



Computing Curriculum
Year 3 and 4 – Cycle A

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.		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. C3: Create and edit sounds. C4: Control when they are heard, their volume, duration and rests. 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
Top ic	Computing Systems and Networks	Creating media - Animation	Creating Media – Desktop Publishing	Data – Branching Data-bases	Programming A – Sequencing music	Programming B – Events and Actions

Resources	Access to internet, laptops, iPads, Paint program,	Access to internet, laptops, iPads, iMotion	Access to internet, laptops, iPads, Adobe Spark app, or other software such as Canva or Microsoft Publisher.	Access to internet, laptops, iPads, J2data - https://www.j2e.com/help/videos/datags3 .	Access to internet, laptops, iPads, Scratch ,	Access to internet, laptops, iPads, Scratch ,
Vocabulary	Digital, devices, network, input, process, output (IPO), infrastructure, draw, fill, edit and undo, network switch, server, wireless access point, router, printer/copier	Animation, drawings, photographs, images, storyboard, onion-skinning,	Text, images, back space, delete, return, shift	Data, data-base, branching, yes/no questions, binary, pictogram, attributes	Blocks, program, sprite, algorithm, attributes	Blocks, program, sprite, algorithm, events, actions
Lesson 1	<p>Year 3/4: To explain how digital devices function</p> <p>Activities: This lesson introduces the concepts of input, process, and output. These concepts are fundamental to all digital devices.</p> <p>Outcomes:</p> <p>Year 3: I can explain that digital devices accept inputs</p> <p>I can explain that digital devices produce outputs</p> <p>I can follow a process</p> <p>Year 4: I can explain that digital devices accept inputs</p> <p>I can explain that digital devices produce outputs</p>	<p>Year 3/4: To explain that animation is a sequence of drawings or photographs</p> <p>Activities: Learners will discuss whether they think a picture can move. They will learn about simple animation techniques and create their own animations in the style of flip books (flick books) using sticky notes.</p> <p>Outcomes:</p> <p>Year 3: I can draw a sequence of pictures</p> <p>I can create an effective flip book—style animation</p> <p>Year 4: I can explain how an animation/flip book works</p>	<p>Year 3/4: To recognise how text and images convey information</p> <p>Activities: In this lesson, learners will become familiar with the terms ‘text’ and ‘images’ and understand that text and images need to be used carefully to communicate messages clearly. Learners will be able to give advantages and disadvantages of using text, images, or both text and images to communicate messages effectively.</p> <p>Outcomes:</p> <p>Year 3: I can explain the difference between text and images</p> <p>I can recognise that text and images can communicate messages clearly</p> <p>I can identify the advantages and disadvantages of using text and images</p> <p>Year 4: I can explain the difference between text and images</p> <p>I can recognise that text and images can communicate messages clearly</p> <p>I can explain the advantages and disadvantages of using text and images</p>	<p>Year 3/4: To create questions with yes/no answers</p> <p>Activities: During this lesson, learners will start to explore questions with yes or no answers, and how these can be used to identify and compare objects. They will create their own yes or no questions before using these to split a collection of objects into groups.</p> <p>Outcomes:</p> <p>Year 3: I can investigate questions with yes/no answers</p> <p>I can make up a yes/no question about a collection of objects</p> <p>I can create two groups of objects separated by one attribute</p> <p>Year 4: I can investigate questions with yes/no answers</p> <p>I can make up a yes/no question about a collection of objects</p> <p>I can create three groups of objects separated by attributes</p>	<p>Year 3/4: To explore a new programming environment</p> <p>Activities: This lesson introduces learners to a new programming environment: Scratch. Learners will begin by comparing Scratch to other programming environments they may have experienced, before familiarising themselves with the basic layout of the screen.</p> <p>Outcomes:</p> <p>Year 3/4: I can identify the objects in a Scratch project (sprites, backdrops)</p> <p>I can explain that objects in Scratch have attributes (linked to)</p> <p>I can recognise that commands in Scratch are represented as blocks</p>	<p>Year 3: To explain how a sprite moves in an existing project</p> <p>Year 4:</p> <p>Activities: In this lesson, learners will investigate how characters can be moved using ‘events’. They will analyse and improve an existing project, and then apply what they have learned to their own projects. They will then extend their learning to control multiple sprites in the same project.</p> <p>Outcomes:</p> <p>Year 3: I can explain the relationship between an event and an action</p> <p>I can choose which keys to use for actions and explain my choices</p> <p>I can identify a way to improve a program</p> <p>Year 4: I can explain the relationship between an event and an action</p> <p>I can choose which keys to use for actions and explain my choices</p> <p>I can identify and explain ways to improve a program</p>
