Computing Progression of skills

Computing National Curriculum Statements and Strands						
Key Stage 1	**1.1** Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions					
	1.2 Create and debug simple programs					
	1.3 Use logical reasoning to predict the behaviour of simple programs					
	1.4 Use technology purposefully to create, organise, store, manipulate and retrieve digital content					
	1.5 Recognise common uses of information technology beyond school					
	1.6 Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.					
Computing Strands	(NW) Networks, (CM) Creating Media, (DI) Data & Information, (DD) Design & Development, (CS) Computing Systems, (IT) Impact of Technology, (AL) Algorithms, (PG) Programming, (ET) Effective Use of tools, (SS) Safety & Security					
Computing Strands		Effective use of tools	Impact of technology	Safety and security		
	Computing systems and networks	Creating media	**P**rogramming A **/** Algorithms	Data and information	Creating media / Design and Development	Programming B / Design and Development
Year 1	**Technology around us** Recognising technology in school and using it responsibly. To identify technology To identify a computer and its main parts To use a mouse in different ways To use a keyboard to type To use the keyboard to edit text To create rules for using technology responsibly	**Digital painting** Choosing appropriate tools in a program to create art, and making comparisons with working non-digitally. To describe what different freehand tools do To use the shape tool and the line tools To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer on my own to paint a picture To compare painting a picture on a computer and on paper	**Moving a robot** Writing short algorithms and programs for floor robots, and predicting program outcomes. To explain what a given command will do To act out a given word To combine forwards and backwards commands to make a sequence To combine four direction commands to make sequences To plan a simple program To find more than one solution to a problem	**Grouping data** Exploring object labels, then using them to sort and group objects by properties. To label objects To identify that objects can be counted To describe objects in different ways To count objects with the same properties To compare groups of objects To answer questions about groups of objects	**Digital writing** Using a computer to create and format text, before comparing to writing non-digitally. To use a computer to write To add and remove text on a computer To identify that the look of text can be changed on a computer To make careful choices when changing text To explain why I used the tools that I chose To compare writing on a computer with writing on paper	**Programming animations** Designing and programming the movement of a character on screen to tell stories. To choose a command for a given purpose To show that a series of commands can be joined together To identify the effect of changing a value To explain that each sprite has its own instructions To design the parts of a project To use my algorithm to create a program
NC links	**1.4, 1.5, 1.6**	**1.4**	**1.1, 1.2, 1.3, 1.5**	**1.4, 1.6**	**1.4, 1.6**	**1.1, 1.2, 1.3, 1.4**
Year 2	**Information technology around us** Identifying IT and how its responsible use improves our world in school and beyond. To recognise the uses and features of information technology To identify information technology in the home To identify information technology beyond school To explain how information technology benefits us To show how to use information technology safely To recognise that choices are made when using information technology	**Digital photography** Capturing and changing digital photographs for different purposes. To know what devices can be used to take photographs To use a digital device to take a photograph To describe what makes a good photograph To decide how photographs can be improved To use tools to change an image To recognise that images can be changed	**Robot algorithms** Creating and debugging programs, and using logical reasoning to make predictions. To describe a series of instructions as a sequence To explain what happens when we change the order of instructions To use logical reasoning to predict the outcome of a program (series of commands) To explain that programming projects can have code and artwork To design an algorithm To create and debug a program that I have written	**Pictograms** Collecting data in tally charts and using attributes to organise and present data on a computer. To recognise that we can count and compare objects using tally charts To recognise that objects can be represented as pictures To create a pictogram To select objects by attribute and make comparisons To recognise that people can be described by attributes To explain that we can present information using a computer	**Making Music** Using a computer as a tool to explore rhythms and melodies, before creating a musical composition. To say how music can make us feel To identify that there are patterns in music To describe how music can be used in different ways To show how music is made from a series of notes To create music for a purpose To review and refine our computer work	**Programming quizzes** Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz. To explain that a sequence of commands has a start To explain that a sequence of commands has an outcome To create a program using a given design To change a given design To create a program using my own design To decide how my project can be improved
NC links	**1.4, 1.5, 1.6**	**1.4, 1.5**	**1.1, 1.2, 1.3, 1.14**	**1.4, 1.6**	**1.4**	**1.1, 1.2, 1.3**

Computing Progression of skills

Computing National Curriculum Statements and Strands	
Key Stage 2	**2.1** Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
	2.2 Use sequence, selection, and repetition in programs; work with variables and various forms of input and output
	2.3 Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
	2.4 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
	2.5 Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
	2.6 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
	2.7 Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
Computing Strands	(NW) Networks, (CM) Creating Media, (DI) Data & Information, (DD) Design & Development, (CS) Computing Systems, (IT) Impact of Technology, (AL) Algorithms, (PG) Programming, (ET) Effective Use of tools, (SS) Safety & Security

