

Medium Term Plan – Computing – Year 6 Autumn 1: **COMPUTING SYSTEMS AND NETWORKS – Communication and collaboration**

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

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• That computers are connected in networks • What small and large networks are • That networks allow people to work collaboratively • What the internet is • How to use desktop publishing to create slides	• Search • Search engine • Refine • Index • Crawler • Bot • Search engine • Optimisation • Links • Web crawlers • Content creator • Selection • Ranking • Communication • Internet • Public • Private • One-way • Two-way • One-to-one • One-to-many • SMS • Email • Blog	Internet addresses
			In this lesson, learners will be introduced to a range of search engines. They will be given the opportunity to explain how we search, then they will write and test instructions. Next, they will learn that searches do not always return the results that we are looking for, and will refine their searches accordingly. Finally, they will be introduced to the two most common methods of searching: using a search engine and the address bar.
			Data packets In this lesson, learners will gain an understanding of why search engines are necessary to help us find things on the World Wide Web. They will conduct their own searches and break down, in detail, the steps needed to find things on the web. They will then emulate web crawlers to create an index of their own classroom. Finally, they will consider why some searches return more results than others.
			Working together This lesson includes an unplugged activity in which the class will learn about some of the main factors that influence how a search engine ranks a web page. Learners will create paper-based 'web pages' in groups, on a topic that they are currently studying. They will then discover how their web pages would rank when searching for keywords relating to their content.
Learning in this unit Resources Google Slides	• To identify how to use a search engine • To describe how search engines select results • To explain how search results are ranked • To recognise why the order of results is important, and to whom • To recognise how we communicate using technology • To evaluate different methods of online communication		Shared working
			In this lesson, learners will explore how the person performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. Learners will also explore some of the limitations of searching, then discuss what can-not be searched.
			How we communicate In this lesson, learners will deepen their understanding of the term 'communication'. They will explore different methods of communication, then they will consider internet-based communication in more detail. Finally, they will evaluate which methods of communication suit particular purposes.
			Communicating responsibly In this lesson, learners will use information provided and their own prior knowledge to categorise different forms of internet communication. They will then choose which method they would use for the scenarios discussed in the previous lesson. During these activities, they will explore issues around privacy and information security.

Medium Term Plan – Computing – Year 6 Autumn 2: **CREATING MEDIA – Web page creation**

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

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning		• Website • Web page • Browser • Media • Hypertext Markup Language (HTML) • Logo • Layout • Header • Purpose	What makes a good website? In this lesson, learners will explore and review existing websites and evaluate their content. They will have some understanding that websites are created by using HTML code. How would you layout your web page? Learners will look at the different layout features available in Google Sites and plan their own web page on paper. Copyright or CopyWRONG? During this lesson learners will become familiar with the terms ‘fair use’ and ‘copyright.’ They will gain an understanding of why they should only use copyright-free images and will find appropriate images to use in their work from suggested sources.
Learning in this unit Resources Google Slides	• To review an existing website and consider its structure • To plan the features of a web page • To consider the ownership and use of images (copyright) • To recognise the need to preview pages • To outline the need for a navigation path • To recognise the implications of linking to content owned by other people	• Copyright • Fair use • Home page • Preview • Evaluate • Device • Breadcrumb trail • Navigation • Hyperlink • Subpage • Implication • External link • Embed	How does it look? Today learners will revise how to create their own web page in Google Sites. Using their plan from previous lessons, learners will create their own web page/home page. They will preview their web page as it will appear on different devices and suggest or make edits to improve the user experience on each device. Follow the breadcrumbs During this lesson learners will begin to appreciate the need to plan the structure of a website carefully. They will plan their website, paying attention to the navigation paths (the way that pages are linked together). They will then create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning. Think before you link! Learners will consider the implications of linking to content owned by other people and create hyperlinks on their own websites that link to other people’s work. They will then evaluate the user experience when using their own website and that of another learner.