Lesson 2	<p>Year 3/4: To identify input and output devices</p> <p>Activities: In this lesson, learners will develop their knowledge of input, process, and output and apply it to devices and parts of devices that they will be familiar with in their everyday surroundings.</p> <p>Outcomes:</p> <p>Year 3/4: I can classify input and output devices</p> <p>I can model a simple process</p> <p>I can design a digital device</p>	<p>Year 3/4: To relate animated movement with a sequence of images</p> <p>Activities: In the previous lesson, learners created their own flip book—style animations. In this lesson, they will develop this knowledge and apply it to make a stop-frame animation using a tablet.</p> <p>Outcomes:</p> <p>Year 3/4: I can predict what an animation will look like</p> <p>I can explain why little changes are needed for each frame</p>	<p>Year 3: To recognise that text and layout can be edited</p> <p>Year 4: To be able to edit text and layout</p> <p>Activities: This lesson will build on last week’s lesson, in which we looked at using images and text to communicate a message effectively. In this lesson we will look at desktop publishing. Learners will think about how to make careful choices regarding font size, colour, and type in an invitation. The use of the Return, Backspace, and Shift keys will be explored and learners will be taught how to type age-appropriate punctuation marks. This will build on the typing skills learned in the Year 1 ‘Digital painting’ unit. Learners will understand that once content has been added, it can be rearranged on the page.</p> <p>Outcomes:</p>	<p>Year 3/4: To identify the object attributes needed to collect relevant data</p> <p>Activities: During this lesson, learners will continue to develop their understanding of using questions with yes or no answers to group collections of objects. They will learn how to arrange objects in a tree structure and will continue to think about which attributes the questions are related to.</p> <p>Outcomes:</p> <p>Year 3/4: I can select an attribute to separate objects into groups</p> <p>I can create a group of objects within an existing group</p> <p>I can arrange objects into a tree structure</p>	<p>Year 3/4: To identify that commands have an outcome</p> <p>Activities: In this lesson, learners will create movement for more than one sprite. In doing this, they will design and implement their code, and then will create code to replicate a given outcome. Finally, they will experiment with new motion blocks.</p> <p>Outcomes:</p> <p>Year 3/4: I can identify that each sprite is controlled by the commands I choose</p>	<p>Year 3/4: To create a program to move a sprite in four directions</p> <p>Activities: In this lesson, learners will program a sprite to move in four directions: up, down, left, and right. They will begin by choosing a sprite and sizing it to fit in with a given background. Learners will then create the code to move the sprite in one direction before duplicating and modifying it to move in all four directions. Finally, they will consider how their project could be extended</p>

		I can create an effective stop-frame animation	Year 3/4: I can change font style, size, and colours for a given purpose I can edit text I can explain that text can be changed to communicate more clearly		I can choose a word which describes an on-screen action for my design I can create a program following a design	to prove that their sprite has successfully navigated a maze. Outcomes: Year 3/4: I can choose a character for my project I can choose a suitable size for a character in a maze I can program movement
Lesson 3	Year 3/4: To recognise how digital devices can change the way we work Activities: In this lesson, learners will apply their learning from lessons 1 and 2 by using programs in conjunction with inputs and outputs on a digital device. They will create two pieces of work with the same focus, using digital devices to create one piece of work, and non-digital tools to create the other. Learners will then compare and contrast the two approaches. Outcomes: Year 3/4: I can explain how I use digital devices for different activities I can recognise similarities between using digital devices and non-digital tools I can suggest differences between using digital devices and non-digital tools	Year 3/4: To plan an animation Activities: Remind the learners of the animations that we created last week and tell them that next week we will use tablets to animate some of our own stories. Tell the learners that during this lesson they will create a storyboard showing the characters, settings and events that they would like to include in their own stop-frame animation next week. Outcomes: Year 3/4: I can break down a story into settings, characters and events I can describe an animation that is achievable on screen I can create a storyboard	Year 3/4: To choose appropriate page settings Activities: Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' within desktop publishing software. The learners will create their own magazine template, which