Computing – Substantive and Disciplinary Progression Maps

Underpinning the intent are key concepts and the National Curriculum Computing statements for Key stages 1 and 2). These are further refined with key substantive and disciplinary concepts.

Substantive Concept:

- **Computer Science -** The technical design. The design of new software, the solution to computing problems and the development of different ways to use technology.
- **Information technology -** The technical knowledge. The design, use and understanding of hardware and software; computers and electronic systems for storing and using information.
- **Digital Literacy -** The technical skills. The ability to use information and communication technologies to find, create, evaluate, and communicate information.

Disciplinary Concept:

- **Code -** Using and writing codes to produce instructions and algorithms; to solve problems; to test and use logic and sequences against inputs and outputs.
- **Connect -** Being able to safely, efficiently and confidently digitally connect with others.
- **Communicate -** Being able to safely, efficiently and confidently use apps and information technology to communicate ideas.
- **Collect -** Being able to safely, efficiently and confidently find, evaluate, store, sort and use appropriate data.

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Substantive knowledge progression

Substantive Knowledge	EYFS (Understanding the world)	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Computer Science	To explore programmable toys such as Botley, Beebot or Cod-eapillar. To use some words like forwards and backwards to describe how I want to make a programmable toy move. To give a simple set of instructions e.g. how to brush your teeth.	To show the difference in outcomes between two sequences that consist of the same commands. To follow a sequence I can predict the outcome of a sequence To compare my prediction to the program outcome To explain the choices I made for my mat design To identify different routes around my mat To test my mat to make sure that it is usable To explain what my algorithm should achieve To create an algorithm to meet my goal	To identify that accuracy in programming is important To explain what 'repeat' means To decompose a program into parts 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 that 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 construct a digital 3D model of a physical object design a digital model by combining 3D objects To develop and improve a digital 3D model To plan the features of a web page To define a 'variable' as something that is changeable To create a program to run on a controllable device

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		To use my algorithm to create a program		
Information technology	To name some sources of IT from home and school. To know that typing using a keyboard is another way of writing information. To know that digital devices can be used to create pictures. To know that things can be similar or different in lots of ways and can talk about some of these similarities and differences.	To identify examples of computers and describe some uses of computers. To identify that a computer is a part of information technology and can explain the purpose of information technology in the home To talk about uses of information technology and compare types of information technology. To list different uses of information technology and recognise how to use information technology responsibly. To say how those rules/guides can help me and identify the choices that I make when using information technology To explain simple guidance for using information technology in different environments and settings To enjoy a variety of activities	To identify that sound can be digitally recorded 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 To describe how images can be changed for different uses To make good choices when selecting different tools To evaluate how changes can improve an image To explain that data gathered over time can be used to answer questions To explain that a data logger collects	To explain how search results are ranked To compare working digitally with 2D and 3D graphics To identify that physical objects can be broken down into a collection of 3D shapes To review an existing website and consider its structure To explain that objects can be described using data To explain why a variable is used in a program To explain that selection can control the flow of a program

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		To sort devices into old and new To talk about how to take a photograph and I can explain the process of taking a good photograph. To identify what is wrong with a photograph and I can discuss how to take a good photograph. To improve a photograph by retaking it. To explore the effect that light has on a photo and to experiment with different light sources. To recognise that images can be changed and I can use a tool to achieve a desired effect I c**an explain my choices .**	'data points' from sensors over time To identify the data needed to answer questions	
Digital literacy	To know what to do if I see something that worries me when I am using a digital device.	To recognise that images can be changed. To recognise common uses of information technology beyond school To use technology safely and respectfully, keeping personal information private; identify where	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	To recognise why the order of results is important, and to whom To use a computer to create and manipulate three- dimensional (3D) digital objects To identify questions which can be answered using data

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		to go for help and support when they have concerns about content or contact on the internet or other online technologies	WWW is created by people To evaluate the consequences of unreliable content To explain that digital images can be changed To recognise that not all images are real	To create a spreadsheet to plan an event To choose how to improve a game by using variables To design a project that uses inputs and outputs on a controllable device

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Disciplinary Knowledge

	EYFS	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Code	I can push a button to make a programmable toy move. I can find a power button on a programmable toy and I need to switch it on to make it work.	I can follow instructions given by someone else I can choose a series of words that can be enacted as a sequence I can give clear and unambiguous instructions I can create different algorithms for a range of sequences (using the same commands) I can use an algorithm to program a sequence on a floor robot I can plan algorithms for different parts of a task I can test and debug each part of the program I can put together the different parts of my program	To create a program in a text-based language To modify a count-controlled loop to produce a given outcome To create a program that uses count- controlled loops to produce a given outcome To create a project that includes repetition	To design a [variable game] project that builds on a given example To use my design to create a project To evaluate my project To update a variable with a user input To use an conditional statement to compare a variable to a value To develop a program to use inputs and outputs on a controllable device

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	EYFS	**Year 1 and Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Connect	I can find and start a favourite app on a digital device. I can search for things I like with support on a child-safe search engine.	I can find examples of information technology To recognise that images can be changed	To understand that any personal information they put online can be seen and used by others. To recognise the effect their writing or images might have on others.	To identify how to use a search engine To consider the ownership and use of images (copyright)

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	EYFS	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Communicate	I can select letters on a keyboard to write simple words and sentences. I am learning where the spacebar and enter button are and what they can do. I can use a mousepad to move a click a cursor, or my finger on a touchscreen to move and select.	I can open a file I can move and resize images I can demonstrate how information technology is used in a shop I can recognise that information technology can be connected I can explain how information technology helps people Digital Photography I can capture digital photos and talk about my experience I can take photos in both landscape and portrait format I can focus on an object Making Music I can use a computer to experiment with pitch and duration	Learn how to make a stop-frame animation or other type of presentation. Use text and images to communicate clearly Use return, backspace and shift keys Learn how to create a magazine. To use a digital device to record sound To change the composition of an image	To recognise how we communicate using technology 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 To choose suitable ways to present data

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	EYFS	**Year 1 and Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Collect	I can sort a group of objects using two given criteria e.g. feathers and fur or curved and straight edges.	I can record data in a tally chart I can represent a tally count as a total I can compare totals in a tally chart I can enter data onto a computer I can use a computer to view data in a different format I can use pictograms to answer simple questions about objects I can organise data in a tally chart I can use a tally chart to create a pictogram I can explain what the pictogram shows	To use a digital device to collect data automatically To use data collected over a long duration to find information To use collected data to answer questions	To describe how search engines select results To explain that formula can be used to produce calculated data To apply formulas to data, including duplicating

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		I can tally objects using a common attribute I can create a pictogram to arrange objects by an attribute I can answer 'more than'/'less than' and 'most/least' questions about an attribute I can choose a suitable attribute to compare people I can collect the data I need I can create a pictogram and draw conclusions from it I can use a computer program to present information in different ways I can share what I have found out using a computer I can give simple examples of why information should not be shared		

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