



Key Knowledge

Overview

Overview









Audio Editing

- You should already know that audio means sound, including music, sound effects, and podcasts.
- The process of recording and listening to sound requires input devices (e.g. a microphone) and output devices (e.g. a speaker).
- Podcasts are a type of spoken word audio file, that can be downloaded by listeners.
- People can have ownership over audio files, and can have the audio copyrighted, so that it can't be copied without permission.

Input and Output Devices

We use input devices to send the audio to the device/ computer.
We use output devices to listen to the audio from the device/ computer.


Input Devices	Output Devices
 <p><u>Microphones</u> are input devices that change sound into electrical signals, which can then be recorded or transmitted.</p>	 <p><u>Digital speakers</u> turn the electrical signal into an audio output that can be heard by the listener.</p>
 <p>With the help of special cables, <u>musical instruments</u> can be linked to computers, and become input devices.</p>	 <p><u>Headphones</u> are worn over the ears of the listener, so that only they can hear the sound output.</p>
<div style="display: flex; align-items: center;">  <p>Some devices are capable of acting as both input and output devices. Examples include headsets, smartphones, and voice assistants (e.g. Google Home and Amazon Echo).</p> </div>	

Key Vocabulary

Spelling	Definition/Sentence
Audio	Sound, including music, sound effects and podcasts
podcasts	A spoken word file that can be downloaded for listeners
input	A device to send audio to the device/computer
output	A device to listen to audio from the device/computer
microphone	An input device that change sounds into electrical signals

Using Software


Audacity is one example of an audio editing tool, but many others are available. For example, you can use the voice memo recorder on a tablet.



↑ Pause Play Stop Skip to start Skip to end Record

How to Record a New Track

1. Go to the tab 'Tracks' and then 'Add New.'
2. Name the new track
3. Click in the track's window to select it.
4. Press record to begin recording into the new track.



The sound is shown as a waveform. We should aim for it to peak at around 0.5/-0.5

Got to the 'file' tab and 'Save Project' to save your work. You can also delete recordings, but you should only ever delete your own files!

Creating Podcasts


Podcasts are a type of spoken word file that can be downloaded by listeners. A user can often choose to download the whole series of podcasts.

Some examples of podcasts are 'Stories Podcast', 'Six Minutes' and 'Brains On! Kids Science Podcast.'

Features of podcasts include:

Sounds: Voices, jingles, background music, sound effects

Information: Presenters' names, name of podcast, introduction, main section, conclusion.



Top Tips for High-Quality Podcasts

- Speak clearly
- Avoid fillers ('um', 'like')
- Avoid coughing/ sneezing
- Take turns to speak
- Avoid background noise
- Don't touch the microphone
- Choose music carefully



Year 4 Audio Editing

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.

Lesson	Brief overview	Learning objectives
1. Digital recording	In this lesson, learners will familiarise themselves with digital devices capable of recording sound and/or playing audio. Learners will identify devices' inputs (microphone) and outputs (headphones or speakers). Learners will consider ownership and copyright issues relating to the recording of audio.	<ul style="list-style-type: none">• To identify that sound can be digitally recorded:• I can identify digital devices that can record sound and play it back• I can identify the inputs and outputs required to play audio or record sound• I can recognise the range of sounds that can be recorded
2. Recording sound	In this lesson, learners will record their own sounds and play back the recorded audio. They will also listen to a range of podcasts and identify the features of a podcast.	<ul style="list-style-type: none">• To use a digital device to record sound:• I can use a device to record audio and play back sound• I can suggest how to improve my recording• I can discuss what other people include when recording sound for a podcast
3. Creating a podcast	In this lesson, learners will plan and begin recording their own podcast. They will also discuss the importance of saving their work and save their recordings as a file. Note: Due to the amount of time required to plan the podcast content, the written parts of the planning template could be completed in a different subject's lesson (e.g. English, or a subject related to the podcast content).	<ul style="list-style-type: none">• To explain that a digital recording is stored as a file:• I can plan and write the content for a podcast• I can discuss why it is useful to be able to save digital recordings• I can save a digital recording as a file
4. Editing digital recordings	In this lesson, learners will open their existing work and continue recording their podcast content. Learners will also edit their recordings, for example by changing the volume of the recording or making the recording fade in or out.	<ul style="list-style-type: none">• To explain that audio can be changed through editing:• I can open a digital recording from a file• I can discuss ways in which audio recordings can be altered• I can edit sections of of an audio recording
5. Combining audio	In this lesson, learners will record additional content for their podcast, such as sound effects or background music. The audio will be combined, or mixed, with their existing digital recordings and exported as an audio file.	<ul style="list-style-type: none">• To show that different types of audio can be combined and played together:• I can discuss sounds that other people combine• I can choose suitable sounds to include in a podcast• I can use editing tools to arrange sections of audio
6. Evaluating podcasts	In this lesson, learners will export their digital recordings so that they can be listened to on a range of digital devices. Learners will give feedback on their own and their peers' podcasts, including areas for improvement.	<ul style="list-style-type: none">• To evaluate editing choices made:• I can explain that digital recordings need to be exported to share them• I can discuss the features of a digital recording I like• I can suggest improvements to a digital recording