they will add content to during the next lesson. This lesson has been designed on a laptop using Adobe Spark and this is reflected in the screenshots and videos. Teachers may decide to use the Adobe Spark app, or other software such as Canva or Microsoft Publisher. Outcomes: Year 3/4: I can define the term 'page orientation' I can recognise placeholders and say why they are important I can create a template for a particular purpose	Year 3/4: To create a branching database Activities: During this lesson, learners will continue to develop their understanding of ordering objects/images in a branching database structure. They will learn how to use an online database tool to arrange objects into a branching database, and will create their own questions with yes or no answers. The learners will show that their branching database works through testing. Outcomes: Year 3/4: I can select objects to arrange in a branching database I can group objects using my own yes/no questions I can prove my branching database works	Year 3/4: To explain that a program has a start Activities: In this lesson, learners will be introduced to the concept of sequences by joining blocks of code together. They will also learn how event blocks can be used to start a project in a variety of different ways. In doing this, they will apply principles of design to plan and create a project. Outcomes: Year 3/4: I can start a program in different ways I can create a sequence of connected commands I can explain that the objects in my project will respond exactly to the code	Year 3/4: To adapt a program to a new context Activities: This lesson will introduce learners to extension blocks in Scratch using the Pen extension. Learners will use the pen down block to draw lines, building on the movement they created for their sprite in Lesson 2. Learners will then decide how to set up their project every time it is run. Outcomes: Year 3/4: I can use a programming extension I can consider the real world when making design choices I can choose blocks to set up my program
Lesson 4	Year 3/4: To explain how a computer network can be used to share information Activities: any digital devices are now connected to other digital devices, e.g. computers through wires, tablets through WiFi, and smartphones through mobile phone networks. The benefit of connecting digital devices is that it allows information to be shared between users and systems.	Year 3/4: To identify the need to work consistently and carefully Activities: In the previous lesson, learners planned out their own stop-frame animations in a storyboard. This lesson, they will use tablets to carefully create stop-frame animations, paying attention to consistency. Outcomes: Year 3: I can use onion skinning to help me make small changes between frames	Year 3/4: To add content to a desktop publishing publication Activities: In this lesson, learners will add their own content (text and images) to the magazine templates they created in lesson 3. They will copy the information for the front of their magazine from a prewritten document and paste it into the chosen place on their magazine cover. Images will be added from within the search facility in Adobe Spark. Teachers could ask learners to	Year 3/4: To explain why it is helpful for a database to be well structured Activities: During this lesson, learners will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes or no answers and apply these to given objects. The learners will be able to explain why questions need to be in a specific order and will compare the efficiency of different branching databases. Outcomes: Year 3/4: I can create yes/no questions	Year 3/4: To recognise that a sequence of commands can have an order Activities: This lesson explores sequences, and how they are implemented in a simple program. Learners have the opportunity to experiment with sequences where order is and is not important. They will create their own sequences from given designs. Outcomes:	Year 3/4: To develop my program by adding features Activities: In this lesson, learners will be given the opportunity to use additional Pen blocks. They will predict the functions of new blocks and experiment with them, before designing features to add to their own projects. Finally, they will add these features to their projects and test their effectiveness. Outcomes:

Lesson 5	<p>This lesson introduces the concept of connections and moving information between connected devices. Learners will learn to explain how and why computers are joined together to form networks.</p> <p>Outcomes:</p> <p>Year 3/4: I can recognise different connections</p> <p>I can explain how messages are passed through multiple connections</p> <p>I can discuss why we need a network switch</p>	<p>I can review a sequence of frames to check my work</p> <p>Year 4: I can use onion skinning to help me make small changes between frames</p> <p>I can review a sequence of frames to check my work</p> <p>I can evaluate the quality of my animation</p>	<p>gather copyright-free images from http://www.pixabay.com if using a different application.</p> <p>Outcomes:</p> <p>Year 3/4: I can choose the best locations for my content</p> <p>I can paste text and images to create a magazine cover</p> <p>I can make changes to content after I've added it</p>	<p>using given attributes</p> <p>I can explain that questions need to be ordered carefully to split objects into similarly sized groups</p> <p>I can compare two branching database structures</p>	<p>Year 3/4: I can explain what a sequence is</p> <p>I can combine sound commands</p> <p>I can order notes into a sequence</p>	<p>Year 3/4: I can identify additional features (from a given set of blocks)</p> <p>I can choose suitable keys to turn on additional features</p> <p>I can build more sequences of commands to make my design work</p>
