Year 4 – The internet

Unit introduction

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.

Overview of lessons

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.	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.	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.	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.	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.	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	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

	information can spread beyond their control.	before I share or reshare content

Progression

This unit progresses students' knowledge and understanding of networks in Year 3. In Year 5, they will continue to develop their knowledge and understanding of computing systems and online collaborative working.

Curriculum links

National curriculum links

Computing

- 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.

PSHE (Lesson 6)

- Evaluating content for honesty and accuracy

Education for a Connected World links

Managing online information

- I can analyse information to make a judgement about probable accuracy, and I understand why it is important to make my own decisions regarding content and that my decisions are respected by others.
- I can explain what is meant by fake news, e.g. why some people will create stories or alter photographs and put them online to pretend something is true when it isn't.
- I can describe ways of identifying when online content has been commercially sponsored or boosted, (e.g. by commercial companies or by vloggers, content creators, or influencers).
- I can describe how fake news may affect someone's emotions and behaviour, and explain why this may be harmful.

Year 4 – Creating media – Audio production

Unit introduction

Learners will identify the input device (microphone) and output devices (speaker or headphones) required to work with sound digitally. 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.

Overview of lessons

Lesson	Brief overview	Learning objectives
1. Recording sound	In this lesson, learners will identify the input devices used to record sound and output devices needed to listen to it. They will then record their voices using a computer, and reflect on what makes a good audio recording. Lastly, learners will consider ownership and copyright issues related to recordings.	To identify that sound can be recorded • I can identify the input and output devices used to record and play sound • I can use a computer to record audio • I can explain that the person who records the sound can say who is allowed to use it
2. Editing audio	In this lesson, learners will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Learners will also listen to a range of podcasts and identify the features of a podcast.	To explain that audio recordings can be edited • I can re-record my voice to improve my recording • I can inspect the soundwave view to know where to trim my recording • I can discuss what sounds can be added to a podcast
3. Planning a podcast	In this lesson, learners will record their voices and then import and align sound effects to create layers in their recordings. Learners will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons.	To recognise the different parts of creating a podcast project • I can explain how sounds can be combined to make a podcast more engaging • I can save my project so the different parts remain editable

		• I can plan appropriate content for a podcast
4. Creating a podcast	In this lesson, learners will record the voice tracks for their podcast. They will review their recordings and re-record if necessary. Learners will edit, trim, and align their voice recordings, and then save their project so they can continue working on it in the next lesson.	To apply audio editing skills independently • I can record content following my plan • I can review the quality of my recordings • I can improve my voice recordings
5. Combining audio	In this lesson, learners will develop their podcast further by adding content such as sound effects and background music. The audio will be layered with their existing voice recordings and exported as an audio file.	To combine audio to enhance my podcast project • I can open my project to continue working on it • I can arrange multiple sounds to create the effect I want • I can explain the difference between saving a project and exporting an audio file
6. Evaluating podcasts	In this lesson, learners will evaluate their own podcasts and that of others. After looking at the evaluation, learners will decide if they can improve their podcast and then make any changes they have chosen.	To evaluate the effective use of audio • I can listen to an audio recording to identify its strengths • I can suggest improvements to an audio recording • I can choose appropriate edits to improve my podcast

Progression

This unit progresses students' knowledge and understanding of creating media, by focusing on the recording and editing of sound to produce a podcast. Following this unit, learners will explore combining audio with video in the 'Video editing' unit in Year 5.

Curriculum links

National curriculum links

Computing – KS2

- 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

Science – Year 4 (Lesson 2)

- **Sound:** Find patterns between the volume of a sound and the strength of the vibrations that produced it
- **Sound:** Recognise that sounds get fainter as the distance from the sound source increases

English – Years 3 and 4 (Lesson 3)

- **Writing – composition:** Plan their writing by discussing and recording ideas
- **Writing – 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

Education for a Connected World links

Copyright and ownership

- I can explain why copying someone else's work from the internet without permission can cause problems (Y3)
- I can give examples of what those problems might be (Y3)
- When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it (Y4)
- I can give some simple examples (Y4)

Year 4 – Photo editing

Unit introduction

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.