Key Knowledge

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Data Logging



- Data is raw numbers and figures. Information is what we can understand from analysing data.
- There are lots of different ways that we can collect, log and interpret data, including by using data loggers.
- Data loggers and logging software can be used to automatically capture data. We can then draw conclusions in answer to our research questions.

Data Recording

Data Recording

-One way for us to record data is by writing it down. Some data loggers can also record data themselves, which we can download later. Computers can also help us to record data, e.g. by connecting our data loggers to computers and opening data logging software.

-An advantage of this is that computers can record data automatically, meaning that someone does not need to sit waiting for a long period of time. Data loggers can be set to measure at different intervals (points in time).

-Data logger software can also be used to show different charts and graphs. This can save the user a lot of time!



Key Vocabulary

Spelling	Definition/Sentence
data	Data is raw numbers or figures
data logger	A device used to collect data
sensor	A device that responds to a physical stimulus (such as heat, light, sound, pressure, magnetism, or a particular motion)

Data Collection

Asking Questions: Data gathered over time can be used to answer important questions. For example, the class register can be used to answer questions about children's attendance. Before collecting data, we need to carefully consider which questions we are trying to answer.

	ABSENCE	LATE	PRESENT
Lee	■	■	■
Amelia	■	■	■
Sam	■	■	■
Patrick	■	■	■
Frank	■	■	■
Mark	■	■	■
Oliver	■	■	■
Oliver D	■	■	■

-Sensors: Our senses (sight, hearing, smell, taste, touch) detect things in our environment. Computers have input device sensors which help them to sense things.

Some examples are:

- Microphones (sound)
- Camera (light)
- Touchscreen (touch)



- Data Loggers: Data loggers have sensors built into them. They can be used to detect and record data. Data loggers often contain:

- A heat sensor (to record the temperature)
- A light sensor (to record brightness)
- A sound sensor (to record the noise).





