Yearly Overview — **Subject: Computing** — **Year Group: 5**

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit of work	**Search Engines**	**Programming music: Scratch**	**Stop Motion Animation (Option 1)**	**Mars Rover 1**	**Micro:bit**	**Mars Rover 2**
Link to programme of study	Computer systems and networks	Programming	Creating media	Data handling	Programming	Skills showcase
Composite Knowledge	To know how search engines work. To understand that anyone can create a website and therefore we should take steps to check the validity of websites. To know that web crawlers are computer programs that crawl through the internet. To understand what copyright is.	To know that a soundtrack is music for a film/video and that one way of composing these is on programming software. To understand that using loops can make the process of writing music simpler and more effective. To know how to adapt their code while performing their music.	To understand that stop motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph. To know that decomposition of an idea is important when creating stop-motion animations. To know that editing is an important feature of making and improving a stop motion animation.	To know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock. To know what numbers using binary code look like and be able to identify how messages can be sent in this format. To understand that RAM is Random Access Memory and acts as the computer's working memory. To know what simple operations can be used to calculate bit patterns.	To know that a Micro:bit is a programmable device. To know that Micro:bit uses a block coding language similar to Scratch. To understand and recognise coding structures including variables. To know what techniques to use to create a program for a specific purpose (including decomposition).	To understand that bit patterns represent images as pixels. To understand that the data for digital images can be compressed. To know the difference between ROM and RAM. To understand various techniques that will improve the design of a 3D object (using CAD software).
Key Concepts and Key skills (Component / intentional knowledge - what they need to understand)	**Information Technology - Using Email and the Internet** Developing searching skills to help find relevant information on the internet. Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns **Digital Literacy and Online Safety** Recognising that information on the Internet might not be true or correct and learning ways of checking validity. Learn about different forms of communication that have developed with the use of technology.	**Computer Science - Programming** Beginning to use nested loops (loops within loops). Debugging their own code. Writing code to create a desired effect. Using a range of programming commands. Using repetition within a program. Writing more complex algorithms for a purpose. Iterating and developing their programming as they work. Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected. Amending code within a live scenario. Predicting how software will work based on previous experience. **Information Technology - Using Software** Using software programme Scratch to create music. Using logical thinking to explore software more independently, making predictions based on their previous experience. Identify ways to improve and edit programs, videos, images etc.	**Computer Science - Computational Thinking** Decomposing animations into a series of images. Decomposing a story to be able to plan a program to tell a story. **Information Technology - Using Software** Using the animation software: Stop Motion to create video animation. Identify ways to improve and edit final products.	**Computer Science - Hardware** Learning that external devices can be programmed by a separate computer. Recognising how the size of RAM affects the processing of data. Understanding the fetch, decode, execute cycle. **Computer Science - Networks and Data Representation** Learning the vocabulary associated with data: data and transmit. Recognising that computers transfer data in binary and understanding simple binary addition. Relating binary signals (Boolean) to the simple character-based language, ASCII. Learning that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary calculations. **Information Technology - Using Data** Understanding how data is collected.	**Computer Science - Programming** Programming an animation. Iterating and developing their programming as they work. Debugging their own code. Writing code to create a desired effect. Using a range of programming commands. **Information Technology - Using Software** Using logical thinking to explore software more independently, making predictions based on their previous experience.	**Computer Science - Hardware** Learning the difference between ROM and RAM. Recognising how the size of RAM affects the processing of data. Recognising that computers transfer data in binary and understanding simple binary addition. **Computer Science - Networks and Data Representation** Understanding the fetch, decode, execute cycle. Learning how the data for digital images can be compressed. Understanding how bit patterns represent images as pixels. **Information Technology - Using Software** Independently learning how to use 3D design software package TinkerCAD.
