

Medium Term Plan – Computing – Year 4 Autumn 1: **COMPUTING SYSTEMS AND NETWORKS – The internet**

Length of unit - 6 Sessions (2 sessions taught per week)

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• How information is routed around the internet • How the WWW is part of the internet • The difference between the WWW and the internet	• Internet • Network • Router • Website • World Wide Web • Content • Ownership • Reliable • Network security • Network switch • Web page • Web address • Browser • Sharing	Connecting networks earners will explore how a network can share messages with another network to form the internet. They will consider some of the net-work devices involved in this, such as routers, and will also discuss what should be kept in and out of a network to keep safe 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. 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. 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. 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 re-late this to principles of ownership and sharing in the real world. 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
Learning in this unit Resources Various websites	• 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.		

Medium Term Plan – Computing – Year 4 Autumn 2: **CREATING MEDIA – Audio editing**

Length of unit - 6 Sessions (2 sessions taught per week)

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• Digital media and how technology can be used to create content • How software and apps include tools that can be used to edit and improve projects • How to evaluate outcomes	• Audio • Record • Playback • Microphone • Speaker • Headphones • Input • Output • Sound • Start • Pause • Stop • Podcast	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 re-cording of audio.
Learning in this unit Resources Audacity (need laptops)	• 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:	• Save • File • Edit • Selection • Open • Mixing • Time shift • Export • MP3 • Evaluate • Feedback	Recording sounds 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.
			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.
			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.
			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.
			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.

Medium Term Plan – Computing – Year 4 Spring 1: **PROGRAMMING A – Repetition in shapes**

Length of unit - 6 Sessions (2 sessions taught per week)

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• How an algorithm can be written to achieve a specific aim • How to debug a program	• Program • Turtle • Commands • Code snippet • Algorithm • Design • Debug • Logo commands • Pattern • Repeat • Repetition • Count-controlled loop • Value • Trace • Decompose • Procedure • Count-controlled loop	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. 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.
			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 re-peated pattern within a square. Once they know the repeated pattern, they will use the repeat command within Logo to program squares the 'short' way.
Learning in this unit Resources FMS Logo	• 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 program into parts • To create a program that uses count-controlled loops to produce a given outcome		Using loops to create shapes
			In this lesson, pupils will work with count-controlled loops in a range of con-texts. 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. 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.
			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 les-son, 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.

Medium Term Plan – Computing – Year 4 Spring 2: **DATA AND INFORMATION – Data logging**

Length of unit - 6 Sessions (2 sessions taught per week)

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• That objects can be described using characteristics and labels • Data and what types of data exist • How data can be collected and grouped • How questions can be answered by analysing data	• Data • Table • Layout • Input device • Sensor • Data logger • Logging • Data point • Interval • Analyse • Data set • Import • Export • Collection • Review • Conclusion	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.
			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.
			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.
			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.
Learning in this unit	• 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		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.
			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.
Resources Data loggers (loan microbits from BCA)			

Medium Term Plan – Computing – Year 4 Summer 1: **CREATING MEDIA – Photo editing**

Length of unit - 6 Sessions (2 sessions taught per week)

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• Digital media and how technology can be used to create content • How software and apps include tools that can be used to edit and improve projects • How to evaluate outcomes	• Image • Edit • Arrange • Select • Crop • Undo • Save • Search • Copyright • Rotate • Flip • Effects • Colours • Hue • Saturation	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. 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. 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.
Learning in this unit Resources Paint.net	• 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	• Sepia • Version • Vignette • Retouch • Clone • Recolour • Select • Adjust • Sharpen • Brighten • Fake • Real • Cut • Copy • Paste • Alter • Background • Foreground • Publication • Original • Border	Retouching images This lesson is based on editing images by using re-touching 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. 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. 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.

Medium Term Plan – Computing – Year 4 Summer 2: **PROGRAMMING B – Repetition in games**

Length of unit - 6 Sessions (2 sessions taught per week)

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• The Scratch coding environment and how to write block code • Algorithms and that they are a set of instructions • How to debug a program • How repetition can play a role in a program	• Scratch • Programming • Sprite • Blocks • Code • Loop • Repeat • Value • Forever • Infinite loop • Count-controlled loop • Costume • Forever • Animate	Using loops to create shapes
			This lesson introduces learners to the concept of a system. Learners will develop their understanding of components working together to make a whole. They will out-line how digital systems might work and the physical and electronic connections that exist. Different loops In this lesson, learners will consider how larger computer systems work. Learners will consider how devices and processes are connected. They will also reflect on how computer systems can help us.
			Animate your name This lesson introduces the idea that parts of a computer system are not always in the same place or country. Instead, those parts of a system must transfer information using the internet. This lesson builds on the introduction to the internet in the Year 4 'What is the internet?' unit, adding awareness of IP addresses and the rules (protocols) that computers have for communicating with one another.
Learning in this unit Resources Scratch	• 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 which 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	• Event block • Duplicate • Block • Modify • Design • Algorithm • Repetition • Duplicate • Debug • Refine • Evaluate	Modifying a game
			In this lesson, learners will consider how people can work together when they are not in the same location. They will discuss ways of working and start a collaborative online project. The online activity assumes that learners can make simple slides including text and images. If your learners are unsure how to do this, you may wish to spend some time on the Year 3 'Desktop publishing' unit before this lesson Designing a game In this lesson, learners will reflect on how they worked together in the previous lesson and how their working together might be improved. Learners will work together on an unplugged activity and use that experience to develop their own ideas of good collective working practices.
			Creating our games In the previous two lessons, learners worked together online on a shared project. This lesson introduces another approach to online working: reusing and modifying work done by someone else. (Using someone else's work needs to be done within the bounds of copyright and with the relevant permissions.) This lesson uses the Scratch programming tool, which allows learners to use other people's work.