Year 4 Data Logging

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

Lesson	Brief overview	Learning objectives
1 Answering questions	This lesson will set the scene for the unit of work. Pupils will consider what data can be collected and how it is collected. They will think about data being collected over time. Pupils will also think about questions that can and can't be answered using available data and reflect on the importance of collecting the right data to answer questions. Later in the unit, pupils will put into practice the ideas that they have thought about in this lesson.	<ul style="list-style-type: none">• To explain that data gathered over time can be used to answer questions• I can choose a data set to answer a given question• I can suggest questions that can be answered using a given data set• I can identify data that can be gathered over time
2 Data collection	This lesson will build on the idea of collecting data over time and introduce the idea of collecting data automatically using computers. Computers can capture data from the physical world using input devices called 'sensors. Sensors can be connected to data loggers, which can collect data while not attached to a computer. Data collected by a data logger can be downloaded for use later.	<ul style="list-style-type: none">• To use a digital device to collect data automatically• I can explain that sensors are input devices• I can use data from a sensor to answer a given question• I can identify that data from sensors can be recorded
3 Logging	In this lesson, pupils will explore how data loggers' work. Pupils will try recording data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals. Pupils will use data loggers independently from a computer, then they will connect the loggers to a computer and download the data.	<ul style="list-style-type: none">• To explain that a data logger collects 'data points' from sensors over time• I can identify a suitable place to collect data• I can identify the intervals used to collect data• I can talk about the data that I have captured
4 Analysing data	In this lesson, pupils will open an existing data file and use software to find out key information. The data file is a five-hour log of hot water cooling to room temperature. Note: The logged activity can't be done safely in school due to the high starting temperature. Later in the unit, pupils may choose to complete a warming experiment, starting with ice and allowing it to warm to room temperature.	<ul style="list-style-type: none">• To use data collected over a long duration to find information• I can import a data set• I can use a computer to view data in different ways• I can use a computer program to sort data
5 Data for answers	In this lesson, pupils will think about questions that can be answered using collected data. Pupils will choose a question to focus on and then plan the data logging process that they need to complete. After they have completed their plan, they will set up the data loggers to check that their plan will work. This setting up is designed to ensure that the data collection will work, and that pupils will have data to use in Lesson 6.	<ul style="list-style-type: none">• To identify the data needed to answer questions• I can propose a question that can be answered using logged data• I can plan how to collect data using a data logger• I can use a data logger to collect data
6 Answering my question	In this lesson, pupils will access and review the data that they have collected using a data logger. They will then use the data collected to answer the question that they selected in Lesson 5. Pupils will also reflect on the benefits of using a data logger.	<ul style="list-style-type: none">• To use collected data to answer questions• I can interpret data that has been collected using a data logger• I can draw conclusions from the data that I have collected• I can explain the benefits of using a data logger

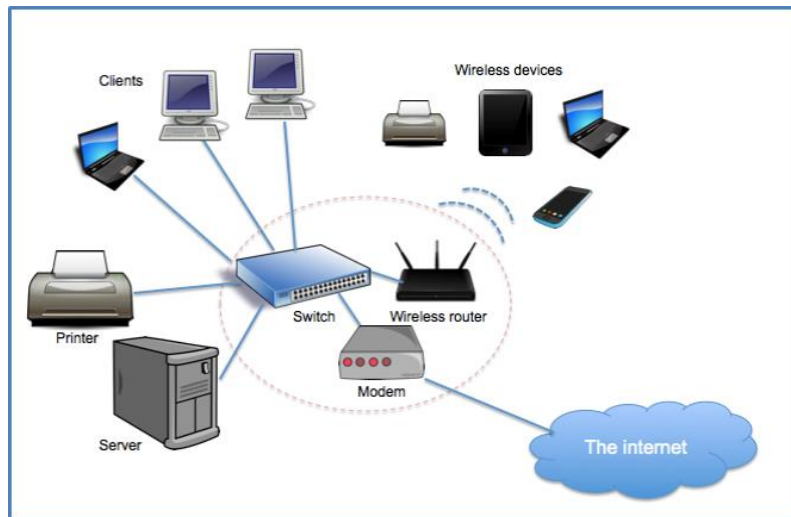
Key Knowledge

Overview

In this using we will be:

- Searching the internet using one word.
- Searching the internet to find results suitable for children.
- Following links to another web page.
- Creating content for an online blog.
- Uploading pictures to an online blog.
- Posting positive comments and responses on a blog.
- To locate information on the search results page.
- To use search effectively to find out information.
- To assess whether an information source is true and reliable

