a computer program to sort data</p>	<p>I can choose which values to change in a loop</p> <p><b>Year 4:</b> I can identify the effect of changing the number of times a task is repeated</p> <p>I can predict the outcome of a program containing a count-controlled loop</p> <p>I can choose which values to change in a loop</p>	<p>I can re-use existing code snippets on new sprites</p>
Lesson 5	<p><b>Year 3/4:</b> To recognise how the content of the WWW is created by people</p> <p><b>Activities:</b> Learners will explore who owns the content on websites. They will explore a variety of websites, investigating 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I know that websites and their content are created by people</p> <p>I can suggest who owns the content on websites</p> <p><b>Year 4:</b> I can explain that websites and their content are created by people</p> <p>I can suggest who owns the content on websites</p> <p>I can explain that there are rules to protect content</p>	<p><b>Year 3/4:</b> To show that different types of audio can be combined and played together:</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can discuss sounds that other people combine</p> <p>I can choose suitable sounds to include in a podcast</p> <p>I can use editing tools to arrange sections of audio</p>	<p><b>Year 3/ 4:</b> To recognise that not all images are real</p> <p><b>Activities:</b> 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><b>Outcomes:</b></p> <p><b>Year 3:</b> I can sort images into ‘fake’ or ‘real’ and explain my choices</p> <p>I can combine parts of images to create new images</p> <p><b>Year 4:</b> I can sort images into ‘fake’ or ‘real’ and explain my choices</p> <p>I can combine parts of images to create new images</p> <p>I can talk about fake images around me</p>	<p><b>Year 3/4:</b> To identify the data needed to answer questions</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3/ 4:</b> I can propose a question that can be answered using logged data</p> <p>I can plan how to collect data using a data logger</p> <p>I can use a data logger to collect data</p>	<p><b>Year 3/4:</b> To decompose a task into small steps</p> <p><b>Activities:</b> 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><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can identify ‘chunks’ of actions in the real world</p> <p>I can use a procedure in a program</p> <p>I can explain that a computer can repeatedly call a procedure</p>	<p><b>Year 3/4:</b> To design a project that includes repetition</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can evaluate the use of repetition in a project</p> <p>I can select key parts of a given project to use in my own design</p> <p>I can develop my own design explaining what my project will do</p>
Lesson 6	<p><b>Year 3/4:</b> To evaluate the consequences of unreliable content</p> <p><b>Activities:</b> In this lesson, 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 they may not be real, before conducting a web search which will return ambiguous and sometimes misleading results, looking for why this is the case. Finally, learners will complete a practical activity, demonstrating how quickly information can spread, beyond your own control.</p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b> I know that not everything on the World Wide Web is true.</p> <p>I know some information I find online may not be honest, accurate, or legal.</p>	<p><b>Year 3/ 4:</b> To evaluate editing choices made:</p> <p><b>Activities:</b> 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> <p><b>Outcomes:</b></p> <p><b>Year 3/4:</b> I can explain that digital recordings need to be exported to share them</p> <p>I can discuss the features of a digital recording I like</p> <p>I can suggest improvements to a digital recording</p>	<p><b>Year 3/4:</b> To evaluate how changes can improve an image</p> <p><b>Activities:</b> 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><b>Outcomes:</b></p> <p><b>Year 3:</b> I can compare the original image with my completed publication</p> <p>I can evaluate the impact of my publication on others through feedback</p> <p><b>Year 4:</b> I can consider the effect of adding other elements to my work</p> <p>I can compare the original image with my completed publication</p>	<p><b>Year 3/4:</b> To use collected data to answer questions</p> <p><b>Activities:</b></p> <p><b>Outcomes:</b></p> <p><b>Year 3:</b></p> <p><b>Year 4:</b> I can interpret data that has been collected using a data logger</p> <p>I can draw conclusions from the data that I have collected</p> <p>I can explain the benefits of using a data logger</p>	<p><b>Year 3/4:</b> To create a program that uses count-controlled loops to produce a given outcome</p> <p><b>Activities:</b> 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><b>Outcomes:</b></p>	<p><b>Year 3/4:</b> To create a project that includes repetition</p> <p><b>Activities:</b> 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.</p> <p><b>Outcomes:</b></p> <p><b>Year 3/4 4:</b> I can refine the algorithm in my design</p> <p>I can build a program that follows my design</p> <p>I can evaluate the steps I followed when building my project</p>

	<p>I understand why I need to think carefully before I share or reshare content</p> <p><b>Year 4:</b> I can explain that not everything on the World Wide Web is true.</p> <p>I can explain why some information I find online may not be honest, accurate, or legal.</p> <p>I can explain why I need to think carefully before I share or reshare content</p>		<p>I can evaluate the impact of my publication on others through feedback</p>		<p><b>Year 3/4:</b> I can design a program that includes count-controlled loops</p> <p>I can make use of my design to write a program</p> <p>I can develop my program by debugging it</p>	
