



The Computing Curriculum Year 4

Year 4 – Autumn 1		Unit 1 – The Internet
National Curriculum Objectives:		
<ul style="list-style-type: none"> 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 		
Cross Curricular Links		
PSHE <ul style="list-style-type: none"> Evaluating content for honesty and accuracy Art <ul style="list-style-type: none"> To improve their mastery of art and design techniques, including drawing, painting, and sculpture with a range of materials 		
Unit Overview		
During this unit learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet and be given opportunities to explore the World Wide Web for themselves to learn about who owns content and what they can access, add, and create. Finally they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information.		
Previous Knowledge acquired - Technology		
Year 1	Year 2	Year 3
<ul style="list-style-type: none"> Know technology as something that helps us Know examples of technology in the classroom Know how these technology examples help us Know the names of the main parts of a computer Know how to switch on and log into a computer Know how to use a mouse to click and drag Know how to use a mouse to open a program Know how to click and drag to make objects on a screen Know how to use a mouse to create a picture Know what a keyboard is for Know how to type my name on a computer Know how to save my work to a file Know how to open my work from a file Know how to use the arrow keys to move the cursor Know how to delete letters Know rules to keep us safe and healthy when we are using technology in and beyond the home and give examples of some of these rules Know how we benefit from these rules 	<ul style="list-style-type: none"> Know examples of computers Know and describe some uses of computers Know that a computer is a part of information technology Know and explain the purpose of information technology in the home Know how to open a file Know how to move and resize images Know how to find examples of information technology Know and talk about uses of information technology Compare types of information technology Know how information technology is used in a shop Know that information technology can be connected Know and explain how information technology helps people 	<ul style="list-style-type: none"> Know that digital devices accept inputs. Know that digital devices produce outputs. Know how to follow a process. Know how to classify input and output devices. Know how to model a simple process. Know how to design a digital device. Know how I use digital devices for different activities. Know how to recognise similarities between using digital devices and non-digital tools. Know the differences between using digital devices and non-digital tools. Know how to recognise different connections. Know how messages are passed through multiple connections. Know why we need a network switch. Know that a computer network is made up of a number of devices. Know and can demonstrate how information can be passed between devices.

	<ul style="list-style-type: none"> • Know different uses of information technology • Know how to use information technology responsibly • Know how those rules/guides can help me • Identify the choices that I make when using information technology • Know and explain simple guidance for using information technology in different environments and settings 	<ul style="list-style-type: none"> • Know and can explain the role of a switch, server, and wireless access point in a network. • Know and can identify how devices in a network are connected with one another. • Know and can identify networked devices around me. • Know and can identify the benefits of computer networks.
--	--	--

Progression of knowledge throughout the Computing curriculum - TECHNOLOGY

Year 5	Year 6
<ul style="list-style-type: none"> • Know that systems are built using a number of parts • Know that a computer system features inputs, processes, and outputs • Know that computer systems communicate with other devices • Know tasks that are managed by computer systems • Know the human elements of a computer system • Know the benefits of a given computer system • Know that data is transferred using agreed methods • Know that networked digital devices have unique addresses • Know that data is transferred over networks in packets • Know that connected digital devices can allow us to access shared files stored online • Know how to send information over the internet in different ways • Know that the internet allows different media to be shared • Know and suggest strategies to ensure successful group work • Compare working online with working offline • Know different ways of working together online • Know that working together on the internet can be public or private • Know how the internet enables effective collaboration 	<ul style="list-style-type: none"> • Know how to complete a web search to find specific information • Know how to refine my search • Know how to compare results from different search engines • Know why we need tools to find things online • Know the role of web crawlers in creating an index • Know how to relate a search term to the search engine's index • Know that search results are ordered • Know that a search engine follows rules to rank relevant pages • Know some of the criteria that a search engine checks to decide on the order of results • Know some of the ways that search results can be influenced • Know some of the limitations of search engines • Know how search engines make money • Know the different ways in which people communicate • Know that there are a variety of ways of communicating over the internet • Know to choose methods of communication to suit particular purposes • Know how to compare different methods of communicating on the internet • Know when I should and should not share • Know that communication on the internet may not be private

Key knowledge acquired throughout this unit

- Know the internet is a network of networks
- Know how information is shared across the internet
- Know why a network needs protecting
- Know the different networked devices and how they connect
- Know how the internet allows us to view the World Wide Web
- Know that the World Wide Web is the part of the internet that contains websites and web pages
- Know the types of media that can be shared on the World Wide Web (WWW)
- Know where websites are stored when uploaded to the WWW
- Know how to access websites on the WWW

- Know how to create media which can be found on websites
- Know that I can add content to the WWW
- Know that new content can be created online
- Know that websites and their content are created by people
- Know who owns the content on websites
- Know that there are rules to protect content
- Know that not everything on the World Wide Web is true.
- Know why some information I find online may not be honest, accurate, or legal.
- Know why I need to think carefully before I share or reshare content

Subject knowledge and teacher guidance

Lesson 1:

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.

Lesson 2:

This lesson builds on Year 3, Computing systems and networks, in particular the parts of a network, covered in Lessons 4 and 5.

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):

https://www.youtube.com/watch?v=ewrBaIT_eBM

You will also need a clear understanding that the World Wide Web is part of the internet — this is explained in this video: <https://www.bbc.co.uk/newsround/47523993>

Lesson 3:

You will need an understanding of where websites are stored, this is also explained in 'A Packet's Tale' (a YouTube video): https://www.youtube.com/watch?v=ewrBaIT_eBM

Lesson 4:

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.

Lesson 5:

A knowledge of copyright and the reasons for it. A useful short summary is here: <https://www.gov.uk/copyright> and a useful guide to creative commons:

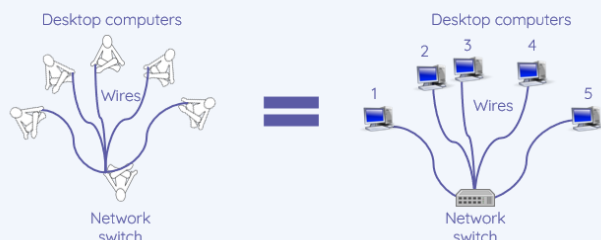
<https://creativecommons.org/licenses/>

Lesson 6

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.