A Network



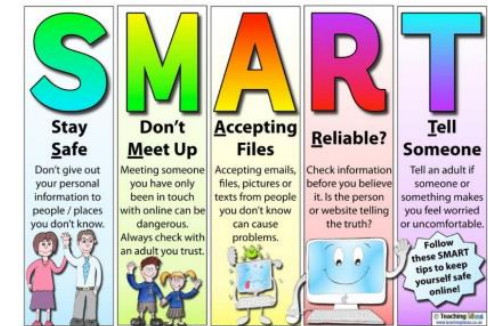
Key Vocabulary

Spelling	Definition/Sentence
internet	An interconnected network made of computers connected to each other around the world.
search	Search technology is any tool that can look for websites you want to find.
web browser	Finds and displays pages from the World Wide Web, Examples of browsers are: Safari, Google Chrome, Internet Explorer, Edge etc
search engine	A program that searches for and identifies items in a database. Used especially for finding sites on the World Wide Web.
website	– A set of related web pages located under a single domain name.
permission	To give approval or be allowed to do something.
personal information	Information about a person that is their own.
plagiarism	pretending that someone else’s work is yours.
profile	An online identity
private	Not being seen by anyone else
public	Known to many people. Not kept a secret.
share	To give information to others.

Web Browsers



Keeping Safe Online





Year 4 The Internet

Learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and will be given opportunities to explore the World Wide Web for themselves in order to learn about who owns content and what they can access, add, and create. Finally, they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information.







Lesson	Brief overview	Learning objectives
1 Connecting networks	Learners will explore how a network can share messages with another network to form the internet. They will consider some of the network devices involved in this, such as routers, and will also discuss what should be kept in and out of a network to keep safe.	<ul style="list-style-type: none"> • To describe how networks physically connect to other networks • I can describe the internet as a network of networks • I can demonstrate how information is shared across the internet • I can discuss why a network needs protecting
2 What is the internet made of?	Learners will describe the parts of a network and how they connect to each other to form the internet. They will use this understanding to help explain how the internet lets us view the World Wide Web and recognise that the World Wide Web is part of the internet which contains websites and web pages.	<ul style="list-style-type: none"> • To recognise how networked devices make up the internet • I can describe networked devices and how they connect • I can explain that the internet is used to provide many services • I can recognise that the World Wide Web contains websites and web pages
3 Sharing information	Learners will explore what can be shared on the World Wide Web and where websites are stored. They will also explore how the World Wide Web can be accessed on a variety of devices.	<ul style="list-style-type: none"> • To outline how websites can be shared via the World Wide Web (WWW) • I can explain the types of media that can be shared on the WWW • I can describe where websites are stored when uploaded to the WWW • I can describe how to access websites on the WWW
4 What is a website?	Learners will analyse a website and identify the key parts. They will then consider what content can be added to websites and what factors they should consider before adding content to a website. Finally, they will use a website which enables them to create their own content online.	<ul style="list-style-type: none"> • To describe how content can be added and accessed on the World Wide Web (WWW) • I can explain what media can be found on websites • I can recognise that I can add content to the WWW • I can explain that internet services can be used to create content online
5 Who owns the web?	Learners will explore who owns the content on the World Wide Web (or 'web' for short). They will explore a variety of websites and will investigate what they can and cannot do with the content on them. They will also relate this to principles of ownership and sharing in the real world.	<ul style="list-style-type: none"> • To recognise how the content of the WWW is created by people • I can explain that websites and their content are created by people • I can suggest who owns the content on websites • I can explain that there are rules to protect content
6 Can I believe what I read?	Learners will gain an appreciation of the fact that not everything they see on the internet is true, honest, or accurate. They will review images and decide whether or not they are real, before looking at why web searches can return ambiguous (and sometimes misleading) results. Finally, learners will complete a practical activity, demonstrating how quickly information can spread beyond their control.	<ul style="list-style-type: none"> • To evaluate the consequences of unreliable content • I can explain that not everything on the World Wide Web is true • I can explain why some information I find online may not be honest, accurate, or legal • I can explain why I need to think carefully before I share or reshare content

Key Knowledge

Overview

Overview	
 	<p style="text-align: center;">Photo Editing</p> <p>-You should already know that we can use <u>digital devices</u> to help us to <u>take and edit photographs</u>.</p> <p>-There are many different apps and programs to edit and improve photos, for example <u>Photoshop</u>, <u>Luminar</u> and <u>paint.net</u></p> <p>-There are lots of different ways that we can edit photographs, for example <u>cropping</u>, <u>rotating</u>, <u>flipping</u>, and <u>changing colours and styles</u>.</p> <p>-We should understand the <u>not all photographs that we see are real</u> – they may have been edited.</p>