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	Technology Around Us	Creating Media – Digital Painting	Creating Media – Digital writing	Data Information – Grouping Data	Programming A – Moving a Robot	Programming B -
Progression	<p>This unit progresses students’ knowledge and understanding of networks in Year ¾ cycle A. In Year 5, they will continue to develop their knowledge and understanding of computing systems and online collaborative working.</p>	<p>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.</p>	<p>Learners should have experience of making choices on a tablet/computer. They should be able to navigate within an application.</p> <p>This unit progresses students’ skills through editing digital images and considering the impact that editing can have on an image. Learners will also consider how editing can be used appropriately for different scenarios, and create and evaluate ‘fake’ images, combining all of their new skills.</p>	<p>This unit progresses pupils’ knowledge and understanding of data and how it can be collected over time to answer questions. The unit also introduces the idea of automatic data collection.</p>	<p>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.</p>	<p>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.</p>

Curricular Links	<b>Computing</b> Understand computer networks including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration. Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Use technology safely, respectfully and responsibly; recognise .acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. <b>PSHE (Lesson 6)</b> Evaluating content for honesty and accuracy <b>Art (Lesson 3)</b> To improve their mastery of art and design techniques, including drawing, painting, and sculpture with a range of materials	<b>Computing – KS2</b> Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. Select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information. Use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. <b>Science – Year 4 (Lesson 2)</b> <b>Sound:</b> Find patterns between the volume of a sound and the strength of the vibrations that produced it <b>Sound:</b> Recognise that sounds get fainter as the distance from the sound source increases <b>English – Years 3 and 4 (Lesson 3)</b> <b>Writing – composition:</b> Plan their writing by discussing and recording ideas <b>Writing – draft and write by:</b> In non-narrative material, using simple organisational devices [for example, headings and subheadings] <b>Writing:</b> Read aloud their own writing, to a group or the whole class, using appropriate intonation and controlling the tone and volume so that the meaning is clear <b>Music – KS2 (Lesson 5)</b> Improvise and compose music for a range of purposes using the interrelated dimensions of music <a href="#">Education for a Connected World links</a> <b>Copyright and ownership</b> I can explain why copying someone else’s work from the internet without permission can cause problems (Y3) I can give examples of what those problems might be (Y3) When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it (Y4) I can give some simple examples (Y4)	<a href="#">Computing national curriculum links</a> Use search technologies effectively Select, use and combine a variety of software (including internet services). on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. <a href="#">Education for a Connected World links</a> <b>Self-image and identity</b> I can describe ways in which people might make themselves look different online. <b>Copyright and ownership</b> When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it.	<a href="#">National curriculum links</a> <b>Computing – Key stage 2</b> ...work with various forms of input Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. <b>Science – Lower key stage 2/Year 4</b> Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.	<a href="#">National curriculum links</a> Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	<a href="#">National curriculum links</a> Design, write, and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. Use logical reasoning to explain how some simple algorithms work, and to detect and correct errors in algorithms and programs. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.
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Assessment	<b>Formative assessment</b> Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide deck at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.	<b>Formative assessment</b> Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide deck at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.	<b>Formative assessment</b> Assessment opportunities are detailed in each lesson plan. The learning objective and success criteria are introduced in the slide deck at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.	<b>Formative assessment</b> Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide deck at the beginning of each lesson, and then reviewed at the end. Pupils are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.	<b>Summative assessment</b> Please see the assessment question and answer documents for this unit.	<b>Formative assessment</b> Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide deck at the beginning of each lesson, and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objectives using thumbs up, thumbs sideways, or thumbs down.