A computer network



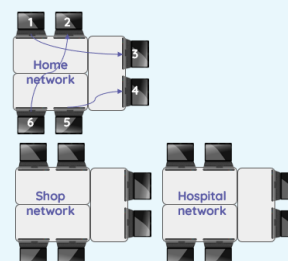
Networks recap

Information flows around networks.

Look at the piece of paper you have been given.

Write your network address on the 'from' line. This is your number@your table name e.g. 1@home

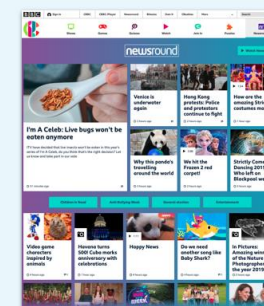
Pass your message to the person in the 'from' field.



Features of a website

Have a look for these features:

- A title
- Links to other websites/pages
- Videos
- Pictures
- Text



Subject specific vocabulary and definitions (Tier 3 vocabulary)

Browser

A program used to view, navigate, and interact with web pages

WWW	A service provided via the internet that allows access to web pages and other shared files.				
Website	A collection of interlinked web pages				
Web page	A HTML document viewed using a web browser				
Router	A device that manages the flow of data between computer networks				
Network	A group of interconnected computing devices				
Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To describe how networks physically connect to other networks	To recognise how networked devices make up the internet	To outline how websites can be shared via the World Wide Web	To describe how content can be added and accessed on the World Wide Web	To recognise how the content of the WWW is created by people	To evaluate the consequences of unreliable content

Year 4 – Autumn 2		Unit 2 – Audio Editing	
National Curriculum Objectives:			
<ul style="list-style-type: none">Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital contentSelect, 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 informationUse technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact			
Cross Curricular Links			
Science – Year 4			
<ul style="list-style-type: none">Sound: Find patterns between the volume of a sound and the strength of the vibrations that produced itSound: Recognise that sounds get fainter as the distance from the sound source increases			
English – Years 3 and 4			
<ul style="list-style-type: none">Writing – composition: Plan their writing by discussing and recording ideasWriting – draft and write by: In non-narrative material, using simple organisational devices [for example, headings and subheadings]Writing: 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			
Music – KS2			
<ul style="list-style-type: none">Improvise and compose music for a range of purposes using the interrelated dimensions of music			
Unit Overview			
In this unit, learners will initially examine devices capable of recording digital audio, which will include identifying the input device (microphone) and output devices (speaker or headphones) if available. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podcast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners will evaluate their work and give feedback to their peers.			
Previous Knowledge acquired – Digital Literacy			
Year 1	Year 2	Year 3	
<ul style="list-style-type: none">Know how to make marks on a screen and explain which tools were usedKnow how to draw lines on a screen and explain which tools were used.Know how to use paint tools to draw a picture.Know how to make marks with the square and line toolsKnow how to use shape and line tools effectively to recreate the work of an artistChoose appropriate shapesKnow how to make appropriate colour choicesKnow how to create a picture in the style of an artistKnow how to choose appropriate paint tools and colours to create the work of an artistKnow which tools were helpful and why	<ul style="list-style-type: none">Know what devices can be used to take photographsKnow how to take a photographKnow and explain what I did to capture a digital photoKnow the process of taking a good photographKnow how to take photos in both landscape and portrait formatKnow and explain why a photo looks better in portrait or landscape formatKnow what is wrong with a photographKnow how to take a good photographKnow that I can improve a photograph by retaking itKnow the effect that light has on a photoKnow to experiment with different light sourcesKnow and explain why a picture may be unclearKnow that images can be changed	<ul style="list-style-type: none">Know how to draw a sequence of picturesKnow how to create flip book—style animation.Know how an animation and flip book works.Know what an animation will look like.Know why little changes are needed for each frame.Know how to create and effective stop frame animation.Know how to break down a story into settings, characters and events.Know how to describe an animation that is achievable on screen.Know how to create a storyboard.Know how to use onion skinning to help me make small changes between frames.Know how to review a sequence of frames to check my work.Know how evaluate the quality of my animation.	

<ul style="list-style-type: none">• Know how to make dots of colour on the page• Know how to change the colour and brush size• Know how to use dots of colour to create a picture in the style of an artist on my own.	<ul style="list-style-type: none">• Know how to use a tool to achieve a desired effect• Know how to apply a range of photography skills to capture a photo• Know which photos have been changed• Know which photos are real and which have been changed	
Progression of knowledge throughout the Computing curriculum – Digital Literacy		
Year 5	Year 6	
<ul style="list-style-type: none">• Know that video is a visual media format• Know features of videos• Know how to compare features in different videos• Know and find features on a digital video recording device• Know how to experiment with different camera angles• Know how to make use of a microphone• Know and suggest filming techniques for a given purpose• Know how to capture video using a range of filming techniques• Know how to review how effective my video is• Know how to outline the scenes of my video• Know how to decide which filming techniques I will use• Know how to create and save video content• Know how to store, retrieve, and export my recording to a computer• Know how to improve a video by reshooting and editing• Know how to select the correct tools to make edits to my video• Know how to make edits to my video and improve the final outcome• Know that my choices when making a video will impact the quality of the final outcome• Know how to evaluate my video and share my opinions	<ul style="list-style-type: none">• Know how to explore a website• Know the different types of media used on websites• Know that websites are written in HTML• Know the common features of a web page• Know which media to include on my page• Know how to draw a web page layout that suits my purpose• Know why I should use copyright-free images• Know how to find copyright-free images• Know what is meant by the term ‘fair use’• Know how to add content to my own web page• Know how to preview what my web page looks like• Know to evaluate what my web page looks like on different devices and suggest/make edits.• Know what a navigation path is• Know why navigation paths are useful• Know how to make multiple web pages and link them using hyperlinks• Know the implication of linking to content owned by others• Know how to create hyperlinks to link to other people's work• Know to evaluate the user experience of a website	
Key skills acquired throughout this unit		
<ul style="list-style-type: none">• Know digital devices that can record sound and play it back• Know the inputs and outputs required to play audio or record sound• Know the range of sounds that can be recorded• Know how to use a device to record audio and play back sound• Know how to improve my recording• Know what other people include when recording sound for a podcast• Know how to plan and write the content for a podcast• Know why it is useful to be able to save digital recordings• Know how to save a digital recording as a file• Know how to open a digital recording from a file• Know ways in which audio recordings can be altered• Know how to edit sections of of an audio recording• Know sounds that other people combine		

- Know suitable sounds to include in a podcast
- Know how to use editing tools to arrange sections of audio
- Know that digital recordings need to be exported to share them
- Know the features of a digital recording I like
- Know and suggest improvements to a digital recording

Subject knowledge and teacher guidance

Lesson 1: 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.