Medium Term Plan – Computing – Year 6 Spring 1: **PROGRAMMING A – Variables in games**

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

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	- Physical computing and that code is used by some hardware - Some physical computing devices and what they can be used for (Crumble controllers) - LED lights and their application - Selection and how programs use it - Loops and how programs use them	- Variable - Change - Name - Value - Set - Design - Event - Algorithm - Code - Task - Artwork - Program - Project - Code - Test - Debug - Improve - Evaluate - Share	Introducing variables
			In this lesson, pupils will be introduced to variables. Pupils will see examples of real-world variables, then they will explore them in a Scratch project. Pupils will then design and make their own project including variables. Finally, pupils will identify that variables are named and can be letters (strings) as well as numbers.
			Variables in programming In this lesson, pupils will understand that variables are used in programs, and that they can hold a single value at a time. Pupils will complete an unplugged task that will demonstrate the process of changing variables. Next, they will explore why it is important to name variables, then they will apply their learning in a Scratch project in which they will make, name, and update variables.
			Improving a game In this lesson, pupils will apply the concept of variables to enhance an existing game in Scratch. They will predict the outcome of changing the same change score block in different parts of a program, then they will test their predictions in Scratch. They will also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they will add comments to their project, explaining how they have met the objectives of the lesson.
Learning in this unit	- To define a 'variable' as something that is changeable - To explain why a variable is used in a program - To choose how to improve a game by using variables - To design a project that builds on a given example - To use my design to create a project - To evaluate my project		Designing a game
			This lesson focuses on the design elements of programming. For the majority of the tasks, pupils will be working at the algorithmic level of abstraction. Pupils will first design the sprites and backgrounds for their project, then they will design their algorithms to create their program flow.
			Design to code In this lesson, pupils will implement the algorithms that they created in Lesson 4 as code. In doing this, they will identify variables in an unfamiliar project and learn the importance of naming variables. They will also have the opportunity to add another variable to enhance their project.
Resources Scratch			Improving and sharing This lesson gives pupils the opportunity to build on the project that they created in Lesson 5. As the lesson develops, the scaffolding is gradually removed, so that the last main activity is without constraints. Finally, pupils will evaluate each other's projects, identifying features that they like, and features that could be improved further.

Medium Term Plan – Computing – Year 6 Spring 2: **DATA AND INFORMATION - Spreadsheets**

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

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	- Databases and that they can be used to select relevant and accurate information - That data can be grouped and sorted using fields - Different databases and how they can be used in real world applications (finding flight times and dates etc)	- Spreadsheet - Data - Data heading - Data set - Cells - Columns - Rows - Data item - Object - Format - Common attribute - Formula - Calculation - Input - Output - Cell reference - Operation - Range - Duplicate - Sigma - Propose - Question - Organised - Graph - Chart - Evaluate - Results - Comparison - Software - Tools	What is a spreadsheet?
			During this lesson learners will understand that a spreadsheet is a computer application which allows users to organise, analyse, and store data in a table. They will begin to realise the importance of data headings. Learners will answer questions about a spreadsheet, and then create their own questions that can be answered using a given set of data.
			Modifying spreadsheets During this lesson learners will be taught that objects can be described using data. They will build a data set within a spreadsheet application and apply appropriate number formats to cells.
			What's the formula? During this lesson learners will begin to use formulas to produce calculated data. They will under-stand that the type of data in a cell is important (e.g. numbers can be used in calculations whereas words cannot). Learners will create formulas to use in their spreadsheet using cell references and identify that changing inputs will change the output of the calculation.
Learning in this unit Resources Google Sheets	- To identify questions which can be answered using data - To explain that objects can be described using data - To explain that formula can be used to produce calculated data - To apply formulas to data, including duplicating - To create a spreadsheet to plan an event - To choose suitable ways to present data	- Cell reference - Operation - Range - Duplicate - Sigma - Propose - Question - Organised - Graph - Chart - Evaluate - Results - Comparison - Software - Tools	Calculate and duplicate During this lesson learners will recognise that data can be calculated using different operations: multiplication, subtraction, division, and addition. They will use these operations to create formulas in a spreadsheet. Learners will then begin to understand the importance of creating formulas that include a range of cells and the advantage of duplicating to apply formulas to multiple cells.
			Event planning During this lesson learners will plan and calculate the cost of an event using a spreadsheet. They will use a predefined list to choose what they would like to include in their event and use their spreadsheet to answer questions on the data they have selected. Learners will be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event.
			Presenting data During this lesson learners will acquire the skills to create charts in Google Sheets. They will evaluate results based on questions asked using the chart that they have created. Finally, learners will outline their understanding that there are different software tools available within spreadsheet applications to present data.