	<b>Summative assessment</b> There are ten multiple choice questions in the quiz at the end of the unit. The questions are drawn from all six lessons. Please see the assessment question and answer documents for this unit.	<b>Summative assessment</b> Within this unit, a rubric is used to assess learners’ work after Lesson six. Please see the assessment rubric document for this unit.	<b>Summative assessment</b> Please see the assessment rubric document for this unit.	<b>Summative assessment</b> Please see the assessment rubric document for this unit.		<b>Summative assessment</b> Please see the ‘Assessment rubric’ document for this unit. Recommend the use of teacher accounts in Scratch to help with assessment throughout this unit. For guidance on setting up teacher accounts, please visit <a href="https://scratch.mit.edu/educators/faq">the Scratch website</a> . (https://scratch.mit.edu/educators/faq)

Subject Knowledge	<p><b>Lesson 1:</b> Knowledge of computer networks is required for this lesson. It builds on concepts introduced in the Year 3 Computer systems and networks unit, in particular, the definition of a network which is covered in Lesson 4.</p> <p><b>Lesson 2:</b> - This lesson builds on Year ¾ Cycle A, Computing systems and networks, in particular the parts of a network, covered in Lessons 4 and 5.</p> <p>You will need an understanding of how data is routed around the internet. Some of the concepts covered in this lesson are explained in ‘A Packet’s Tale’ (a YouTube video): <a href="https://www.youtube.com/watch?v=ewrBaITeBM">https://www.youtube.com/watch?v=ewrBaITeBM</a></p> <p>You will also need a clear understanding that the World Wide Web is part of the internet — this is explained in this video: <a href="https://www.bbc.co.uk/newsround/47523993">https://www.bbc.co.uk/newsround/47523993</a></p> <p><b>Lesson 3</b> - You will need an understanding of where websites are stored, this is also explained in ‘A Packet’s Tale’ (a YouTube video): <a href="https://www.youtube.com/watch?v=ewrBaITeBM">https://www.youtube.com/watch?v=ewrBaITeBM</a></p> <p><b>Lesson 4:</b> - An understanding of the elements common to many websites (text content, images, video, etc.). A knowledge of websites which can be used to generate content on the World Wide Web, in particular Chrome Music Lab.</p> <p><b>Lesson 5:</b> A knowledge of copyright and the reasons for it. A useful short summary is here: <a href="https://www.gov.uk/copyright">https://www.gov.uk/copyright</a> and a useful guide to creative commons: <a href="https://creativecommons.org/licenses/">https://creativecommons.org/licenses/</a></p> <p><b>Lesson 6</b> An awareness that there is a high volume of inaccurate, misleading, or false content on the internet. An understanding that search results are influenced by adverts and sponsored content. An awareness of how quickly information spreads around the World Wide Web.</p> <p>Enhance your subject knowledge to teach this unit through the following training opportunities:</p> <p><b>Online training courses</b> <a href="#">Raspberry Pi Foundation online training courses</a></p> <p><b>Face-to-face courses</b> <a href="#">National Centre for Computing Education face-to-face training courses</a></p>	<p><b>Lesson 1:</b> You will need to be familiar with the location of microphones and/or speakers on digital devices capable of recording sound. You will also need to be familiar with using Audacity to record sound.</p> <p><b>Lesson 2:</b> You will need to be familiar with using Audacity to record audio, which should include how to delete individual tracks.</p> <p><b>Lesson 3:</b> You will need to be familiar with using Audacity to record sound.</p> <p><b>Lesson 4:</b> You will need to be familiar with using Audacity to edit audio, including altering the volume and fading sections of audio in and out.</p> <p><b>Lesson 5:</b> You will need to be familiar with using the <b>Copy, Paste, and Time Shift</b> tools in Audacity.</p> <p><b>Lesson 6:</b> You will need to be familiar with using Audacity to export audio recordings.</p> <p>Enhance your subject knowledge to teach this unit through the following training opportunities:</p> <p><b>Online training courses</b> <a href="#">Raspberry Pi Foundation online training courses</a></p> <p><b>Face-to-face courses</b> <a href="#">National Centre for Computing Education face-to-face training courses</a></p>	<p><b>All lessons</b> - You will need to be familiar with the tools used throughout the unit in paint.net or your chosen image editor, and know how to save a new version of an image from within the editor. You can find a guide to all tools in paint.net at <a href="http://www.getpaint.net/doc/latest/index.html">www.getpaint.net/doc/latest/index.html</a>. You should consider how the learners will access the editor. For example, you may wish to create a shortcut to the program for them.</p> <p><b>Lesson 1</b> - You will need to be familiar with the effect that cropping can have on an image. You can find more information at <a href="http://www.dpreview.com/forums/post/56318241">www.dpreview.com/forums/post/56318241</a>.</p> <p><b>Lesson 2</b> - You will need to know how to search for and save an image from <a href="http://pixabay.com">pixabay.com</a>. You will need to be familiar with how to combine parts of two images in your chosen image editor.