



# Progression of Skills, Understanding and Knowledge in Computing

Computing	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
		<b>Stage 1</b>	<b>Stage 2</b>	<b>Stage 3</b>	<b>Stage 4</b>	<b>Stage 4</b>	<b>Stage 4</b>	<b>Stage 5</b>	<b>Stage 5</b>
<b>Computer systems and networks</b>		<ul style="list-style-type: none"> <li>To identify technology</li> <li>To identify a computer and its main parts</li> <li>To use a mouse in different ways</li> <li>To use a keyboard to type on a computer</li> <li>To use the keyboard to edit text</li> <li>To create rules for using technology responsibly</li> </ul>	<ul style="list-style-type: none"> <li>To recognise the uses and features of information technology</li> <li>To identify the uses of information technology in the school</li> <li>To identify information technology beyond school</li> <li>To explain how information technology helps us</li> <li>To explain how to use information technology safely</li> <li>To explain how digital devices function</li> <li>To identify input and output devices</li> <li>To recognise how digital devices can change the way we work</li> <li>To explain how a computer network can be used to share information</li> <li>To explore how digital devices can be connected</li> <li>To recognise the physical components of a network</li> </ul>	<ul style="list-style-type: none"> <li>To describe how networks physically connect to other networks</li> <li>To recognise how networked devices make up the internet</li> <li>To outline how websites can be shared via the World Wide Web (WWW)</li> <li>To describe how content can be added and accessed on the World Wide Web (WWW)</li> <li>To recognise how the content of the WWW is created by people</li> <li>To evaluate the consequences of unreliable content</li> </ul>	<ul style="list-style-type: none"> <li>To explain that computers can be connected together to form systems</li> <li>To recognise the role of computer systems in our lives</li> <li>To describe how search engines select results</li> <li>To explain how search results are ranked</li> <li>To recognise why the order of results is important, and to whom</li> <li>To explain the importance of internet addresses</li> <li>To recognise how data is transferred across the internet</li> <li>To explain how sharing information online can help people to work together</li> <li>To evaluate different ways of working together online</li> </ul>	<ul style="list-style-type: none"> <li>Choose search terms relating to a particular issue</li> <li>Identify key features of a good poster</li> <li>Use tools to copy an image into another application</li> <li>Create a poster using a desktop publishing application</li> <li>Plan a poster to clearly convey a message</li> <li>Choose how to combine text and graphics in a slide</li> <li>Modify a logo using a graphic editing program</li> <li>Use digital tools to provide feedback on design choices</li> <li>Modify a logo so that it fits in with the planned slide styles</li> <li>Plan a consistent layout for a set of slides</li> <li>Create a styled set of slides based on a plan</li> <li>Search for and add a suitable image</li> <li>Search for suitable text for slides</li> <li>Evaluate your work against a rubric</li> <li>Explain your work to others through a presentation</li> </ul>			





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Creating Media 1		<ul style="list-style-type: none"> <li>To describe what different freehand tools do</li> <li>To use the shape tool and the line tools</li> <li>To make careful choices when painting a digital picture</li> <li>To explain why I chose the tools I used</li> <li>To use a computer on my own to paint a picture</li> <li>To compare painting a picture on a computer and on paper</li> </ul>	<ul style="list-style-type: none"> <li>To use a digital device to take a photograph</li> <li>To make choices when taking a photograph</li> <li>To describe what makes a good photograph</li> <li>To decide how photographs can be improved</li> <li>To use tools to change an image</li> <li>To explain that animation is a sequence of drawings or photographs</li> <li>To relate animated movement with a sequence of images</li> <li>To plan, review and improve an animation</li> </ul>	<ul style="list-style-type: none"> <li>To identify that sound can be recorded</li> <li>To explain that audio recordings can be edited</li> <li>To recognise the different parts of creating a podcast project</li> <li>To apply audio editing skills independently</li> <li>To combine audio to enhance my podcast project</li> <li>To evaluate the effective use of audio</li> </ul>	<ul style="list-style-type: none"> <li>To explain what makes a video effective</li> <li>To identify digital devices that can record video</li> <li>To capture video using a range of techniques</li> <li>To create a storyboard</li> <li>To identify that video can be improved through reshooting and editing</li> <li>To consider the impact of the choices made when making and sharing a video</li> <li>To review an existing website and consider its structure</li> <li>To plan the features of a web page</li> <li>To consider the ownership and use of images (copyright)</li> <li>To recognise the need to preview pages</li> <li>To outline the need for a navigation path</li> <li>To recognise the implications of linking to content owned by other people</li> </ul>	<p>Part 1:</p> <ul style="list-style-type: none"> <li>Define 'protocol' and provide examples of non-networking protocols</li> <li>Define what a computer network is and explain how data is transmitted between computers across networks</li> <li>List examples of the hardware necessary for connecting devices to networks</li> <li>Compare wired to wireless connections and list examples of specific technologies currently used to implement such connections</li> <li>Define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important</li> <li>Describe key words such as 'protocols', 'packets', and 'addressing'</li> <li>Explain how data travels between computers across the internet</li> <li>Describe how internet-connected devices can affect me</li> <li>Describe how services are provided over the internet</li> <li>Explain the difference between the internet, its services, and the World Wide Web</li> <li>Explain the term 'connectivity' as the capacity for connected devices ('Internet of Things') to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation)</li> <li>List some of these services and the context in which they are used</li> <li>Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together</li> </ul>			