Lesson 2: You will need to be familiar with using Audacity to record audio, which should include how to delete individual tracks.

Lesson 3: You will need to be familiar with using Audacity to record sound.

Lesson 4: You will need to be familiar with using Audacity to edit audio, including altering the volume and fading sections of audio in and out.

Lesson 5: You will need to be familiar with using the **Copy**, **Paste**, and **Time Shift** tools in Audacity.

Lesson 6: You will need to be familiar with using Audacity to export audio recordings.

Microphone, speakers, and headphones



What makes a good audio recording?

Which of these things did you come up with?

- Having a clear voice
- Avoiding filler words such as 'um' and 'ah'
- Not coughing or sneezing
- One person speaking at a time
- No background noise
- Not playing or fiddling with the microphone or digital device

Features of podcasts

What was discussed in the last lesson?

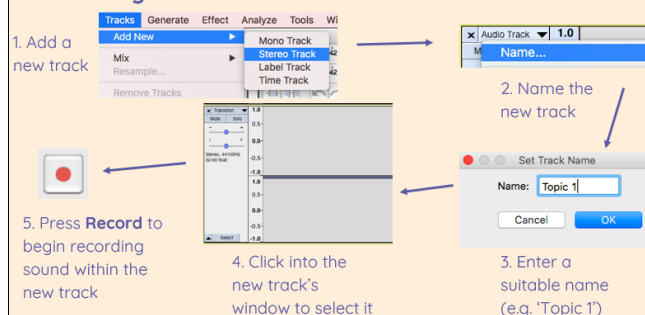
What sounds do you hear?

- Voices
- Jingles
- Sound effects
- Background music

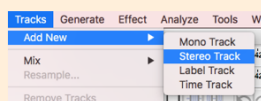
What information is included?

- The presenters' names
- The podcast name
- Introduction

Recording new tracks



Recording new tracks



A new track should be recorded for each part of your podcast (introduction, topic 1, transition, topic 2, and close).

Subject specific vocabulary and definitions (Tier 3 vocabulary)

Input	Data that is sent to a program to be processed
Output	The result of data processed by a computer

Input device	A piece of hardware used to control, or send data to, a computer
Output device	A piece of hardware that is controlled by outputs from a computer
Edit	Make a change
Podcast	Audio file that can downloaded and listened to on a computer

Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To identify that sound can be digitally recorded	To use a digital device to record sound	To explain that a digital recording is stored as a file	To explain that audio can be changed through editing	To show that different types of audio can be combined and played together	To evaluate editing choices made.

Year 4 – Spring 1		Unit 3 – Data Logging	
National Curriculum Objectives:			
<ul style="list-style-type: none">• Use sequence, selection, and repetition in programs; work with variables and various forms of input and output• 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			
Unit Overview			
<p>In this unit, pupils will consider how and why data is collected over time. Pupils will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Pupils will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer to review and analyse data. Towards the end of the unit, pupils will pose questions and then use data loggers to automatically collect the data needed to answer those questions.</p> <p>Note: Your school may not have the same data loggers as those used in this unit or may not have any data loggers at all. If you don't have access to data loggers, a lot of the activities can be completed using tablet computers and apps such as Google Science Journal. Whichever data logging solution you have available, you should be able to address the learning objectives in the unit.</p>			
Previous Knowledge acquired – Data Handling			
Year 1		Year 2	
<ul style="list-style-type: none">• Know how to describe objects using labels• Know how to match objects to groups• Know how to identify the label for a group of objects• Know how to count objects• Know how to group objects• Know how to count a group of objects• Know how to describe an object• Know how to describe a property of an object• Know how to find objects with similar properties• Know how to group similar objects• Know how to group objects in more than one way• Know how to count how many objects share a property• Know how to choose how to group objects• Know how to describe groups of objects• Know how to record how many objects are in a group• Know how to decide how to group objects to answer a question• Know how to compare groups of objects• Know how to record and share what I have found		<ul style="list-style-type: none">• Know how to record data in a tally chart• Know how to represent a tally count as a total• Know how to compare totals in a tally chart• Know how to enter data onto a computer• Know how to use a computer to view data in a different format• Know how to use pictograms to answer simple questions about objects• Know how to organise data in a tally chart• Know how to use a tally chart to create a pictogram• Know what the pictogram shows• Know how to tally objects using a common attribute• Know how to create a pictogram to arrange objects by an attribute• Know how to answer, 'more than'/'less than' and 'most/least' questions about an attribute• Know how to choose a suitable attribute to compare people• Know how to collect the data I need• Know how to create a pictogram and draw conclusions from it• Know how to use a computer program to present information in different ways• Know to share what I have found out using a computer• Know to give simple examples of why information should not be shared	
		Year 3	
		<ul style="list-style-type: none">• Know how to investigate questions with yes/no answers.• Know how to make up a yes/no question about a collection of objects.• Know how to create two groups of objects separated by one attribute.• Know select an attribute to separate objects into groups.• Know how to create a group of objects within an existing group.• Know how to arrange objects into a tree structure.• Know how to select objects to arrange in a branching database.• Know how to group objects using my own yes/no questions.• Know how my branching database works.• Know how to create yes/no questions using given attributes.• Know how to explain that questions need to be ordered carefully to split objects into similarly sized groups.• Know how to compare two branching database structures.• Know how to select a theme and choose a variety of objects.• Know how to create questions and apply them to a tree structure.• Know how to use my branching database to answer	