</p> <p><b>Lesson 3</b> - You will need to be familiar with how to make image adjustments and change effects in paint.net or your chosen image editor.</p> <p><b>Lesson 4</b> = You will need to be familiar with the following tools in paint.net or your chosen image editor. For more information about tools in paint.net, visit the following websites: The ‘clone stamp’: <a href="http://www.getpaint.net/doc/latest/CloneStamp.html">www.getpaint.net/doc/latest/CloneStamp.html</a> ! The ‘recolor’ tool: <a href="http://www.getpaint.net/doc/latest/RecolorTool.html">www.getpaint.net/doc/latest/RecolorTool.html</a> ! The ‘magic wand’ tool: <a href="http://www.getpaint.net/doc/latest/MagicWand.html">www.getpaint.net/doc/latest/MagicWand.html</a> ! <b>Lesson 5</b> You will need to be familiar with the ‘lasso select’ tool in paint.net or your chosen image editor. For more information about this tool in paint.net, visit <a href="http://www.getpaint.net/doc/latest/LassoSelectionTool.html">www.getpaint.net/doc/latest/LassoSelectionTool.html</a>.</p> <p><b>Lesson 6</b> You will need to be familiar with the text and shape tools in paint.net or your chosen image editor. For more information about these tools in paint.net, visit <a href="http://www.getpaint.net/doc/latest/TextShapeTools.html">www.getpaint.net/doc/latest/TextShapeTools.html</a></p>	<p>This unit focuses on using technology to automatically gather environmental data over time. It refers to data points and logging intervals.</p> <p>A data logger is a digital device that can collect data over time and store it. Data loggers designed for education will usually have built-in sensors for light, temperature, and sound, as well as the option to connect external sensors.</p> <p>You should be aware that input devices allow data to be entered into a computer. Keyboards, mice, and microphones are all input devices.</p> <p>A sensor is a type of input designed to allow computers to capture data from the physical environment. Sensors can be connected to a computer to capture data about temperature, light, sound, humidity, pressure, etc. A microphone can be used to record audio into a computer, or it can be used as a sound sensor.</p> <p>You should also be aware that data loggers capture data at given time intervals. The interval is a regular time period between each data capture and can vary according to the experiment. For example, if data is being logged for a week, the interval might be every hour.</p>	<p>You will need to be able to access and demonstrate the version of Logo that you are using. You will also need to be aware of the Logo commands used in this unit. You can find these in the glossary which is part of Lesson 3 of this unit.</p> <p>This unit focuses on repetition, where actions or commands in programming are repeated. The repeating commands can also be placed into a loop. Loops can be repeated indefinitely, or a set number of times — the latter are called ‘count-controlled loops’.</p> <p>Different pedagogies are used in this programming unit. For example, pupils will encounter Parson’s Problems, which are programming puzzles where the pupil is given the correct code, but the commands have been split and mixed up. Pupils will also carry out code tracing, where they will read through the code line by line and say exactly what each command will make happen when it runs.</p> <p>In Lesson 5, pupils will look at decomposition and procedures. They will decompose code snippets, breaking them down to make them easier to plan and work with. They will use these broken-down chunks to help recognise patterns in their programming.</p> <p>Pupils will create and call procedures in Logo. Procedures are code snippets that are named and can be reused in their programming. When creating a procedure, the word ‘TO’ is typed, followed by the procedure name, eg TO SQUARE.</p> <p>Enhance your subject knowledge to teach this unit through the following training opportunities:</p>	<p>This unit focuses on developing learners' understanding of repetition within the Scratch programming environment. Repetition is where actions or commands in programming are repeated. The repeating commands can also be referred to as a ‘loop’. Loops can be repeated indefinitely (known as ‘infinite loops’), or for a set number of times (known as ‘count-controlled loops’).</p> <p>This unit also develops learners’ understanding of design in programming, using the approach outlined below.</p> <p>When programming, there are four levels which can help describe a project (known as ‘Levels of abstraction’). Research suggests that this structure can support learners in understanding how to create a program and how it works:</p> <ul style="list-style-type: none"><li>• Task - what is needed</li><li>• Design - what it should do</li><li>• Code - how it is done</li><li>• Running the code - what it does</li></ul> <p>Spending time at the ‘task’ and ‘design’ levels before engaging in code-writing can aid learners in assessing the ‘do-ability’ of their programs. It also reduces a learner’s cognitive load during programming. Learners will move between the different levels throughout the unit, and this is highlighted within each lesson plan.</p>