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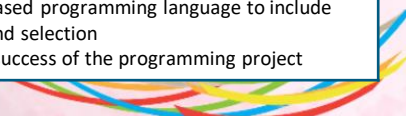
Computing	EYF5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5			
Creating Media 1									<p>Part 2:</p> <p>Explain the difference between a general-purpose computing system and a purpose-built device</p> <p>Recall that a general-purpose computing system is a device for executing programs</p> <p>Recall that a program is a sequence of instructions that specify operations that are to be performed on data"</p> <p>Describe how the hardware components used in computing systems work together in order to execute programs</p> <p>Describe the function of the hardware components used in computing systems</p> <p>Recall that all computing systems, regardless of form, have a similar structure ('architecture')</p> <p>Analyse how the hardware components used in computing systems work together in order to execute programs</p> <p>Define what an operating system is, and recall its role in controlling program execution</p> <p>Describe how hardware is built out of increasingly complex logic circuits</p> <p>Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions</p> <p>Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits</p> <p>Use logic gates to construct logic circuits, and associate these with logical operators and expressions</p> <p>Associate the use of artificial intelligence with moral dilemmas</p> <p>Describe how machine learning differs from traditional programming</p> <p>Describe the steps involved in training machines to perform tasks (gathering data, training, testing)</p> <p>Identify examples of artificial intelligence and machine learning in the real world</p> <p>Provide broad definitions of 'artificial intelligence' and 'machine learning'</p> <p>Explain the implications of sharing program code</p>