	<p>Year 3/4: To explore how digital devices can be connected</p> <p>Activities: This lesson introduces key network components, including a server and wireless access points. Learners will examine each device's functionality and look at the benefits of networking computers.</p> <p>Outcomes:</p> <p>Year 3: I can recognise that a computer network is made up of a number of devices</p> <p>I can demonstrate how information can be passed between devices</p> <p>I can explain the role of a switch, server, and wireless access point in a network</p>	<p>Year 3: To review and improve an animation</p> <p>Activities: Last lesson, learners created their own stop-frame animations. This lesson, they will evaluate their animations and try to improve them by creating a brand-new animation based on their feedback.</p> <p>Outcomes:</p> <p>Year 3/4: I can explain ways to make my animation better</p> <p>I can evaluate another learner's animation</p> <p>I can improve my animation based on feedback</p>	<p>Year 3/4: To consider how different layouts can suit different purposes</p> <p>Activities: In this lesson, learners will think about the different ways information can be laid out on a page. They will look at a range of page layouts such as letters and newspapers, and begin to think about the purpose of each of these.</p> <p>Outcomes:</p> <p>Year 3: I can identify different layouts</p> <p>I can match a layout to a purpose</p> <p>I can choose a suitable layout for a given purpose</p>	<p>Year 3/4: To identify objects using a branching database</p> <p>Activities: During this lesson, learners will independently create a branching database that will identify a given object. They will continue to think about the attributes of objects to write questions with a yes or no answer, which will enable them to separate a group of objects effectively. The learners will then arrange the questions and objects into a tree structure, before using their branching database to answer questions.</p> <p>Outcomes:</p> <p>Year 3: I can select a theme and choose a variety of objects</p> <p>I can create questions and apply them to a tree structure</p> <p>I can use my branching database to answer questions</p>	<p>Year 3/4: To change the appearance of my project</p> <p>Activities: This lesson develops learners' understanding of sequences by giving them the opportunity to combine motion and sounds in one sequence. They will also learn how to use costumes to change the appearance of a sprite, and backdrops to change the appearance of the stage. They will apply the skills in Activity 1 and 2 to design and create their own project, including sequences, sprites with costumes, and multiple backdrops.</p> <p>Outcomes:</p> <p>Year 3/4: I can build a sequence of commands</p> <p>I can decide the actions for each sprite in a program</p> <p>I can make design choices for my artwork</p>	<p>Year 3/4: To identify and fix bugs in a program</p> <p>Activities: This lesson explores the process of debugging, specifically looking at how to identify and fix errors in a program. Learners will review an existing project against a given design and identify bugs within it. They will then correct the errors, gaining independence as they do so. Learners will also develop their projects by considering which new setup blocks to use.</p> <p>Outcomes: Year 3/4: I can test a program against a given design</p> <p>I can match a piece of code to an outcome</p> <p>I can modify a program using a design</p>
	<p>Year 3/4: To recognise the physical components of a network</p> <p>Activities: In this lesson, learners will further develop their understanding of computer networks. They will see examples of network infrastructure in a real-world setting and relate them to the activities in the last lesson.</p> <p>Outcomes:</p> <p>Year 3/4:</p>	<p>Year 3/4: To evaluate the impact of adding other media to an animation</p> <p>Activities: Last lesson, learners perfected their stop-frame animations. This lesson, they will add other media and effects into their animations, such as music and text.</p> <p>Outcomes:</p> <p>Year 3/4:</p> <p>I can add other media to my animation</p>	<p>Year 3/4: To consider the benefits of desktop publishing</p> <p>Activities: In this lesson, learners will explain what desktop publishing means in their own words. They will think about how desktop publishing is used in the wider world and consider the benefits of using desktop publishing applications.