Editing Techniques


Editing Techniques	
<p>Below are a number of different ways that we can edit photographs.</p>	
 <p>When we only need a part of a photograph, we can <u>crop</u> the image. We can also <u>enlarge and reduce</u> the parts that we need.</p>	 <p>We can make more than one of an image by <u>copying</u> it. We can also <u>rotate</u> and <u>flip</u> images to create different effects.</p>
 <p>Photograph editing programs often have filters. These can change the <u>colours</u> in a photograph. Different colours can give us different feelings.</p>	 <p>When the lighting of the photograph is not quite right, we can change the <u>brightness</u> of the photograph.</p>
 <p>We can <u>add and remove</u> parts of a photograph by using cut, copy and paste tools.</p>	 <p>We can change the <u>contrast</u> of photographs, making the subjects clearer.</p>


Key Vocabulary

Spelling	Definition/Sentence
crop	To cut out or resize parts of an image you don't need
filters	Change the colours of an image
contrast	A tool to make an image or subject clearer
blur	To distort an image so your eyes
edit	To change an image
enlarge	To make an image or subject larger
rotate	To change the direction of a picture or image


Photo Editing

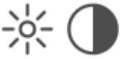
You can change the appearance of an image to **highlight something in it** or to **suggest a mood/feeling** (e.g. coldness, magical, happiness).


 **Crop** lets you cut out parts you don't want.

 Apply **filters** or effects to change the colours.

 Remove **blemishes** like dust or dirt.

 Add a **border** or frame so it looks neat.

 Adjust the **brightness** and **contrast** so it is lighter or darker.

 **Blur** parts so your eyes focus on the main subject.



Year 4 Photo Editing




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.

Lesson	Brief overview	Learning objectives
1 Changing digital images	In this lesson, learners will be introduced to the online editor, and changes that can be made to images using a range of tools. They will look at changing the composition of images using the 'crop' tool, and evaluate the effect that this can have on an image.	<ul style="list-style-type: none">• To explain that digital images can be changed• I can identify changes that we can make to an image• I can explore how images can be changed in real life• I can explain the effect that editing can have on an image
2 Changing the composition of images	In this lesson, learners will identify changes that have been made to edited images. They will search for and save images from a copyright-free website. Learners will then use an image editor to make a new image composition linked to a cross-curricular theme.	<ul style="list-style-type: none">• To change the composition of an image• I can explain what has changed in an edited image• I can change the composition of an image by selecting parts of it• I can consider why someone might want to change the composition of an image
3 Changing images for different uses	In this lesson, learners will look at the effect that different colours and filters can have on an image. They will choose appropriate effects to fit a scenario, and explain how they made their choices. They will then edit the same original image using different effects to suit two different scenarios, and compare the two versions.	<ul style="list-style-type: none">• To describe how images can be changed for different uses• I can talk about changes made to images• I can choose effects to make my image fit a scenario• I can explain why my choices fit a scenario
4 Retouching images	This lesson is based on editing images by using retouching tools. Learners will consider why people may choose to retouch images, and the positive and negative effects that retouching can have on images. They will use retouching tools to improve images, and consider which tools are appropriate for retouching.	<ul style="list-style-type: none">• To make good choices when selecting different tools• I can identify how an image has been retouched• I can give examples of positive and negative effects that retouching can have on an image• I can choose appropriate tools to retouch an image
5 Fake images	This lesson is based on the concept of fake images. Learners will sort images into 'fake' and 'real', and give reasons for their decisions. They will create their own fake images and reflect on how easy it is to digitally alter images, and what this might mean for the images that they see around them.	<ul style="list-style-type: none">• To recognise that not all images are real• 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
6 Making and evaluating a publication	This lesson is the final lesson in the unit on photo editing. Learners will use the 'fake' image that they created in lesson 5 to make a publication designed to advertise their imaginary place. They will add elements such as text, shapes, and borders. They will design a survey for gaining feedback on their work, and compare their completed publications with the original images.	<ul style="list-style-type: none">• To evaluate how changes can improve an image• 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