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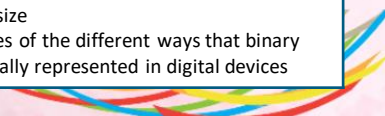
Computing	EYF5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
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Creating Media 2		<p>Digital writing</p> <ul style="list-style-type: none"> <li>To add and remove text on a computer</li> <li>To identify that the look of text can be changed on a computer</li> <li>To make careful choices when changing text</li> <li>To explain why I used the tools that I chose</li> <li>To compare typing on a computer to writing on paper</li> </ul>	<p>Digital photography</p> <ul style="list-style-type: none"> <li>To use a digital device to take a photograph</li> <li>To make choices when taking a photograph</li> <li>To describe what makes a good photograph</li> <li>To decide how photographs can be improved</li> <li>To use tools to change an image</li> </ul> <p>Desktop publishing</p> <ul style="list-style-type: none"> <li>To recognise how text and images convey information</li> <li>To recognise that text and layout can be edited</li> <li>To choose appropriate page settings</li> <li>To consider how different layouts can suit different purposes</li> <li>To consider the benefits of desktop publishing</li> </ul>	<p>Photo editing</p> <ul style="list-style-type: none"> <li>To explain that the composition of digital images can be changed</li> <li>To explain that colours can be changed in digital images</li> <li>To explain how cloning can be used in photo editing</li> <li>To combine images for a purpose</li> <li>To evaluate how changes can improve an image</li> </ul>	<p>Vector graphs</p> <ul style="list-style-type: none"> <li>To identify that drawing tools can be used to produce different outcomes</li> <li>To create a vector drawing by combining shapes</li> <li>To recognise that vector drawings consist of layers</li> <li>To group objects to make them easier to work with</li> <li>To recognise that you can work in three dimensions on a computer</li> <li>To plan and create my own 3D model</li> </ul>	<p>Part A:</p> <ul style="list-style-type: none"> <li>Apply the key features of a word processor to format a document</li> <li>Evaluate formatting techniques to understand why we format documents</li> <li>Select the most appropriate software to use to complete a task</li> <li>Apply appropriate formatting techniques</li> <li>Select appropriate images for a given context</li> <li>Apply techniques in order to identify whether or not a source is credible</li> <li>Apply referencing techniques and understand the concept of plagiarism</li> <li>Evaluate online sources for use in own work</li> <li>Apply referencing techniques that credit authors appropriately</li> <li>Construct a blog using appropriate software</li> <li>Organise the content of the blog based on credible sources</li> </ul> <p>Part B:</p> <ul style="list-style-type: none"> <li>Identify when a problem needs to be broken down</li> <li>Implement and customise GUI elements to meet the needs of the user</li> <li>Develop a partially complete application to include additional functionality</li> <li>Recognise that events can control the flow of a program</li> <li>Use user input in an event-driven programming environment</li> <li>Use variables in an event-driven programming environment</li> <li>Establish user needs when completing a creative project</li> <li>Identify and fix common coding errors</li> <li>Pass the value of a variable into an object</li> <li>Apply decomposition to break down a large problem into more manageable steps</li> <li>Use user input in a block-based programming language</li> <li>Use variables in a block-based programming language</li> <li>Reflect and react to user feedback</li> <li>Use a block-based programming language to include sequencing and selection</li> <li>Evaluate the success of the programming project</li> </ul>			





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<b>Data and Information</b>		<ul style="list-style-type: none"> <li>To label objects</li> <li>To identify that objects can be counted</li> <li>To describe objects in different ways</li> <li>To count objects with the same properties</li> <li>To compare groups of objects</li> <li>To answer questions about groups of objects</li> </ul>	<ul style="list-style-type: none"> <li>To recognise that we can count and compare objects using tally charts</li> <li>To recognise that objects can be represented as pictures</li> <li>To create a pictogram</li> <li>To select objects by attribute and make comparisons</li> <li>To recognise that people can be described by attributes</li> <li>To explain that we can present information using a computer</li> <li>To create questions with yes/no answers</li> <li>To identify the attributes needed to collect data about an object</li> <li>To create a branching database</li> <li>To explain why it is helpful for a database to be well structured</li> <li>To plan the structure of a branching database</li> <li>To independently create an identification tool</li> </ul>		<ul style="list-style-type: none"> <li>To explain that data gathered over time can be used to answer questions</li> <li>To use a digital device to collect data automatically</li> <li>To explain that a data logger collects 'data points' from sensors over time</li> <li>To recognise how a computer can help us analyse data</li> <li>To identify the data needed to answer questions</li> <li>To use data from sensors to answer questions</li> </ul>		<ul style="list-style-type: none"> <li>To use a form to record information</li> <li>To compare paper and computer-based databases</li> <li>To outline how you can answer questions by grouping and then sorting data</li> <li>To explain that tools can be used to select specific data</li> <li>To explain that computer programs can be used to compare data visually</li> <li>To use a real-world database to answer questions</li> <li>To create a data set in a spreadsheet</li> <li>To build a data set in a spreadsheet</li> <li>To explain that formulas can be used to produce calculated data</li> <li>To apply formulas to data</li> <li>To create a spreadsheet to plan an event</li> <li>To choose suitable ways to present data</li> </ul>		<ul style="list-style-type: none"> <li>Part 1:</li> <li>Identify columns, rows, cells, and cell references in spreadsheet software</li> <li>Use formatting techniques in a spreadsheet</li> <li>Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /)</li> <li>Use the autofill tool to replicate cell data</li> <li>Explain the difference between data and information</li> <li>Explain the difference between primary and secondary sources of data</li> <li>Collect and analyse data</li> <li>Create appropriate charts in a spreadsheet</li> <li>Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet</li> <li>Use a spreadsheet to sort and filter data</li> <li>Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet</li> <li>Apply all of the spreadsheet skills covered in this unit</li> <li>Use conditional formatting in a spreadsheet</li> <li>Part 2:</li> <li>List examples of representations</li> <li>Provide examples of how different representations are appropriate for different tasks</li> <li>Recall that representations are used to store, communicate, and process information</li> <li>Measure the length of a representation as the number of symbols that it contains</li> <li>Provide examples of how symbols are carried on physical media</li> <li>Recall that characters can be represented as sequences of symbols and list examples of character coding schemes</li> <li>Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters</li> <li>Measure the size or length of a sequence of bits as the number of binary digits that it contains</li> <li>Convert a decimal number to binary and vice versa</li> <li>Describe how natural numbers are represented as sequences of binary digits</li> <li>Convert between different units and multiples of representation size</li> <li>Provide examples of the different ways that binary digits are physically represented in digital devices</li> </ul>	







