| Year 5
Computing
Autumn 1
Computing systems and networks: Search engines	
Previous learning	
Before starting this unit, you might want to check that children can recall:

-A network is more than one electronic device connected through the internet or a local connection to share files and information.
-The internet is a worldwide network that enables tens of millions of computers around the globe to share information and allows users to communicate with each other.
-You should tell a trusted adult if you feel unsafe or worried online. | |

Substantive Knowledge in Computing	**Disciplinary knowledge in Computing**
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Lesson 1	**Searching basics**
	To understand what a search engine is and how to use it.

I can explain what a search engine is.
I can use a search engine to navigate the web.
I can suggest keywords for searching. |
| Lesson 2 | **Inaccurate information** |
| | To be aware that not everything online is true.

I can recognise that not everything online is true.
I can understand anyone can create a website.
I can suggest ways of checking validity. |
| Lesson 3 | **Web quest** |
| | To search effectively.

I can understand the importance of keywords.
I can use the acronym TASK.
I can use my search skills to answer focused questions. |
| Lesson 4 | **Information poster** |
| | To create an informative poster.

I can include a title and at least five facts.
I can choose appropriate pictures, colours and designs.
I can consider fair use.
I can credit people for information, images and videos I use. |
| Lesson 5 | **Web crawlers** |
| | To understand how search engines work.

I can understand the role of a web index. |

	I can explain what web crawlers are. I can discuss page rank.
Vocabulary	
data leak, data privacy, network, online, search engine, Website, correct, deceive, fake news, inaccurate information, keywords, TASK, copyright, credit, fair, inappropriate	

Year 5
Computing
Autumn 2
Programming 1: Music

Previous learning

Before starting this unit, you might want to check that children can recall:

Scratch is a programming language.
What a loop is and how it improves programming.
Decomposition means to break a problem down into smaller chunks.
Remixing is when existing code is adapted to create something new.

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Lesson 1	**Tinkering with Scratch music elements**
	To tinker with Scratch music elements. I can identify that Scratch is a coding application with music elements. I can predict what I think different code blocks will do. I can explore Scratch independently. I can explain what I found from tinkering.
Lesson 2	**Scratch soundtracks**
	To create a program that plays themed music. I can use Scratch's basic sound commands. I can include a loop in my program. I can debug simple errors in my code.
Lesson 3	**Planning a soundtrack**
	To plan a soundtrack program. I can decompose a story. I can plan my program by tinkering. I can explain how my program will add to the story.
Lesson 4	**Programming a soundtrack**
	To program a soundtrack. I can work from a plan. I can use a range of programming commands. I can explain how my program enhances the scene.

Lesson 5	Battle of the bands
	To program music for a specific purpose. I can combine known commands. I can code music with a purpose. I can use repetition in a program. I can use various forms of output [sound].

Vocabulary
basic command, tinkering, debug, code, loop, pitch, program, rhythm, tempo, timbre, decompose, pitch, rhythm, soundtrack, repeat, output

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Year 5 Computing Spring 1 Data handling: Mars Rover 1

Previous learning
Before starting this unit you might want to check children can recall: What a branching database is. Filtering data shows only selected data. Logging information means recording data.

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Lesson 1	Mars Rover
	To identify how and why data is collected from space. I can recall the meanings of 'data' and 'transmit'. I can identify a type of data that the Mars Rover may transmit back to Earth. I can identify the challenges of transmitting data over large distances. I can explain why data is being collected from the Mars Rover.
Lesson 2	Binary code
	To read and calculate numbers using binary code. I can identify binary as the most basic way that computers communicate. I can read binary numbers up to eight characters. I can recall that each number (one or zero) is referred to as a bit. I can calculate binary numbers, knowing each digit is worth double the one that precedes it.
Lesson 3	Computer architecture
	To identify the computer architecture of the Mars Rovers. I can identify sensors. I can identify the difference between computer input and output. I can explain how the size of random-access memory (RAM) affects the processing of data (CPU).
Lesson 4	Using binary - numbers

	To use simple operations to calculate bit patterns. I can recall how binary is used to represent numbers up to 255. I can recall that computers use binary mathematically to calculate data. I can carry out binary addition.
Lesson 5	**Using binary - text**
	To represent binary as text. I can recall that binary is the main means of all data transfer. I can identify that data transfer needs a common language. I can use binary to create a written message.
Vocabulary	
data, data transmission, discovery, Mars Rover, signal, 8-bit binary, binary code, data transmission, numerical data, radio signal, sequence, byte, CPU, input, output, RAM, simulation, binary numbers	

Year 5 Computing Spring 2 Programming 2: Micro:bit
Previous learning
Before starting this unit you might want to check children can recall: What is coding? (Using a set of instructions for a computer to understand.) What are programming blocks? (The part of the coding platform which give the instructions.) Why are the blocks colour coded? (They all belong in the same category as they all have similar attributes.) What is the process called to fix an error in a code? (Debugging.)