Key Knowledge

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Repetition in Scratch

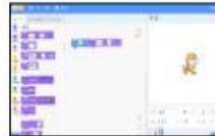
- Programming is when we make a set of instructions for computers to follow.
- Scratch is a program that we can use in order to code our own stories, animations and games. We can use repeat and loop operator blocks in order to make our programs more logical and efficient. These help to run code continuously or for a set number of times.
- We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

The Basics of Scratch

The Basics of Scratch

-What is Scratch? Scratch is a website/ app that lets us code our own stories, games and animations.

-Scratch helps us to learn how to use programming language, whilst also being creative and using problem-solving skills.



There are three main areas in Scratch:

- The **Blocks Palette** (on the left) contain all of the different blocks: puzzle piece commands which control the animation.
- Code Area** (in the middle) is where the blocks are placed to create a program.
- Stage with Sprite** (right) is where the output of the program is presented. The sprite is the character.









Attributes: There are three attributes of the sprite which we can change to make our animation: Code, Costumes, Sounds.

- Event Blocks:** Event blocks are coloured yellow and are used to sense different events that happen e.g., the green flag being clicked.
- Action Blocks:** Action blocks include 'Motion' blocks, 'Sound' blocks and 'Looks' blocks. They make the sprite move, make sounds and change appearance.

Key Vocabulary

Spelling	Definition/Sentence
programming	Making a set of instructions for a computer to follow
algorithm	A set of instructions to perform a task
Coding	Computer programmes are made using a special language called code. Coding is used so computers understand what to do.
Debug	Finding an issue in a programme and repairing it.
Sequence	A series of events that must be performed in order to achieve a task.
Variables	Something that can be changed. They are used to store information that might change

Loops and Repetition

- Pen Drawing in Scratch:** Select the 'add extension' icon in the bottom left corner. Then select 'pen.' This allows you to draw with your sprites.  
- The Repeat Block:** Select 'code' and then the 'control' blocks (orange). Here you will find the repeat block. It should be placed around the command blocks that you want to repeat. The number of times something is repeated can be typed into the white area.  
- Creating Shapes:** Selecting 'pen down' (in the 'operators' blocks) can be followed by use of the motion blocks to determine the line that will be drawn (e.g. 'move 10 steps'). Turning a number of degrees changes the direction of the pen. Placing the repeat block around this motion code can allow more complex shapes to be drawn.  
- Count-Controlled/Infinite Loops:** We can control the number of 'loops' of a command with the number typed into the 'repeat' block. The 'forever' block makes a command continue infinitely (forever).  



Year 4 Repetition in Games

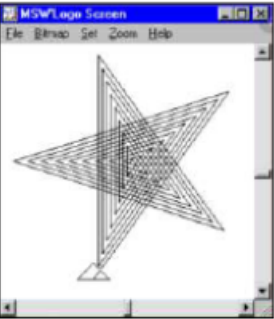
Learners will explore the concept of repetition in programming using the Scratch environment. The unit begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled 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.