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Programming		<ul style="list-style-type: none"> <li>To choose a command for a given purpose</li> <li>To show that a series of commands can be joined together</li> <li>To identify the effect of changing a value</li> <li>To explain that each sprite has its own instructions</li> <li>To design the parts of a project</li> <li>To use my algorithm to create a program</li> <li>To explain that a sequence of commands has a start and an outcome</li> <li>To create a program using a given/own design</li> <li>To decide how my project can be improved</li> </ul>	<ul style="list-style-type: none"> <li>To explain how a sprite moves in an existing project</li> <li>To create a program to move a sprite in four directions</li> <li>To adapt a program to a new context</li> <li>To develop my program by adding features</li> <li>To identify and fix bugs in a program</li> <li>To design and create a maze-based challenge</li> </ul>	<ul style="list-style-type: none"> <li>To develop the use of count-controlled loops in a different programming environment</li> <li>To explain that in programming there are infinite loops and count controlled loops</li> <li>To develop a design that includes two or more loops which run at the same time</li> <li>To modify an infinite loop in a given program</li> <li>To design and create a project that includes repetition</li> </ul>	<ul style="list-style-type: none"> <li>To explain how selection is used in computer programs</li> <li>To relate that a conditional statement connects a condition to an outcome</li> <li>To explain how selection directs the flow of a program</li> <li>To design, create and evaluate a program which uses selection</li> <li>To explain how selection is used in computer programs</li> <li>To relate that a conditional statement connects a condition to an outcome</li> <li>To explain how selection directs the flow of a program</li> <li>To design, create and evaluate a program which uses selection</li> </ul>	<ul style="list-style-type: none"> <li>Define a subroutine as a group of instructions that will run when called by the main program or other subroutines</li> <li>Define decomposition as breaking a problem down into smaller, more manageable subproblems</li> <li>Identify how subroutines can be used for decomposition</li> <li>Identify where condition-controlled iteration can be used in a program</li> <li>Implement condition-controlled iteration in a program</li> <li>Evaluate which type of iteration is required in a program</li> <li>Define a list as a collection of related elements that are referred to by a single name</li> <li>Identify when lists can be used in a program</li> <li>Apply appropriate constructs to solve a problem</li> <li>Decompose a larger problem into smaller subproblems</li> <li>Describe what algorithms and programs are and how they differ</li> <li>Locate and correct common syntax errors</li> <li>Recall that a program written in a programming language needs to be translated in order to be executed by a machine</li> <li>Write simple Python programs that display messages, assign values to variables, and receive keyboard input</li> <li>Describe the semantics of assignment statements</li> <li>Receive input from the keyboard and convert it to a numerical value</li> <li>Use simple arithmetic expressions in assignment statements to calculate values</li> <li>Generate and use random integers</li> <li>Use binary selection (if, else statements) to control the flow of program execution</li> <li>Use relational operators to form logical expressions</li> <li>Describe how iteration (while statements) controls the flow of program execution</li> <li>Use multi-branch selection (if, elif, else statements) to control the flow of program execution</li> <li>Use iteration (while loops) to control the flow of program execution</li> <li>Use variables as counters in iterative programs</li> <li>Combine iteration and selection to control the flow of program execution</li> <li>Use Boolean variables as flags</li> </ul>			