</p> <p>Outcomes:</p> <p>Year 3/4: I can identify the uses of desktop publishing in the real world</p>	<p>Year 3/4: To compare the information shown in a pictogram with a branching database</p> <p>Activities: During this lesson, the learners will compare two ways of presenting information. They will demonstrate their ability to explain what information is shown in a pictogram and a branching database. The learners will begin to compare the two ways of presenting information.</p> <p>Outcomes:</p>	<p>Year 3/4: To create a project from a task description</p> <p>Activities: In this lesson, learners will create a musical instrument in Scratch. They will apply the concept of design to help develop programs and use programming blocks — which they have been introduced to throughout the unit. They will learn that code can be copied from one sprite to another, and that projects</p>	<p>Year 3/4: To design and create a maze-based challenge</p> <p>Activities:</p> <p>Outcomes:</p> <p>Year 3/4: I can make design choices and justify them</p> <p>I can implement my design</p> <p>I can evaluate my project</p>

	<p>I can identify how devices in a network are connected with one another</p> <p>I can identify networked devices around me</p> <p>I can identify the benefits of computer networks</p>	<p>I can explain why I added other media to my animation</p> <p>I can evaluate my final film</p>	<p>I can say why desktop publishing might be helpful</p> <p>I can compare work made on desktop publishing to work created by hand</p>	<p>Year 3/4: I can explain what a pictogram tells me</p> <p>I can explain what a branching database tells me</p> <p>I can compare two ways of presenting information</p>	<p>should be tested to see if they perform as expected.</p> <p>Outcomes:</p> <p>Year 3/4: I can identify and name the objects I will need for a project</p> <p>I can relate a task description to a design</p> <p>I can implement my algorithm as code</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 technology by focussing on digital and non-digital devices, and introducing the concept of computers connected together as a network. Following this unit, learners will explore the internet as a network of networks.</p>	<p>This unit progresses students’ knowledge and understanding of using digital devices to create media, exploring how they can create stop-frame animations. Following this unit, learners will further develop their video editing skills in Year 5.</p>	<p>This unit progresses learners’ knowledge and understanding of using digital devices to combine text and images building on work from the following units; Digital Writing Year 1, Digital painting Year 1, and Digital Photography Year 2.</p>	<p>This unit progresses students’ knowledge and understanding of presenting information. It builds on their knowledge of data and information from key stage 1. They continue to develop their understanding of attributes and begin to construct and interrogate branching databases as a means of displaying and retrieving information.</p>	<p>This unit assumes that learners will have some prior experience of programming; the KS1 NCCE units cover floor robots and ScratchJr. However, experience of other languages or environments may also be useful.</p>	<p>This unit assumes that learners will have some prior experience of programming. The key stage 1 National Centre for Computing Education units focus on floor robots and ScratchJr, however experience of other languages or environments may also be useful. The Year 3 — Programming A unit introduces the Scratch programming environment and the concept of sequences.</p>

Curricular Links	<p>Computing</p> <p>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output</p> <p>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</p> <p>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</p> <p>Maths (lesson 1)</p> <p>Number and place value: Solve number problems and practical problems</p> <p>Art (lesson 3)</p> <p>To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials</p>	<p>Computing</p> <p>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 .</p> <p>Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</p> <p>Further national curriculum links</p> <p>Literacy links</p> <p>Pupils should be taught to: draft and write by: in narratives, creating settings, characters and plot</p> <p>Pupils should be taught to: proof-read for spelling and punctuation errors</p> <p>History</p> <p>The Roman Empire and its impact on Britain</p> <p>Education for a Connected World links</p> <p>Managing online information</p> <p>I can use key phrases in search engines.</p> <p>I can use search technologies effectively.</p> <p>Copyright and ownership</p> <p>I can explain why copying someone else’s work from the internet without permission can cause problems.</p> <p>I can give examples of what those problems might be.</p> <p>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.</p> <p>I can give some simple examples.</p> <p>I can give examples of content that is permitted to be reused.</p> <p>I can demonstrate the use of search tools to find and access online content which can be reused by others.