		<ul style="list-style-type: none">• questions.• Know how to explain what a pictogram tells me.• Know how to explain what a branching database tells me.• Know how to compare two ways of presenting information.
Progression of knowledge throughout the Computing curriculum – Data Handling		
Year 5	Year 6	
<ul style="list-style-type: none">• Know how to create multiple questions about the same field• Know how information can be recorded• Know how to order, sort, and group my data cards• Know how to navigate a flat-file database to compare different views of information• Know what a ‘field’ and a ‘record’ is in a database• Know which field to sort data by to answer a given question• Know how information can be grouped• Know how to group information to answer questions• Know how to combine grouping and sorting to answer more specific questions• Know which field and value are required to answer a given question• Know how ‘AND’ and ‘OR’ can be used to refine data selection• Know to choose multiple criteria to answer a given question• Know to an appropriate chart to visually compare data• Know to refine a chart by selecting a particular filter• Know the benefits of using a computer to create graphs• Know to ask questions that will need more than one field to answer• Know how to refine a search in a real-world context	<ul style="list-style-type: none">• Know and explain the relevance of data headings• Know how to answer questions from an existing data set• Know to ask simple relevant questions which can be answered using data• Know what an item of data is• Know how to apply an appropriate number format to a cell• Know how to build a data set in a spreadsheet application• Know and explain the relevance of a cell’s data type• Know how to construct a formula in a spreadsheet• Know that changing inputs changes outputs• Know that data can be calculated using different operations• Know how to create a formula which includes a range of cells• Know how to apply a formula to multiple cells by duplicating it• Know how to use a spreadsheet to answer questions• Know and explain why data should be organised• Know and apply a formula to calculate the data I need to answer questions• Know how to produce a graph• Know how to use a graph to show the answer to questions• Know when to use a table or graph	
Key skills acquired throughout this unit		
<ul style="list-style-type: none">• Know how to choose a data set to answer a given question• Know how to suggest questions that can be answered using a given data set• Know that data gathered over time can be used to answer questions• Know data that can be gathered over time• Know that sensors are input devices• Know how to use data from a sensor to answer a given question• Know that data from sensors can be recorded• Know a suitable place to collect data• Know the intervals used to collect data• Know and talk about the data that I have captured• Know how to import a data set• Know how to use a computer to view data in different ways• Know how to use a computer program to sort data		

- Know to propose a question that can be answered using logged data
- Know to plan how to collect data using a data logger
- Know how to use a data logger to collect data
- Know how to interpret data that has been collected using a data logger
- Know to draw conclusions from the data that I have collected
- Know and explain the benefits of using a data logger

Subject knowledge and teacher guidance

This unit focuses on using technology to automatically gather environmental data over time. It refers to data points and logging intervals.

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.

You should be aware that input devices allow data to be entered into a computer. Keyboards, mice, and microphones are all input devices.

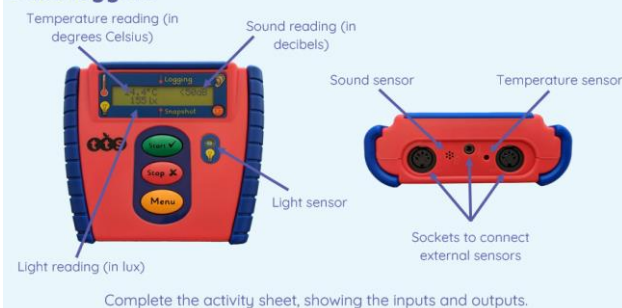
A sensor is a type of input designed to allow computers to capture data from the physical environment. Sensors can be connected to a computer to capture data about temperature, light, sound, humidity, pressure, etc. A microphone can be used to record audio into a computer, or it can be used as a sound sensor.

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.

Data gathered over time



Data loggers



Downloading data from the logger

1. Connect the data logger to the computer
2. Load Logbook Graphing
3. In Logbook Graphing, click on **Logger Files**
4. Click on the last recorded date
5. Click on **Download**

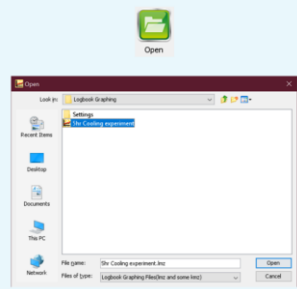
The data will download and the graphs screen will be shown.



Importing data

To open the data file on your computer:

1. Open the data logging software
2. Click on **Open**
3. Navigate to the file and select it
4. Click on **Open**



Subject specific vocabulary and definitions (Tier 3 vocabulary)

Stored (data)

Data kept digitally so that it can be accessed by a computer

Data	A letter, word, number etc. that has been collected for a purpose, but stored without context				
Input	Data that is sent to a program to be processed				
Output	The result of data processed by a computer				
Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To explain that data gathered over time can be used to answer questions	To use a digital device to collect data automatically	To explain that a data logger collects 'data points' from sensors over time	To use data collected over a long duration to find information	To identify the data needed to answer questions	To use collected data to answer questions

