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**Heathcoat Primary School**

**Computing Curriculum – Progression of Key Skills and Knowledge**

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| Date | Review Date | Subject leaders |
| Sept 2023 | July 2024 | Elise Holman |
| It is our intention that pupils will be taught a curriculum:   * where they can use their computational thinking and digital literacy to understand the digital world they live in, and use it to enrich their lives in a positive way to achieve a greater depth of knowledge in how technology can benefit them in the future. * where children are able to use their creativity to express themselves and develop their ideas through information and communication technology as they become more confident to become active participants in the digital world. * including essential elements and concepts of computer science, programming and data handling as well as building on the children’s research, communication and presentation skills. * Computing encourages creativity, logical thinking and problem solving and has strong cross-curricular links to Literacy, Maths, Science and Design Technology. We want our children to be confident in their use of various types of computing.   **We intend that all pupils:**   * are confident in using code and can understand and apply the fundamental principles and concepts of computer science, including logic, algorithms and data representation. * can analyse problems when coding, in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems. * effectively communicate and can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems. * are able to connect with others responsibly and are competent, confident and creative users of information and communication technology.     HPS use the Kapow computing scheme of work throughout each year group from EYFS to Year 6. The scheme is arranged and designed through three strands, which runs throughout the computing curriculum at HPS. Digital Literacy, Computer Science and Information Technology. Kapow is organised in five key areas and work though a cyclical route which pupils can develop their computing knowledge and skills by revisiting and building on previous learning. These areas are; Computer systems and networks, Programming, Creating Media, Data handling and Online safety.  This document shows the planned progression of computing knowledge and skills across the year groups. It can also be used to differentiate work appropriately for pupils working above and below age-related expectations (particularly SEND pupils and Greater Depth pupils). Potential Greater Depth pupils are encouraged to make more consistent and confident reference to the connections between Computing and their digital world outside of school. When deepening their skills and knowledge, they are encouraged to work with greater independence and with a clear context. | | |

**Curriculum Organisation**

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| **Year / Term** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **EYFS** | **Internet Safety Focus**  Internet safety via  Think You Know  website for age range.  **Focus – Watching Videos**  thinkuknow.co.uk/4\_7/6-7/badges/watching-videos/ | **Internet Safety Focus**  Internet safety via  Think You Know  website for age range.  **Focus – Online Gaming**  thinkuknow.co.uk/4\_7/6-7/badges/online-gaming/  **Kapow -Programming 1: All about instructions**  The children learn to receive and give instructions and understand the importance of precise instructions | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)** | **Kapow -Programming 2: Programming Bee-Bots**  Children learn about directions, experiment with programming a Bee-bot/Blue-bot and tinker with hardware | **Internet Safety Focus**  Internet safety via  Think You Know  website for age range.  **Focus – Chatting Online**  thinkuknow.co.uk/4\_7/6-7/badges/chatting-online/ | **Internet Safety Focus**  Internet safety via  Think You Know  website for age range.  **Focus – Sharing Pictures**  thinkuknow.co.uk/4\_7/6-7/badges/sharing-pictures/  **Kapow - Data handling: Introduction to data**  Children sort and categorise data and are introduced to branching databases and pictograms |
| **1** | **Internet Safety Focus**  **Lesson 1: Using the internet safely**  To know what the internet is and how to use it safely    **Computing systems and networks: Improving mouse skills**  Knowing how to log in and navigate around a computer, developing mouse skills, learning how to drag, drop, click and control a cursor to create works of art inspired by Kandinsky and self-portraits. | **Internet Safety Focus**  **Lesson 2: Online emotions**  To understand different feelings when using the internet  **Programming 1: Algorithms unplugged**  Using an unplugged approach so that algorithms, decomposition and debugging are made relatable to familiar contexts, such as dressing up and making a sandwich, while learning why instructions need to be very specific. | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)**    **Skills showcase: Rocket to the moon**  Developing keyboard and mouse skills through designing, building and testing individual rockets by creating a digital list of materials, using drawing software and recording data. | **Internet Safety Focus**  **Lesson 3: Always be kind and considerate**  To understand how to treat others, both online and in-person  **Programming 2: Bee-Bot**  Developing early programming skills using either the Bee:Bot or virtual Bee:Bot. | **Internet Safety Focus**  **Lesson 4: Posting and sharing online**  To understand the importance of being careful about what we post and share online  **Creating media: Digital imagery**  Using creativity and imagination to plan a miniature adventure story and capturing it using developing photography skills. Children learn to enhance photos using a range of editing tools as well as searching for and adding other images to a project, resulting in a high-quality photo collage showcase. | **Internet Safety Focus**  Assessement Year 1 – Online Safety  **Data handling: Introduction to data**  Learning what data is and the different ways that it can be represented as well as developing an understanding of why data is useful, how it can be used and ways in which it can be gathered and recorded both by humans and computers. |