</p>	<p>Computing</p> <p>Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</p> <p>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</p> <p>English programmes of study links</p> <p>Pupils should be taught to draft and write by: in non-narrative material, using simple organisational devices [for example, headings and subheadings]</p> <p>Evaluate and edit by assessing the effectiveness of their own and others’ writing and suggesting improvements</p> <p>Proofread for spelling and punctuation errors</p> <p>Education for a Connected World links</p> <p>Managing online information</p> <p>I can use key phrases in search engines</p> <p>I can use search technologies effectively</p> <p>Copyright and ownership</p> <p>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</p> <p>I can demonstrate the use of search tools to find and access online content which can be reused by others</p>	<p>National curriculum links</p> <p>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.</p> <p>Use technology safely, respectfully, and responsibly</p> <p>Education for a Connected World links</p>	<p>National curriculum links</p> <p>Design, write, and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</p> <p>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</p> <p>Use logical reasoning to explain how some simple algorithms work, and to detect and correct errors in algorithms and programs.</p> <p>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.</p>	<p>National curriculum links</p> <p>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</p> <p>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</p> <p>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</p> <p>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.</p>
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Assessment	<p>Formative assessment</p> <p>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.</p> <p>Summative assessment</p> <p>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.</p>	<p>Formative assessment opportunities are provided throughout each of the lesson plan documents. For summative assessment, please see the assessment rubric document for this unit.</p>	<p>Please see the assessment rubric document for this unit.</p>	<p>Summative assessment</p> <p>Please see the assessment question and answer documents for this unit.</p>	<p>Formative assessment</p> <p>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</p> <p>Summative assessment</p> <p>Please see the assessment rubric document for this unit. We recommend the use of teacher accounts in Scratch to help with assessment throughout this unit. For guidance on setting up teacher accounts, please visit the Scratch website. (https://scratch.mit.edu/educators/faq)</p>	<p>Formative assessment</p> <p>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.</p> <p>Summative assessment</p> <p>See the assessment questions and solutions for this unit.</p> <p>We recommend the use of teacher and learner accounts in Scratch to help with assessment throughout this unit. For guidance on setting up teacher accounts, visit scratch.mit.edu/educators/faq. A teacher account enables you to manage learners’ accounts and organise projects into studios. If you are unable to use teacher and learner accounts, work can be saved offline to local devices.</p>
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Subject Knowledge	<p>Lesson 1: You will need an understanding of digital and non-digital devices. The key difference is that a digital device is capable of some processing, i.e. it has functions beyond being either on or off. You will also need to be familiar with the concept of input, process, output (IPO) which underpins all digital devices. There are cross-curricular links with maths for IPO which can be referenced during this lesson.</p>	Teachers will need to understand that animations are a series of still images stitched together to create a motion video. Animations can be created using on-screen or off-screen (flipbooks) images. Teachers need to understand how to create a simple flipbook (see lesson 1 for support) and how to use software to create an on-screen animation (support is provided in the lessons).	This unit focuses on desktop publishing.	This unit focuses on branching databases. A branching database is a collection of data organised in a tree structure using yes/no or true/false questions. In computer science, these are known as binary trees. In the final lesson of this unit, learners will begin to recognise that information can be presented in different ways. Teachers will need to be familiar with pictograms. A pictogram is a pictorial representation of information, usually used to present numerical data, such as common methods of transport amongst a group of people.	This unit focuses on developing learners' understanding of sequences in a new programming language. It highlights that the order of sequences is important. This unit also develops learners' understanding of design in programming, using the approach outlined below.	This unit focuses on the links between 'events' and 'actions' in programming, while also developing learners' understanding of sequencing. It highlights that events cause actions, and that the order of those actions can have an impact on the outcome of a program. This unit also further develops learners' understanding of design in programming, using the approach outlined below.