Year 4 – Spring 2		Unit 4 – Photo editing	
National Curriculum Objectives:			
<ul style="list-style-type: none">• 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			
Unit Overview			
In this unit, learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices.			
Previous Knowledge acquired – Digital Literacy			
Year 1		Year 2	
<ul style="list-style-type: none">• Know how to open a word processor• Know keys on a keyboard• Know how to enter text into a computer• Know how to use letter, number, and space keys• Know how to use backspace to remove text• Know how to type capital letters• Know where the toolbar is and use bold, italic, and underline• Know how to select a word by double-clicking• Know how to select all of the text by clicking and dragging• Know how to change the font• Know and say what tool I used to change the text• Know if my changes have improved my writing• Know how to use ‘undo’ to remove changes• Know how to write a message on a computer and on paper• Compare using a computer with using a pencil and paper• Know which method I like best		<ul style="list-style-type: none">• Know and identify simple differences in pieces of music• Know to listen with concentration to a range of music (links to the Music curriculum)• Know how music makes me feel, e.g. happy or sad• Know how to create a rhythm pattern• Know how to play an instrument following a rhythm pattern• Know how to explain that music is created and played by humans• Know how to connect images with sounds• Know how to use a computer to experiment with pitch and duration• Know to relate an idea to a piece of music• Know that music is a sequence of notes• Know how to use a computer to create a musical pattern using three notes• Know how to describe an animal using sounds• Know to explain my choices• Know how to save my work• Know to refine my musical pattern on a computer• Know how to reopen my work• Know to explain how I made my work better• Know to listen to music and describe how it makes me feel	
		Year 3	
		<ul style="list-style-type: none">• Know the difference between text and images.• Know that text and images can communicate messages clearly.• Know I can identify the advantages and disadvantages of using text and images.• Know how to change font style, size, and colours for a given purpose.• Know how to edit text.• Know how to explain that text can be changed to communicate more clearly.• Know and can explain what ‘page orientation’ means.• Know how to recognise placeholders and say why they are important.• Know how to create a template for a particular purpose• Know how to add content to a desktop publishing publication.• Know how to choose the best locations for my content.• Know how to paste text and images to create a magazine cover.• Know how to make changes to content after I’ve added it.• Know how different layouts can suit different purposes• Know how to identify different layouts.• Know how to match a layout to a purpose.• Know how to choose a suitable layout for a given purpose.• Know the benefits of desktop publishing• Know how to identify the uses of desktop publishing in the real world.• Know how to say why desktop publishing might be	

		<ul style="list-style-type: none">helpful.Know how to compare work made on desktop publishing to work created by hand.
Progression of knowledge throughout the Computing curriculum – Digital literacy		
Year 5	Year 6	
<ul style="list-style-type: none">Know that vector drawings are made using shapesKnow how to experiment with the shape and line toolsKnow how vector drawings are different from paper-based drawingsKnow the shapes used to make a vector drawingKnow that each element added to a vector drawing is an objectKnow how to move, resize, and rotate objects I have duplicatedKnow how to use the zoom tool to help me add detail to my drawingsKnow how alignment grids and resize handles can be used to improve consistencyKnow how to modify objects to create a new imageKnow that each added object creates a new layer in the drawingKnow how to change the order of layers in a vector drawingKnow how to use layering to create an imageKnow how to copy part of a drawing by duplicating several objectsKnow how to recognise when I need to group and ungroup objectsKnow how to reuse a group of objects to further develop my vector drawingKnow how to create a vector drawing for a specific purposeKnow to reflect on the skills I have used and why I have used themKnow how to compare vector drawings to freehand paint drawings	<ul style="list-style-type: none">Know the similarities and differences between 2D and 3D shapesKnow why we might represent 3D objects on a computerKnow how to select, move, and delete a digital 3D shapeKnow how graphical objects can be modifiedKnow how to resize a 3D objectKnow how to change the colour of a 3D objectKnow how to rotate a 3D objectKnow how to position 3D objects in relation to each otherKnow how to select and duplicate multiple 3D objectsKnow how to identify the 3D shapes needed to create a model of a real-world objectKnow how to create digital 3D objects of an appropriate sizeKnow how to group a digital 3D shape and a placeholder to create a hole in an objectKnow to plan my 3D modelKnow which 3D objects I need to construct my modelKnow how to modify multiple 3D objectsKnow how my model can be improvedKnow to modify my model to improve itKnow to evaluate my model against a given criterion	
Key skills acquired throughout this unit		
<ul style="list-style-type: none">I can identify changes that we can make to an imageI can explore how images can be changed in real lifeI can explain the effect that editing can have on an imageI can explain what has changed in an edited imageI can change the composition of an image by selecting parts of itI can consider why someone might want to change the composition of an imageI can talk about changes made to imagesI can choose effects to make my image fit a scenarioI can explain why my choices fit a scenarioI can identify how an image has been retouchedI can give examples of positive and negative effects that retouching can have on an image		

- I can choose appropriate tools to retouch an image
- I can sort images into 'fake' or 'real' and explain my choices
- I can combine parts of images to create new images
- I can talk about fake images around me
- I can consider the effect of adding other elements to my work
- I can compare the original image with my completed publication
- I can evaluate the impact of my publication on others through feedback

Subject knowledge and teacher guidance

All lessons

- 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 www.getpaint.net/doc/latest/index.html.
- You should consider how the learners will access the editor. For example, you may wish to create a shortcut to the program for them.

Lesson 1

- You will need to be familiar with the effect that cropping can have on an image. You can find more information at www.dpreview.com/forums/post/56318241.

Lesson 2

- You will need to know how to search for and save an image from pixabay.com.
- You will need to be familiar with how to combine parts of two images in your chosen image editor.

Lesson 3

- You will need to be familiar with how to make image adjustments and change effects in paint.net or your chosen image editor.

Lesson 4

- 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': www.getpaint.net/doc/latest/CloneStamp.html
 - The 'recolor' tool: www.getpaint.net/doc/latest/RecolorTool.html
 - The 'magic wand' tool: www.getpaint.net/doc/latest/MagicWand.html

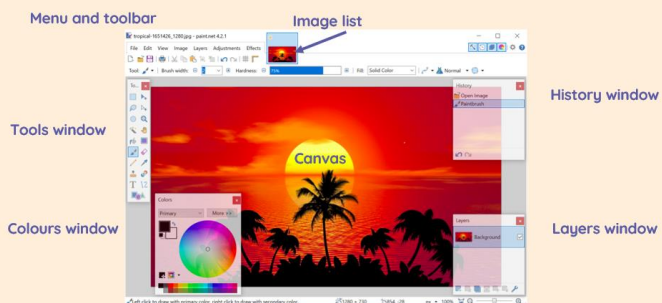
Lesson 5

- 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 www.getpaint.net/doc/latest/LassoSelectionTool.html.

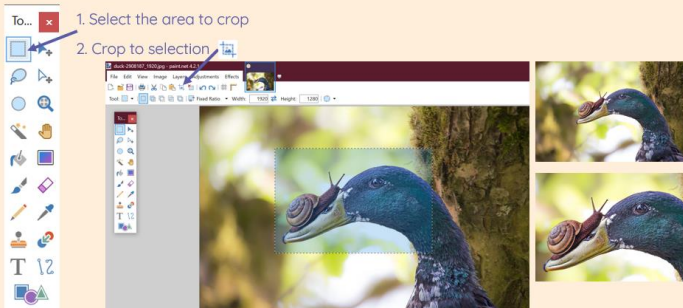
Lesson 6

- 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 www.getpaint.net/doc/latest/TextShapeTools.html.