Lesson	Brief overview	Learning objectives
1 Using loops to create shapes	In the first lesson, learners look at real-life examples of repetition, and identify which parts of instructions are repeated. Learners then use Scratch, a block-based programming environment, to create shapes using count-controlled loops. They consider what the different values in each loop signify, then use existing code to modify and create new code, and work on reading code and predicting what the output will be once the code is run.	<ul style="list-style-type: none">• To develop the use of count-controlled loops in a different programming environment• I can list an everyday task as a set of instructions including repetition• I can predict the outcome of a snippet of code• I can modify a snippet of code to create a given outcome
2 Different loops	In this lesson, learners look at different types of loops: infinite loops and count-controlled loops. They practise using these within Scratch and think about which might be more suitable for different purposes.	<ul style="list-style-type: none">• To explain that in programming there are infinite loops and count-controlled loops• I can modify loops to produce a given outcome• I can choose when to use a count-controlled and an infinite loop• I can recognise that some programming languages enable more than one process to be run at once
3 Animate your name	In this lesson, learners create designs for an animation of the letters in their names. The animation uses repetition to change the costume (appearance) of the sprite. The letter sprites will all animate together when the event block (green flag) is clicked. When they have designed their animations, the learners will program them in Scratch. After programming, learners then evaluate their work, considering how effectively they used repetition in their code.	<ul style="list-style-type: none">• To develop a design that includes two or more loops which run at the same time• I can choose which action will be repeated for each object• I can explain what the outcome of the repeated action should be• I can evaluate the effectiveness of the repeated sequences used in my program
4 Modifying a game	In this lesson, learners look at an existing game and match parts of the game with the design. They make changes to a sprite in the existing game to match the design. They then look at a completed design, and implement the remaining changes in the Scratch game. They add a sprite, re-use and modify code blocks within loops, and explain the changes made.	<ul style="list-style-type: none">• To modify an infinite loop in a given program• I can identify which parts of a loop can be changed• I can explain the effect of my changes• I can re-use existing code snippets on new sprites
5 Designing a game	In this lesson, learners look at a model project that uses repetition. They then design their own games based on the model project, producing designs and algorithms for sprites in the game. They share these designs with a partner and have time to make any changes to their design as required.	<ul style="list-style-type: none">• To design a project that includes repetition• I can evaluate the use of repetition in a project• I can select key parts of a given project to use in my own design• I can develop my own design explaining what my project will do
6 Creating your games	In this lesson, learners build their games, using the designs they created in Lesson 5. They follow their algorithms, fix mistakes, and refine designs in their work as they build. They evaluate their work once it is completed, and showcase their games at the end.	<ul style="list-style-type: none">• To create a project that includes repetition• I can refine the algorithm in my design• I can build a program that follows my design• I can evaluate the steps I followed when building my project

Key Knowledge

Overview

Overview



Repetition in Shapes

- Programming is when we make a set of instructions for computers to follow.
- Logo is a text-based program that we can use in order to create shapes and patterns.
- We use algorithms (a set of instructions to perform a task) which we can plan, model and test, in order to create accurate and imaginative shapes and patterns.

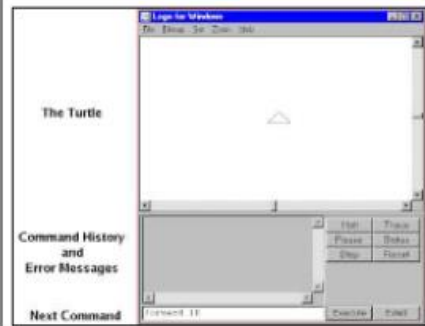
FMS Logo

The Basics of FMS Logo

-What is FMS Logo? Logo is a text-based programming language, where we can type commands which are then drawn on the screen.
 -Logo helps us to learn how to use programming language, whilst also being creative and using problem-solving skills.



The Display:



Basic Commands:



- FD:** Forwards. Always followed by a space and the number of steps, e.g. FD 50
- BK:** Backwards. As above, e.g. BK 50
- LT:** Left turn. Always followed by a space and then the degrees to turn, e.g. LT 90
- RT:** Right turn. As above, e.g. RT 90
- CS:** Clears any pen marks on your screen and gets the turtle back to the centre.
- PJ:** Stops turtle from leaving a pen trail.
- PD:** Makes turtle leave a pen trail again.

Key Vocabulary

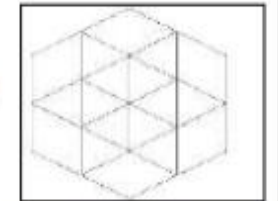
Spelling	Definition/Sentence
Programming	Making a set of instructions for the computer to follow
Logo	A text-based program
Algorithm	A set of instructions for performing a task
Sequence	A pattern or process in which one thing follows another
Debugging	to find and repair mistakes in an algorithm

Programming Patterns

-Patterns: Patterns are things that repeat in a logical way. In everyday life, patterns are everywhere!