Overview of lessons

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.	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.	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.	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	To make good choices when selecting different tools

	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.	• 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.	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.	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

Progression

Learners should have experience of making choices on a tablet/computer. They should be able to navigate within an application.

This unit progresses students' skills through editing digital images and considering the impact that editing can have on an image. Learners will also consider how editing can be used appropriately for different scenarios, and create and evaluate 'fake' images, combining all of their new skills.

Curriculum links

Computing national curriculum links

- Use search technologies effectively
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Education for a Connected World links

Self-image and identity

- I can describe ways in which people might make themselves look different online.

Copyright and ownership

- When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it.

Year 4 – Data logging

Unit introduction

In this unit, learners will consider how and why data is collected over time. Learners 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. Learners 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. Learners will spend time using a computer to review and analyse data. Towards the end of the unit, learners will pose questions and then use data loggers to automatically collect the data needed to answer those questions.

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Answering questions	Learners will consider what data can be collected and how it is collected. They will think about data being collected over time. Learners 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.	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	Learners will build on the idea of collecting data over time, and be introduced to the idea of collecting data automatically using computers such as data loggers. They will also be introduced to the concept that computers can capture data from the physical world using input devices called 'sensors'. Learners will establish that sensors can be connected to data loggers, which can automatically collect data while not attached to a computer.	To use a digital device to collect data automatically • I can explain what data can be collected using sensors • I can use data from a sensor to answer a given question • I can identify that data from sensors can be recorded
3 Logging	Learners will explore how data loggers work. They will record data at set moments in time and draw parallels with the data points that a data logger	To explain that a data logger collects 'data points' from sensors over time

	captures at regular intervals. Learners will use data loggers away from a computer, then they will connect the loggers to a computer and download the data.	• I can recognise that a data logger collects data at given points • I can identify the intervals used to collect data • I can talk about the data that I have captured
4 Analysing data	Learners will open an existing data file and use software to find out key information. They will analyse a data file which is a five-hour log of hot water cooling to room temperature.	To recognise how a computer can help us analyse data • I can view data at different levels of detail • I can sort data to find information • I can explain that there are different ways to view data
5 Data for answers	Learners will think about questions that can be answered using collected data. They will choose a question to focus on and then plan the data logging process that they need to complete. After learners 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 learners will have data to use in the next lesson.	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	Learners 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 the previous lesson. Learners will also reflect on the benefits of using a data logger.	To use data from sensors 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

Progression

This unit progresses learners' knowledge and understanding of data and how it can be collected over time to answer questions. Specifically, it builds on the concept of answering questions with data which is first introduced in the KS1 data and information units. The unit also introduces the idea of automatic data collection. Learners are also introduced to data in tables and graphs, knowledge they will build on in the Year 5 unit (flat file databases) and the Year 6 unit (spreadsheets).

Curriculum links

National curriculum links
Computing – Key stage 2

- 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

Science – Lower key stage 2/Year 4

- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.

Year 4 – Programming A – Repetition in shapes

Unit introduction

Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language.

Overview of lessons

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.	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.	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	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

	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.	
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.	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.	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,	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

	and evaluate their programs against the original brief.	

Progression

This unit progresses students' knowledge and understanding of programming. It progresses from the sequence of commands in a program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code.

Curriculum links

National curriculum links

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

Year 4 — Repetition in games

Unit introduction

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.

Overview of lessons

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.	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.	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.	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.	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.	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.	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

Progression

This unit assumes that learners will have some prior experience of programming. The KS1 NCCE units cover floor robots and ScratchJr, and Scratch is introduced in the Year 3 programming units. However, experience of other languages or environments may also be useful.

Curriculum links

National curriculum links

- Design, write, and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- Use logical reasoning to explain how some simple algorithms work, and to detect and correct errors in algorithms and programs
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information