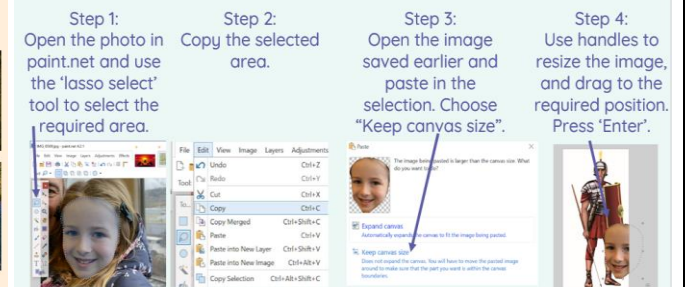
Introduction to the paint.net image editor



Editing images by cropping in paint.net



Use paint.net to change your image composition



Editing image colours and effects

Original Black and white Brightness and contrast

Hue and saturation Sepia Vignette

Retouching an image in paint.net

Clone stamp: copies pixels from one part of an image to another

Recolor: used for replacing colours

Magic wand: allows areas of a similar colour to be selected

Colour **adjustments** can also be used for making images look more appealing

Can you use paint.net to make an image of a fruit look more appealing?

Subject specific vocabulary and definitions (Tier 3 vocabulary)					
Retouched	Improving a photograph by editing parts of it				
Edit	Make a change				
Composition	The way in which a photograph has been put together				
Fake images	Images that are not real. They have been edited in a way to make them look real.				
Hue	Colour				
Saturation	Removing or adding colour to a photograph				
Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To explain that digital images can be changed	To change the composition of an image	To describe how images can be changed for different uses	To make good choices when selecting different tools	To recognise that not all images are real	To evaluate how changes can improve an image

Year 4 – Summer 1		Unit 5 – Repetition in Shapes	
National Curriculum Objectives:			
<ul style="list-style-type: none">Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts			
Unit Overview			
Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming			
There are two Year 4 programming units: <ul style="list-style-type: none">Programming A – Repetition in shapesProgramming B – Repetition in games This is unit A, which should be delivered before unit B.			
You can use either a tablet, desktop or laptop computer for this unit. Logo software should be installed or accessible online, for example: <ul style="list-style-type: none">You can use Turtle Academy online at turtleacademy.com/playgroundYou can download FMSLogo from fmslogo.sourceforge.net Note: The activities will be easier to complete on a laptop or desktop computer as there is more screen area available.			
Previous Knowledge acquired – Programming A			
Year 1		Year 2	
<ul style="list-style-type: none">I can predict the outcome of a command on a deviceKnow how to match a command to an outcomeKnow how to run a command on a deviceKnow how to follow an instructionKnow how to recall words that can be acted outKnow how to give directionsKnow how to compare forwards and backwards movementsKnow to start a sequence from the same placeI can predict the outcome of a sequence involving forwards and backwards commandsKnow to compare left and right turnsKnow how to experiment with turn and move commands to move a robotI can predict the outcome of a sequence involving up to four commandsKnow how to what my program should doKnow how to choose the order of commands in a sequenceKnow how to debug my programKnow to identify several possible solutionsKnow how to plan two programsKnow how to use two different programs to get to the same place		<ul style="list-style-type: none">I can predict the outcome of a command on a deviceKnow how to match a command to an outcomeKnow how to run a command on a deviceKnow how to follow an instructionKnow how to recall words that can be acted outKnow how to give directionsKnow how to compare forwards and backwards movementsKnow to start a sequence from the same placeI can predict the outcome of a sequence involving forwards and backwards commandsKnow to compare left and right turnsKnow how to experiment with turn and move commands to move a robotI can predict the outcome of a sequence involving up to four commandsKnow how to what my program should doKnow how to choose the order of commands in a sequenceKnow how to debug my program	
		Year 3	
		<ul style="list-style-type: none">Know all the objects in a Scratch project (sprites, backdrops)Know that objects in Scratch have attributes (linked to)Know that commands in Scratch are represented as blocksKnow that each sprite is controlled by the commands I chooseKnow a word which describes an on-screen action for my designKnow how to create a program following a designKnow how to start a program in different waysKnow how to create a sequence of connected commandsKnow how to explain that the objects in my project will respond exactly to the codeKnow how to explain what a sequence isKnow how to combine sound commandsKnow how to order notes into a sequenceKnow how to build a sequence of commandsKnow how to decide the actions for each sprite in a program	

	<ul style="list-style-type: none">• Know to identify several possible solutions• Know how to plan two programs• Know how to use two different programs to get to the same place	<ul style="list-style-type: none">• Know how to make design choices for my artwork• Know the names of the objects I will need for a project• Know how to relate a task description to a design• Know how to implement my algorithm as code
Progression of knowledge throughout the Computing curriculum – Programming A		
Year 5	Year 6	
<ul style="list-style-type: none">• Know how to build a simple circuit to connect a microcontroller to a computer• Know how to program a microcontroller to light an LED• Know and explain why I used an infinite loop• Know how to connect more than one output device to a microcontroller• Know how to design sequences for given output devices• Know which output devices I control with a count-controlled loop• Know that a condition is something that can be either true or false (eg whether a value is more than 10, or whether a button has been pressed)• Know to experiment with a ‘do until’ loop• Know how to program a microcontroller to respond to an input• Know that a condition being met can start an action• Know how to identify a condition and an action in my project• Know how to use selection (an ‘if... then...’ statement) to direct the flow of a program• Know how to identify a condition to start an action (real world)• Know and describe what my project will do (the task)• Know how to create a detailed drawing of my project• Know how to write an algorithm to control lights and a motor• Know to use selection to produce an intended outcome• Know how to test and debug my project	<ul style="list-style-type: none">• Know examples of information that is variable• Know that the way that a variable changes can be defined• Know that variables can hold numbers or letters• Know to identify a program variable as a placeholder in memory for a single value• Know that a variable has a name and a value• Know that the value of a variable can be changed• Know where in a program to change a variable• Know to make use of an event in a program to set a variable• Know that the value of a variable can be used by a program• Know how to choose the artwork for my project• Know to explain my design choices• Know how to create algorithms for my project• Know how to create the artwork for my project• Know to choose a name that identifies the role of a variable• Know how to test the code that I have written• Know ways that my game could be improved• Know how to extend my game further using more variables• Know how to share my game with others	
Key knowledge acquired throughout this unit		
<ul style="list-style-type: none">• Know how to program a computer by typing commands• Know the effect of changing a value of a command• Know how to create a code snippet for a given purpose• Know how to use a template to draw what I want my program to do• Know how to write an algorithm to produce a given outcome• Know how to test my algorithm in a text-based language• Know examples of repetition in everyday tasks• Know how to identify patterns in a sequence• Know how to use a count-controlled loop to produce a given outcome• Know the effect of changing the number of times a task is repeated• Know to predict the outcome of a program containing a count-controlled loop		