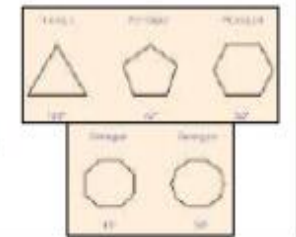


-Patterns in Logo: Instead of typing in the code to create each individual shape, we can save time by repeating a sequence of instructions. We use the 'repeat' function.



-Repeat: Type the command 'repeat' — this repeats commands a set number of times. The number following repeat is the number of times to repeat the code, and the code to be repeated is in square brackets, e.g. repeat 4 [FD 100 LT 90]

The above code will repeat FD 100 LT 90 four times.



-Creating Shapes and Loops: To make shapes, we need to know the angles of corners of different shapes (see right). Using the repeat function with shapes can help us to make spirals.



Year 4 Photo Editing

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

You can use either a tablet, desktop or laptop computer for this unit. Logo software should be installed or accessible online, for example: You can use Turtle Academy online at turtleacademy.com/playground or you can download FMSLogo from fmslogo.sourceforge.net

Lesson	Brief overview	Learning objectives
1 Programming a screen turtle	This lesson will introduce pupils to programming in Logo. Logo is a text-based programming language where pupils type commands that are then drawn on screen. Pupils will learn the basic Logo commands and will use their knowledge of them to read and write code.	<ul style="list-style-type: none">• To identify that accuracy in programming is important• I can program a computer by typing commands• I can explain the effect of changing a value of a command• I can create a code snippet for a given purpose
2 Programming letters	In this lesson, pupils will create algorithms (a precise set of ordered instructions, which can be turned into code) for their initials. They will then implement these algorithms by writing them in Logo commands to draw the letter. They will debug their code by finding and fixing any errors that they spot.	<ul style="list-style-type: none">• To create a program in a text-based language• I can use a template to draw what I want my program to do• I can write an algorithm to produce a given outcome• I can test my algorithm in a text-based language
3 Patterns and repeats	In this lesson, pupils will first look at examples of patterns in everyday life. They will recognise where numbers, shapes, and symbols are repeated, and how many times repeats occur. They will create algorithms for drawing a square, using the same annotated diagram as in Lesson 2. They will use this algorithm to program a square the 'long' way, and recognise the repeated pattern within a square. Once they know the repeated pattern, they will use the repeat command within Logo to program squares the 'short' way.	<ul style="list-style-type: none">• To explain what 'repeat' means• I can identify repetition in everyday tasks• I can identify patterns in a sequence• I can use a count-controlled loop to produce a given outcome
4 Using loops to create shapes	In this lesson, pupils will work with count-controlled loops in a range of contexts. First, they will think about a real-life example, then they will move on to using count-controlled loops in regular 2D shapes. They will trace code to predict which shapes will be drawn, and they will modify existing code by changing values within the code snippet.	<ul style="list-style-type: none">• To modify a count-controlled loop to produce a given outcome• I can identify the effect of changing the number of times a task is repeated• I can predict the outcome of a program containing a count-controlled loop• I can choose which values to change in a loop
5 Breaking things down	In this lesson, pupils will focus on decomposition. They will break down everyday tasks into smaller parts and think about how code snippets can be broken down to make them easier to plan and work with. They will learn to create, name, and call procedures in Logo, which are code snippets that can be reused in their programming.	<ul style="list-style-type: none">• To decompose a task into small steps• I can identify 'chunks' of actions in the real world• I can use a procedure in a program• I can explain that a computer can repeatedly call a procedure
6 Creating a program	In the final lesson, pupils will apply the skills that they have learnt in this unit to create a program containing a count-controlled loop. Over the course of the lesson, they will design wrapping paper using more than one shape, which they will create with a program that uses count-controlled loops. They will begin by creating the algorithm, either as an annotated sketch, or as a sketch and algorithm, and then implement it as code. They will debug their work throughout and evaluate their programs against the original brief.	<ul style="list-style-type: none">• To create a program that uses count-controlled loops to produce a given outcome• I can design a program that includes count-controlled loops• I can make use of my design to write a program• I can develop my program by debugging it