| **2** | **Internet Safety Focus**  **Lesson 1: What happens when I post online?**  I know what happens to information posted online  **Computing systems and networks 1: What is a computer?**  Exploring what a computer is by identifying and learning how inputs and outputs work. Understanding how computers are used in the wider world, children design their own computerised invention. | **Internet Safety Focus**  **Lesson 2: How do I keep my things safe online?**  To know how to keep things safe and private online  **Programming 1: Algorithms and debugging**  Developing an understanding of what algorithms are, how to program them and how they can be developed to be more efficient through a range of unplugged and plugged-in activities. | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)**  **Computing systems and networks 2: Word processing**  Learning about word processing and how to stay safe online as well developing touch typing skills. Introducing important keyboard shortcuts, as well as simple editing tools within a word processor including: bold, italics, underline and font colour as well as how to import images. | **Internet Safety Focus**  **Lesson 3: Who should I ask?**  To explain what should be done before sharing information online  **Programming 2: ScratchJr**  Exploring what ‘blocks’ do, using the app ‘ScratchJr,’ by carrying out an informative cycle of predict > test > review. Programming a familiar story and an animation of an animal, children make their own musical instrument by creating buttons and recording sounds as well as following an algorithm to record a joke. | **Internet Safety Focus**  **Lesson 4: It’s my choice**  To explain why I have the right to say no and deny permission  **Creating media: Stop motion**  Storyboarding and simple animation creation using either tablet devices or devices with cameras.  **Option 3 – devices without cameras** | **Internet Safety Focus**  **Lesson 5: Is it true?**  To understand strategies that will help me decide if something seen online is true or not  **Assessement Year 2 – Online Safety**  **Data handling: International Space Station**  Learning how astronauts survive on the ISS, including identifying necessary items, designing sensor displays, and exploring habitable planets. Children gain an understanding of living in space and how space exploration can benefit life on Earth. |
| **3/4**  **Cycle A** | **Internet Safety Focus**  **Lesson 1: Beliefs, opinions and facts on the internet**  To understand how the internet can be used to share beliefs, opinions and facts  **Computing systems and networks 1: Networks and the internet**  Introduction to the concept of networks, learning how devices communicate. Identifying components, learning how information is shared and exploring examples of real-world networks**.**  (Microsoft 365**)** | **Internet Safety Focus**  **Lesson 2: When being online makes me upset**  To understand the effects that some internet use can have on our feelings and emotional wellbeing  **Programming: Scratch**  Building on the use of the ‘ScratchJr’ application in Year 2, progressing to using the more advanced computer-based application called ‘Scratch’, learning to use repetition or ‘loops’ and building upon skills to program; an animation, a story and a game. | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)**  **Computing systems and networks 2: Emailing**  Learning how to send and edit emails, add attachments and how to be a responsible digital citizen by thinking about the contents of what is sent.  (Microsoft 365) | **Internet Safety Focus**  **Lesson 3: Sharing of information**  To understand the ways personal information can be shared on the internet  **Computing systems and networks 3: Journey inside a computer**  Assuming the role of computer parts and creating paper versions of computers helps to consolidate an understanding of how a computer works, as well as identifying similarities and differences between various models. | **Internet Safety Focus**  **Lesson 4: Rules of social media platforms**  To understand the rules for social media platforms  **Creating media: Video trailers (Previously called 'Digital literacy')**  Developing filming and editing video skills through the storyboarding and creation of book trailers.  (Option 1) | **Internet Safety Focus**  Assessment Year 3 – Online Safety  **Data handling: Comparison cards databases**  Using the theme of a ‘Comparison card game’ to understand what a database is. Learning the meanings of records, fields and data. Further exploration will lead to the development of the ideas of sorting and filtering.  (Microsoft 365) |