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Lesson 1	**Tinkering with BBC Micro:bit**
	To tinker with a new piece of software. I can predict what I think something new will do. I can explore something independently. I can explain what I found.
Lesson 2	**Programming an animation**
	To program an animation. I can decompose an animation into a series of images. I can explain the difference between 'on start' and 'forever' blocks. I can choose the blocks I need for my program.
Lesson 3	**Polling program**
	To recognise coding structures. I can identify some code blocks. I can predict what a block or program does.

	I can explain how and why a program works.
Lesson 4	**Programming a pedometer**
	To create a program for a specific task. I can recognise code blocks. I can decompose a program. I can debug a program.
Lesson 5	**Programming a scoreboard**
	To create a program. I can decompose a program. I can write an algorithm. I can debug a program.
Vocabulary	
Algorithm, Animation, App, Blocks, Bluetooth, Code block, Connection, Debug, Decompose, Designing, Desktop, Device Download, Input, Instructions, Load, Loop, Micro:bit, Outputs, Pairing, Pedometer, Polling, Program, Repetition, Reset, Sabotage, Systematic, Tinkering, USB, Variables, Wifi, Wireless	

Year 5 Computing Summer 1 Creating media: Stop motion animation	
Previous learning	
N/A	
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Lesson 1	**Animation explored**
	To understand what animation is I understand and can explain what 'animation' means I can explain the history of animation I can create my own 19th century animation toy
Lesson 2	**Exploring stop motion**
	To understand what stop motion animation is I understand and can explain what 'stop motion' means I understand how to create a short animation I understand what onion skinning is I can make small changes to my object to make my animation smoother
Lesson 3	**Planning my stop motion project**
	To plan my stop motion video, thinking about the characters I want to use I can work collaboratively with others to plan a storyboard for an animation

	I can keep my animation idea simple I can design and create a character that can be used in my animation I can decompose my story into smaller parts
Lesson 4	**Stop motion creation**
	To create a stop motion animation I can create a simple animation following my storyboard plan I can change my plan to recognise when something is too difficult to animate I understand the importance of keeping the camera still and making small movements between shots
Lesson 5	**Editing my stop motion project**
	To edit and assess my stop motion animation I can make small changes to my models to make my animation smoother I can delete frames I can assess my animation
Vocabulary	
Animation, Animator, Background, Character, Decomposition, Design, Digital device, Edit, Evaluate, Flip book, Fluid movement, Frames, Model, Moving images, Onion skinning, Still images, Stop motion, Storyboard, Thaumatrope, Zoetrope	

Year 5 Computing Summer 2 Skills showcase: Mars Rover 2
Previous learning
Before starting this unit, you might want to check that the children can recall: Data transmission is the movement of data from one point to another. The Mars rover is a robotic vehicle that explores, investigates and returns data about the terrain on Mars. Binary is the basic form of communication between computers, including the Mars rover. ASCII (American Standard Code for Information Interchange) uses binary codes to represent other characters, such as numbers and letters. A computer's RAM (Random Access Memory) stores the instructions while a program is running. A computer's CPU (Central Processing Unit) is the 'brain' of a computer. It handles data from input and output devices and the programs running on the computer.

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Lesson 1	**Pixels**
	To recognise how bit patterns represent images as pixels. I can recall how computers transfer data in binary. I can relate 8-bit binary to 256 possibilities. I can identify that a pixel is the smallest possible element of a digital image. I can explain how a series of pixels are used to encode an image.
Lesson 2	**Compressing images**

	To explain how the data for digital images can be compressed.
	I recall that images are made of pixels.
	I can relate the number of pixels to the size of an image.
	I can explain one of the methods of JPEG compression.
	I can explain how to reduce the file-size of a digital image.
Lesson 3	Fetch, decode, execute
	To identify and explain the fetch, decode, execute cycle.
	I understand the difference between ROM and RAM.
	I know what fetch, decode and execute look like in different contexts and examples.
	I can explain the fetch, decode, execute cycle.
Lesson 4	Tinkering with CAD
	To create a safe online profile and tinker with 3D design software.
	I can choose a safe and suitable username and password.
	I understand the importance of keeping personal information safe.
	I can begin to use 3D design software.
Lesson 5	TinkerCAD tutorials
	To modify the design of a 3D object using CAD software.
	I can undertake independent online tutorial-based learning.
	I can name my object.
	I can share my object to an online community.
	I can discuss how to use an online community responsibly.
Vocabulary

Vocabulary

3D, Algorithm, Binary image, CAD, Compression, CPU, Data, Drag and drop, Fetch, decode, execute, ID card, Input, JPEG, Memory, Online community, Operating system, Output, Pixels, RAM, Responsible, RGB, ROM