Medium Term Plan – Computing – Year 6 Summer 1: **CREATING MEDIA – 3D Modelling**

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

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	• How software can be used to create images and models • How to use tools to create and alter images • Vector images • How shapes can be grouped together to create larger images • How to duplicate objects	• 2D • 3D • 3D space • View • Resize • Colour • Lift • Rotate • Position • Select • Duplicate • Dimensions, • Placeholder • Hole • Group • Ungroup • Design • Modify • Evaluate • Improve	Introduction to 3D modelling
			This lesson introduces learners to the concept of 3D modelling by creating a range of 3D shapes that they select and move. They also examine the shapes from a variety of views within the 3D space.
			Modifying 3D objects This lesson examines the similarities and differences between working digitally with 2D and 3D graphics. Learners initially discuss the similarities and differences they have identified so far, then move on to combine 3D shapes, including lifting the 3D object, to produce a house. Learners then colour their 3D shapes, followed by adding further shapes and undertaking further reflection on the similarities and differences between working digitally with 2D and 3D graphics.
			Make your own name badge During this lesson, learners will produce a 3D model of a physical object, which will contain a number of different 3D objects. 3D objects will need to be rotated and placed into position in relation to other 3D objects.
Learning in this unit Resources Tinkercad	• To use a computer to create and manipulate three-dimensional (3D) digital objects • To compare working digitally with 2D and 3D graphics • To construct a digital 3D model of a physical object • To identify that physical objects can be broken down into a collection of 3D shapes • To design a digital model by combining 3D objects • To develop and improve a digital 3D model		Making a desk tidy During this lesson, learners will produce a 3D model of a pencil holder desk tidy. The 3D model will contain a number of 3D objects that are of specific dimensions and use other 3D objects as placeholders to create holes with them.
			Planning a 3D model During this lesson, learners will resize and enhance their 3D model of a pencil holder desk tidy. Learners will also plan their own 3D model of a photo frame, which will be developed during the next lesson.
			Make your own 3D model During this lesson, learners will produce their own 3D model based on their planning during the previous lesson. They will evaluate their work and make improvements based on feedback from their peers.

Medium Term Plan – Computing – Year 6 Summer 2: **PROGRAMMING B – Sensing movement**

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

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	- Physical computing and that code is used by some hardware - Some physical computing devices and what they can be used for (Crumble controllers) - LED lights and their application - Selection and how programs use it - Loops and how programs use them	- Micro:bit - MakeCode - Input - Process - Output - Flashing - USB - Selection - Condition - If... then... else - Variable - Random - Sensing - Accelerometer - Compass - Direction - Navigation - Design - Task - Algorithm - Step counter - Plan - Create - Code - Test - Debug	The micro:bit
			In this lesson, learners will be introduced to the micro:bit as an input, process, output device that can be programmed. Learners will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then flash their programs to the device.
			Go with the flow In this lesson, learners will explore how if, then, else statements are used to direct the flow of a program. They will initially relate if, then, else statements to real-world situations, before creating programs in Make-Code. They will apply their knowledge of if, then, else statements to create a program that features selection influenced by a random number to create a micro:bit fortune teller project.
Learning in this unit Microbits (Loan from BCA)	- To create a program to run on a controllable device - To explain that selection can control the flow of a program - To update a variable with a user input - To use an conditional statement to compare a variable to a value - To design a project that uses inputs and outputs on a controllable device - To develop a program to use inputs and outputs on a controllable device		Sensing inputs In this lesson, learners will initially use the buttons to change the value of a variable using selection. They will then develop their programs to update the variable by moving their micro:bit using the accelerometer to sense motion. Finally, they will learn that a variable can be displayed after it is updated or in response to an input.
			Finding your way In this lesson, learners will initially work at code level by applying their knowledge from the previous lesson to make their micro:bit perform the function of a compass. They will then design a program which will enable the micro:bit to be used as a navigational device. To code this, they will adapt the code they completed to make the compass.
			Designing a step counter In this lesson, learners will be working at the design level. They will pick out features of a step counter, a piece of technology with which they are likely to be familiar. They will then relate those features to the sensors on a micro:bit. Having seen a simulated example of a micro:bit step counter, learners will pick out features which they will be able to include in their design. In the main activity, learners will design the algorithm for their step counter project. Finally, they will connect the battery pack to their micro:bit to set it up as a datalogger.
			Making a step counter In this lesson, learners will use the design that they have created in Lesson 5 to make a micro:bit-based step counter. First they will review their plans, followed by

			creating their code. Depending on their level of confidence, they can use a scaffolded or part-complete project, otherwise they can start a new project. Learners will test and debug their code, using the emulator and then the physical device. To successfully complete this project, learners will need to use all four programming constructs: sequence, repetition, selection, and variables.
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