	<p>Lesson 2: You will need to be familiar with the inputs and outputs of a range of digital devices and you will need an understanding that devices can have one input which leads to several outputs (e.g. starting a video leads to outputs from the screen and the speaker) and that many inputs can lead to one output (e.g. using a mouse and keyboard to produce a document).</p>	Teachers will need to have an understanding of using their chosen software. Within the software, teachers will need to be aware of how to take images, 'onion skinning' (showing a part transparent photo to demonstrate the previous frame to make small movements more consistent), deleting frames and saving.	Enhance your subject knowledge to teach this unit through the following training opportunities:	Teachers will also need to be familiar with the term attributes. An attribute includes its name and a value. For example, a ball will have a colour which might be red. Colour is the attribute name, red is the attribute value. Learners may be familiar with the term property introduced in Year 1 – 'Grouping data'. Property and attribute are interchangeable; however, property has been used with younger children to make it more accessible.	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:	When programming, there are four levels that help to describe the stages of 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>Lesson 3: You will need to be familiar with your chosen digital paint program, including the draw, fill, edit and undo functions.</p>	Enhance your subject knowledge to teach this unit through the following training opportunities:	<p>Online training courses</p> <p>Raspberry Pi Foundation online training courses</p> <p>Face-to-face courses</p> <p>National Centre for Computing Education face-to-face training courses</p>		<ul style="list-style-type: none">● Task - what is needed● Design - what it should do● Code - how it is done● Running the code - what it does	<ul style="list-style-type: none">● Task — this is what is needed● Design — this is what it should do● Code — this is how it is done● Running the code — this is what it does
	<p>Lesson 4: You will need a basic understanding of how information (data) flows around a computer network, and how this benefits us. You will also need to know that a network switch manages the way in which data moves around a network.</p>	<p>Online training courses</p> <p>Raspberry Pi Foundation online training courses</p> <p>Face-to-face courses</p> <p>National Centre for Computing Education face-to-face training courses</p>		Throughout this unit, learners will use the online database tool j2data. You should be familiar with using the 'Branch' tool. Support with navigating the 'Branch' tool can be found at https://www.j2e.com/help/videos/datags3 . Teachers would also benefit from having an understanding of the 'Pictogram' tool. Support with navigating the 'Pictogram' tool can be found at https://www.j2e.com/help/videos/ks1datavideo1 .	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.	Spending time at the Task and Design levels before engaging in code writing aids learners in assessing the 'do-ability' of their programs and reduces a learner's cognitive load during programming.
	<p>Lesson 5: This lesson requires further knowledge of a simple school network. It introduces a server, which for the purposes of this lesson is defined as a location to store files (they can, and usually do, carry out more functions than this). It also introduces wireless access points, which send and receive wireless signals from wireless devices such as tablets or laptops. There is likely to be a</p>				Learners will move between the different levels throughout the unit and this is highlighted within each lesson plan.	Learners will move between the different levels throughout the unit. This is highlighted within each lesson plan.
					Enhance your subject knowledge to teach this unit through the following training opportunities:	Enhance your subject knowledge to teach this unit through the following training opportunities:
					<p>Online training courses</p> <p>Raspberry Pi Foundation online training courses</p>	<p>Online training courses</p> <p>Raspberry Pi Foundation online training courses</p>

	<p>wireless access point in most classrooms or communal areas in school. It will be connected to the network via a physical cable.</p> <p>Lesson 6: You will need to be familiar with how the main devices (network switch, server, wireless access point, router, printer/copier) on your school’s network are connected with one another and where the devices are located. You may wish to discuss this with the IT technician prior to the lesson.</p>			<p>Enhance your subject knowledge to teach this unit through the following training opportunities:</p> <p>Online training courses Raspberry Pi Foundation online training courses</p> <p>Face-to-face courses National Centre for Computing Education face-to-face training courses</p>		<p>Face-to-face courses National Centre for Computing Education face-to-face training courses</p>
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