- Know how to choose which values to change in a loop
- Know where there are 'chunks' of actions in the real world
- Know how to use a procedure in a program
- Know that a computer can repeatedly call a procedure
- Know how to design a program that includes count-controlled loops

Teacher subject knowledge and guidance

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.

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'.

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.

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.

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.

Glossary of Logo commands

FD — forwards. FD is always followed by a space and then a number of steps, eg FD 50

BK — backwards. BK is always followed by a space and then a number of steps, eg BK 50

LT — left. LT is always followed by a space and then a number of degrees to turn, eg LT 90

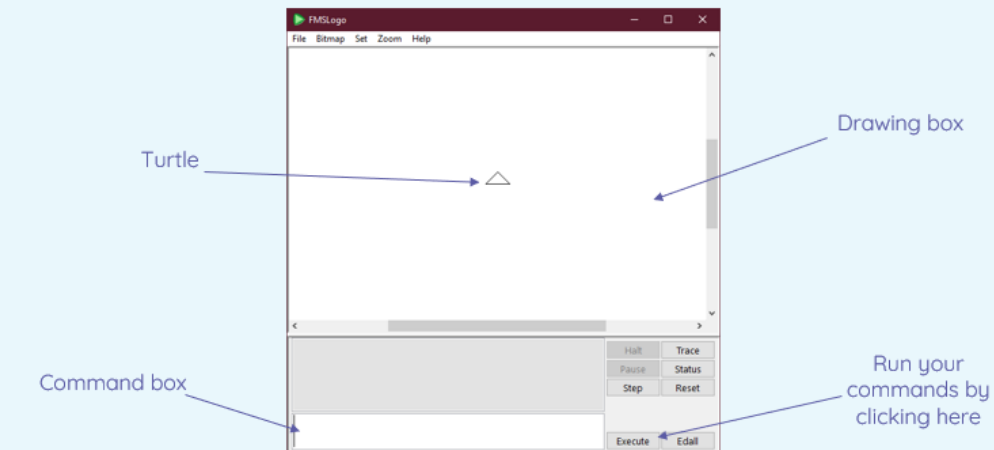
RT — right. RT is always followed by a space and then a number of degrees to turn, eg RT 90

CS — clear screen. This command clears any pen marks on your screen and gets the turtle back to the home position in the centre of the screen.

PU — pen up. This command will stop the turtle from leaving a pen trail. It is not followed by any numbers.

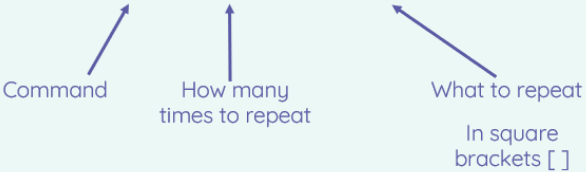
PD — pen down. This command will make the turtle start leaving a pen trail again, so it needs to be used before you want to draw. It is not followed by any numbers.

The Logo interface

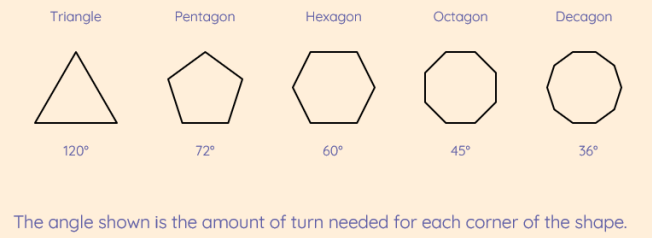


Using the repeat command in a count-controlled loop

```
REPEAT 4 [FD 100 RT 90]
```



Turns in Logo



Subject specific vocabulary and definitions (Tier 3 vocabulary)

Program	A set of ordered commands that can be run by a computer to complete a task
Count controlled loop	A command that repeatedly runs a defined section of code a predefined number of times
Command	A single instruction that can be used in a program to control a computer
Code	The commands that a computer can run
Algorithm	A precise set of ordered steps that can be followed by a human or a computer to achieve a task
Debug	The process of finding and correcting errors in a program

Medium Term Planning

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To identify that accuracy in programming is important	To create a program in a text-based language	To explain what ‘repeat’ means	To modify a count-controlled loop to produce a given outcome	To decompose a task into small steps	To create a program that uses count-controlled loops to produce a given outcome

