Computing: Substantive and Disciplinary Knowledge KS2

	Year 3	Year 4	Year 5	Year 6
Substantive: Computer Science	I understand how event blocks can be used to start a project in a variety of different ways. Learn how to create sequence of commands. Understand how to programme movement.	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 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 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.

Substantive: Information Technology	To understand how a digital device works and what parts make up a digital device. Understanding how digital devices help us and how computers are connected. Understand what a branching database is.	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 'data points' from sensors over time. To identify the data needed to answer questions.	To identify that drawing tools can be used to produce different outcomes. To recognise that vector drawings consist of layers. To recognise video as moving pictures, which can include audio. To identify digital devices that can record video. To recognise the features of an effective video. To identify that video can be improved through reshooting and editing. 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 explain how selection is used in computer programs.	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

Substantive: Digital Literacy	**Copyright and ownership** Explain why copying someone else's work from the internet without permission can cause problems and give examples. When searching on the internet for content to use, explain why you need to consider who owns it. Give examples of content that is permitted to be reused.	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. To explain that digital images can be changed. To recognise that not all images are real.	To evaluate my vector drawing. To use tools to achieve a desired effect. To create a vector drawing by combining shapes. To group objects to make them easier to work with. To design a physical project that includes selection. To create a controllable system that includes selection. To relate that a conditional statement connects a condition to an outcome. To design a program which uses selection. To create a program which uses selection. To evaluate my program.	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. 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.
Disciplinary: Code	Use code to make a musical instrument. Learn how to debug a programme.	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 write a program that includes count-controlled loops. To explain how selection directs the flow of a program	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.

Disciplinary: Connect	**Managing online information** Use key phrases in search engines. Use search technologies effectively. **Copyright and ownership** Use of search tools to find and access online content which can be reused by others.	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 consider the impact of the choices made when making and sharing a video.	To identify how to use a search engine. To consider the ownership and use of images (copyright)
Disciplinary: Communicate	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 evaluate different ways of working together online.	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.
Disciplinary: Collect	Create a branching database. Use a branching database to answer questions.	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 capture video using a digital device.	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.