Learning Objectives	**Lesson 1:** To understand what a search engine is and how to use it. **Lesson 2:** To be aware that not everything online is true. **Lesson 3:** To search effectively. **Lesson 4:** To create an informative poster. **Lesson 5:** To understand how search engines work.	**Lesson 1:** To tinker with Scratch music elements **Lesson 2:** To create a program that plays themed music **Lesson 3:** To plan a soundtrack program **Lesson 4:** To program a soundtrack **Lesson 5:** To program music for a specific purpose	**Lesson 1:** To understand what animation is. **Lesson 2:** To understand what stop motion animation is. **Lesson 3:** To plan my stop motion video, thinking about the characters I want to use. **Lesson 4:** To create a stop motion animation. **Lesson 5:** To edit and assess my stop motion animation.	**Lesson 1:** To identify how and why data is collected from space. **Lesson 2:** To read and calculate numbers using binary code. **Lesson 3:** To identify the computer architecture of the Mars Rovers. **Lesson 4:** To use simple operations to calculate bit patterns. **Lesson 5:** To represent binary as text.	**Lesson 1:** To tinker with a new piece of software. **Lesson 2:** To program an animation. **Lesson 3:** To recognise coding structures. **Lesson 4:** To create a program. **Lesson 5:** To create a program.	**Lesson 1:** To understand how bit patterns represent images as pixels. **Lesson 2:** To explain how the data for digital images can be compressed. **Lesson 3:** To identify and explain the 'fetch, decode, execute' cycle. **Lesson 4:** To create a safe online profile and tinker with 3D design software. **Lesson 5:** To modify the design of a 3D object using CAD software.
Vocabulary	algorithm, company logo, data leak, data privacy, inaccurate information, index, keywords, network, online, page rank, TASK, web crawler, website, WWW	basic commands, block (Scratch), bug, computer code, code (verb), debug, error, loop, pitch, rhythm, soundtrack, tempo, timbre, tinker	animation, animator, background, decompose, design, digital device, duplicate, editing, frame, illusion, onion skinning, stop-motion, storyboard	binary code, data, input, output, numerical data, data transmission	code block, decompose, emulator, loop, predict, program, systematic, tinker, USB (universal serial bus), variable	Binary image, CAD (computer-aided design), JPEG, pixels
Links to Prior Knowledge	Using search engines to find information. Staying safe online (Online Safety Unit)	**Year 4:** Further coding with Scratch	**Year 2:** Stop motion	**Year 3:** Journey Inside a Computer and Networks and the Internet **Year 4:** HTML	**Year 4:** Further coding with Scratch Computational thinking **Year 5:** Programming music: Scratch	**Year 5:** Mars Rover 1

Key knowledge for assessment	How does a search engine work? What do we need to think about when using information found online? What are web crawlers? What is copyright?	What is a soundtrack? How can we make writing simpler and more effective? How can you adapt your code while performing their music?	What is stop motion animation? What do you need to do to the story before you can plan a program? How can you improve stop motion animation?	What is the Mars Rover and what does it do? What is binary code? Can you decode a message in this format? What is RAM and does it do? How can we calculate bit patterns?	What is a Micro:bit? What coding language does Micro:bit use? What does a specific part of code do? How do variables work? What can I do to debug the program?	How do bit patterns represent images? What is the difference between RAM and ROM? How is the data of digital images compressed? How can you improve the design of a 3D object (using CAD software)?
Cross curricular links	RSE / PSHE	Music English	Art	Maths Science	English	Art & Design English
Resources	https://www.kapowprimary.com/wp-content/uploads/2020/11/Y5-Search-engines-KO.pdf		https://www.kapowprimary.com/wp-content/uploads/2021/05/M_Computing-_Stop_Motion_Animation_KO-12-05-2021.pdf	https://drive.google.com/file/d/1FF8YoU4zlIJzqQUqWMz-zpYunLL0BODn/view	Micro:bit emulator: https://microbit.org/code/ https://classroom.microbit.org/ https://app.edublocks.org/#MicroBit https://www.kapowprimary.com/wp-content/uploads/2020/11/Y5-Microbit-KO.pdf	https://drive.google.com/file/d/1kEZe5dofV2-IsMKrpoYsWtVZ-Alz2iB3/view
Online safety unit:	**Lesson 1**	**Lesson 2**	**Lesson 3**	**Lesson 4**	**Lesson 5**	**Lesson 6**
National Curriculum KS2 (skills)	**Key stage 2** **Pupils should be taught to:** • design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. • 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. • use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • 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. • use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.					