Computing Strands		Effective use of tools	Impact of technology	Safety and security		
	Computing systems and networks	Creating media	Programming A / Algorithms	Data and information	Creating media / Design and Development	Programming B / Design and Development
Year 3	**Connecting computers** Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks. To explain how digital devices function To identify input and output devices To recognise how digital devices can change the way we work To explain how a computer network can be used to share information To explore how digital devices can be connected To recognise the physical components of a network	**Stop-frame animation** Capturing and editing digital still images to produce a stop-frame animation that tells a story. To explain that animation is a sequence of drawings or photographs To relate animated movement with a sequence of images To plan an animation To identify the need to work consistently and carefully To review and improve an animation To evaluate the impact of adding other media to an animation	**Sequencing sounds** Creating sequences in a block-based programming language to make music. To explore a new programming environment I can identify that each sprite is controlled by the commands I choose To explain that a program has a start To recognise that a sequence of commands can have an order To change the appearance of my project To create a project from a task description	**Branching databases** Building and using branching databases to group objects using yes/no questions. To create questions with yes/no answers To identify the object attributes needed to collect relevant data To create a branching database To identify objects using a branching database To explain why it is helpful for a database to be well structured To compare the information shown in a pictogram with a branching database	**Desktop publishing** Creating documents by modifying text, images, and page layouts for a specified purpose. To recognise how text and images convey information To recognise that text and layout can be edited To choose appropriate page settings To add content to a desktop publishing publication To consider how different layouts can suit different purposes To consider the benefits of desktop publishing	**Events and actions** in programs Writing algorithms and programs that use a range of events to trigger sequences of actions. To explain how a sprite moves in an existing project To create a program to move a sprite in four directions To adapt a program to a new context To develop my program by adding features To identify and fix bugs in a program To design and create a maze-based challenge
NC links	**2.2, 2.4, 2.6, 2.7**	**2.6**	**2.1, 2.2, 2.3, 2.6**	**2.6**	**2.5, 2.6**	**2.1, 2.2, 2.3, 2.6**
Year 4	**The internet** Recognising the internet as a network of networks including the WWW, and why we should evaluate online content. 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	**Audio editing** Capturing and editing audio to produce a podcast, ensuring that copyright is considered. 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:	**Repetition in shapes** Using a text-based programming language to explorecount-controlled loops when drawing hapes. 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	**Data logging** Recognising how and why data is collected over time, before using data loggers to carry out an investigation. 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	**Photo editing** Manipulating digital images, and reflecting on the impact of changes and whether the required purpose is fulfilled. 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	**Repetition in games** Using a block-based programming language to explore count-controlled and infinite loops when creating a game. 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
NC links	**2.4, 2.5, 2.6, 2.7**	**2.5, 2.6, 2.7**	**2.1, 2.2, 2.3, 2.6**	**2.2, 2.6**	**2.5, 2.6, 2.7**	**2.1, 2.2, 2.3, 2.6**
Year 5	**Sharing information** Identifying and exploring how information is shared between digital systems. To explain that computers can be connected together to form systems To recognise the role of computer systems in our lives To recognise how information is transferred over the internet To explain how sharing information online lets people in different places work together To contribute to a shared project online To evaluate different ways of working together online	**Video editing** Planning, capturing, and editing video to produce a short film. To recognise video as moving pictures, which can include audio To identify digital devices that can record video To capture video using a digital device To recognise the features of an effective video To identify that video can be improved through reshooting and editing To consider the impact of the choices made when making and sharing a video	**Selection in physical computing** Exploring conditions and selection using a programmable microcontroller. To control a simple circuit connected to a computer To write a program that includes count-controlled loops To explain that a loop can stop when a condition is met, eg number of times To conclude that a loop can be used to repeatedly check whether a condition has been met To design a physical project that includes selection To create a controllable system that includes selection	**Flat-file databases** Using a database to order data and create charts to answer questions. To use a form to record information To compare paper and computer-based databases To outline how grouping and then sorting data allows us to answer questions To explain that tools can be used to select specific data To explain that computer programs can be used to compare data visually To apply my knowledge of a database to ask and answer real-world questions	**Vector drawing** Creating images in a drawing program by using layers and groups of objects. To identify that drawing tools can be used to produce different outcomes To create a vector drawing by combining shapes To use tools to achieve a desired effect To recognise that vector drawings consist of layers To group objects to make them easier to work with To evaluate my vector drawing	**Selection in quizzes** Exploring selection in programming to design and code an interactive quiz. To explain how selection is used in computer programs To relate that a conditional statement connects a condition to an outcome To explain how selection directs the flow of a program To design a program which uses selection To create a program which uses selection To evaluate my program
NC links	**2.1, 2.2, 2.4, 2.6, 2.7**	**2.5, 2.6, 2.7**	**2.1, 2.2, 2.3, 2.6**	**2.5, 2.6**	**2.6**	**2.1, 2.2, 2.3, 2.6**
Year 6	**Internet communication** Recognising how the WWW can be used to communicate and be searched to find information. 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	**Webpage creation** Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation. 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	**Variables in games** Exploring variables when designing and coding a game. 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	**Introduction to spreadsheets** Answering questions by using spreadsheets to organise and calculate data. 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	**3D modelling** Planning, developing, and evaluating 3D computer models of physical objects. 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	**Sensing** Designing and coding a project that captures inputs from a physical device. 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
NC links	**2.1, 2.4, 2.5, 2.6, 2.7**	**2.5, 2.6, 2.7**	**2.1, 2.2, 2.3, 2.6**	**2.6**	**2.6, 2.7**	**2.1, 2.2, 2.3, 2.6**