Year 4 – Summer 2		Unit 6 – Repetition in Games	
National Curriculum Objectives:			
<ul style="list-style-type: none">Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller partsUse sequence, selection, and repetition in programs; work with variables and various forms of input and outputUse logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programsSelect, 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			
Unit Overview			
<p>Learners will explore the concept of repetition in programming using the Scratch environment. The unit begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.</p> <p>There are two Year 4 programming units:</p> <ul style="list-style-type: none">Programming A — Repetition in shapesProgramming B — Repetition in games <p>This is unit B, which should be delivered after unit A.</p> <p>It is recommended that learners use desktop or laptop computers to access Scratch (scratch.mit.edu). We recommend the use of teacher accounts in Scratch to make it easier to manage student accounts. For guidance on setting up teacher accounts, please visit the Scratch website. (https://scratch.mit.edu/educators/faq)</p> <p>Throughout this unit, there are opportunities to model within Scratch or to demonstrate a concept through a video. Pedagogically, it is more beneficial to model the concepts to the learners, which allows for easier questioning and understanding. We recommend that you use the videos to see what needs to be modelled, but give a live demonstration within the lesson. However, the videos are provided on the slides if you wish to use them instead.</p>			
Previous Knowledge acquired – Programming B			
Year 1	Year 2	Year 3	
<ul style="list-style-type: none">I can predict the outcome of a command on a deviceKnow how to match a command to an outcomeKnow how to run a command on a deviceKnow how to follow an instructionKnow how to recall words that can be acted outKnow how to give directionsKnow how to compare forwards and backwards movementsKnow to start a sequence from the same placeI can predict the outcome of a sequence involving forwards and backwards commandsKnow to compare left and right turnsKnow how to experiment with turn and move commands to move a robotI can predict the outcome of a sequence involving up to four commandsKnow how to what my program should doKnow how to choose the order of commands in a sequenceKnow how to debug my programKnow to identify several possible solutionsKnow how to plan two programs	<ul style="list-style-type: none">Know where the start of a sequence isKnow that a program needs to be startedKnow how to run my programKnow to predict the outcome of a sequence of commandsKnow how to match two sequences with the same outcomeKnow how to change the outcome of a sequence of commandsKnow how to work out the actions of a sprite in an algorithmKnow which blocks to use to meet the designKnow how to build the sequences of blocks I needKnow how to choose backgrounds for the designKnow how to choose characters for the designKnow how to create a program based on the new designKnow how to choose the images for my own designKnow how to create an algorithmKnow how to build sequences of blocks to match my	<ul style="list-style-type: none">Know the relationship between an event and an actionKnow which keys to use for actions and explain my choicesKnow a way to improve a programKnow a suitable size for a character in a mazeKnow how to program movementKnow how to use a programming extensionKnow to consider the real world when making design choicesKnow which blocks to use to set up my programKnow additional features (from a given set of blocks)Know suitable keys to turn on additional featuresKnow how to build more sequences of commands to make my design workKnow how to test a program against a given designKnow how to match a piece of code to an outcomeKnow how to modify a program using a designKnow to make design choices and justify themKnow how to implement my designKnow to evaluate my project	

<ul style="list-style-type: none">Know how to use two different programs to get to the same place	<ul style="list-style-type: none">designKnow how to compare my project to my designKnow how to improve my project by adding featuresKnow how to debug	
Progression of knowledge throughout the Computing curriculum – Programming B		
Year 5	Year 6	
<ul style="list-style-type: none">Know how conditions are used in selectionKnow how to identify conditions in a programKnow how to modify a condition in a programKnow how to use selection in an infinite loop to check a conditionKnow to identify the condition and outcomes in an ‘if... then... else...’ statementKnow how to create a program with different outcomes using selectionKnow that program flow can branch according to a conditionKnow how to design the flow of a program which contains ‘if... then... else...’Know that a condition can direct program flow in one of two waysKnow how to outline a given taskKnow how to use a design format to outline my projectKnow how to identify the outcome of user input in an algorithmKnow how to implement my algorithm to create the first section of my programKnow how to test my programKnow how to share my program with othersKnow to identify ways the program could be improvedKnow how to identify the setup code I need in my programKnow how to extend my program further	<ul style="list-style-type: none">Know how to apply my knowledge of programming to a new environmentKnow how to test my program on an emulatorKnow how to transfer my program to a controllable deviceKnow how to identify examples of conditions in the real worldKnow to use a variable in an if, then, else statement to select the flow of a programKnow how to determine the flow of a program using selectionKnow to use a condition to change a variableKnow how to experiment with different physical inputsKnow that if you read a variable, the value remainsKnow the importance of the order of conditions in else, if statementsKnow how to use an operand (e.g. <>=) in an if, then statementKnow how to modify a program to achieve a different outcomeKnow what variables to include in a projectKnow how to design the algorithm for my projectKnow how to design the program flow for my projectKnow how to create a program based on my designKnow how to test my program against my designKnow to use a range of approaches to find and fix bugs	
Key knowledge acquired throughout this unit		
<ul style="list-style-type: none">Know an everyday task as a set of instructions including repetitionKnow to predict the outcome of a snippet of codeKnow how to modify a snippet of code to create a given outcomeKnow how to modify loops to produce a given outcomeKnow when to use a count-controlled and an infinite loopKnow that some programming languages enable more than one process to be run at onceKnow which action will be repeated for each objectKnow what the outcome of the repeated action should beKnow to evaluate the effectiveness of the repeated sequences used in my programKnow which parts of a loop can be changedKnow the effect of my changesKnow to re-use existing code snippets on new spritesKnow to evaluate the use of repetition in a project		
Teacher subject knowledge and guidance		

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'). This unit also develops learners' understanding of design in programming, using the approach outlined below.

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:

- Task - what is needed
- Design - what it should do
- Code - how it is done
- Running the code - what it does

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.

What similarities can you see in these code snippets?

Logo code

```
repeat 4 [fd 50 rt 90]
```

Scratch code

Infinite loops in programming

Programmers can use an 'infinite loop'.

In an infinite loop, commands are repeated over and over again, without an end point. In Scratch, this is called the **repeat forever** block.

In this example, the sprite will keep changing to the next costume continually. This means it will keep changing the way it looks.

Subject specific vocabulary and definitions (Tier 3 vocabulary)					
Count controlled loop	A command that repeatedly runs a defined section of code a predefined number of times				
Infinite loop	A command that repeatedly runs a defined section of code indefinitely				
Repetition	Part of a program where one or more commands are run multiple times in a loop				
Value	Number or amount				
Loop	Commands that repeatedly run a defined section of code				
Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To develop the use of count-controlled loops in a different programming environment	To explain that in programming there are infinite loops and count-controlled loops	To develop a design that includes two or more loops which run at the same time	To modify an infinite loop in a given program	To design a project that includes repetition	To create a project that includes repetition