| **3/4**  **Cycle B** | **Internet Safety Focus**  **Lesson 1: What happens when I search online?**  To describe how to search for information within a wide group of technologies and make a judgement about the probable accuracy  **Computing systems and networks: Collaborative learning**  Working collaboratively in a responsible and considerate way as well as looking at a range of collaborative tools.  (Microsoft 365) | **Internet Safety Focus**  **Lesson 2: How do companies encourage us to buy online?**  To describe some of the methods used to encourage people to buy things online  **Programming 1: Further coding with Scratch**  Learning the basics of programming in Scratch, children will create a simple script, use decomposition and understand what variables are | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)**  **Creating media: Website design**  Developing their research, word processing, and collaborative working skills whilst learning how web pages and web sites are created, exploring how to change layouts, embed images and videos and link between pages. | **Internet Safety Focus**  **Lesson 3: Fact, opinion or belief?**  To explain why lots of people sharing the same opinions or beliefs online do not make those opinions or beliefs true  **Skills showcase: HTML**  Editing the HTML and CSS of a web page to change the layout of a website and the text and images. | **Internet Safety Focus**  **Lesson 4: What is a bot?**  To explain that technology can be designed to act like or impersonate living things  **Programming 2: Computational thinking**  Developing the four areas of computational thinking through a range of plugged and unplugged activities. | **Internet Safety Focus**  **Lesson 5: What is my #TechTimetable like?**  To explain how technology can be a distraction and identify when I might need to limit the amount of time spent using technology  Assessement Year 4 – Online Safety  **Data handling: Investigating weather**  Researching and storing data using spreadsheets, designing  a weather station which gathers and records data and learning how weather forecasts are made. Children use tablets or digital cameras to present a weather forecast |
| **5** | **Internet Safety Focus**  **Lesson 1: Online protection**  To understand how apps can access our personal information and how to alter the permissions  **Computing systems and networks: Search engines**  Learning what a search engine is and understanding why keywords and phrases are important, identifying inaccurate information and recognising the terms ‘copyright and ‘fair use’. Children make parallels between book searching and internet searching, explaining the role of web crawlers and recognising that results are rated to decide rank. | **Internet Safety Focus**  **Lesson 2: Online communication**  To be aware of the positive and negative aspects of online communication  **Programming 1: Music**  Applying programming skills to create sounds and melodies leading to a battle of the bands performance. | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)**  **Data handling: Mars Rover 1**  Identifying some of the types of data that the Mars Rover collects and explaining how the Mars Rover transmits the data back to Earth. Children will read binary numbers, and understand binary addition as well as identifying input, processing and output on the Mars Rovers. | **Internet Safety Focus**  **Lesson 3: Online reputation**  To understand how online information can be used to form judgements  **Programming 2: Micro:bit**  Clipping blocks together in a program and predicting what will happen while making connections with previously used programming interfaces. Children create animations, recognise inputs/outputs, choose appropriate blocks, and break programs down into smaller steps. | **Internet Safety Focus**  **Lesson 4: Online bullying**  To discover ways to overcome bullying  **Creating media: Stop motion animation**  Storyboarding ideas, taking photographs and editing to create a video animation. | **Internet Safety Focus**  **Lesson 5: Online health**  To understand how technology can affect health and wellbeing  Assessement Year 5 – Online Safety  **Skills showcase: Mars Rover 2**  Learning about pixels and binary, creating a pixel picture and saving a JPEG as a bitmap to understand the transfer of image data. Children will learn about the ‘fetch, decode, execute’ cycle and its real-world applications while beginning to use 3D design tools. |
| **6** | **Internet Safety Focus**  **Lesson 1: Life online**  To describe issues online that give us negative feelings and know ways to get help  **Computing systems and networks: Bletchley Park**  Discovering the history of Bletchley Park, historical figures, and computer science. Children learn about code-breaking and password hacking as well as decoding messages. Children present information about historical figures.  (Microsoft 365) | **Internet Safety Focus**  **Lesson 2: Sharing online**  To think about the impact and consequences of sharing online  **Programming: Intro to Python**  Learning the fundamentals of the programming language of Python, they will test, change and explain what their program does. Children use loops and explain what repeats do and what the parts of the loop do while recognising that computers choose random numbers and decompose the program into an algorithm. | **Internet Safety Focus**  **Celebrate Safer Internet Day (Feb)**  **Lesson 3: Creating a positive online reputation**  To know how to create a positive online reputation  **Data handling 1: Big Data 1**  Understanding about the use of big data including barcodes, QR codes, infrared, and RFID technologies. Children will create and scan their own QR codes, manipulate real-time data in spreadsheets, and present their findings. They also analyse transport data to understand its usefulness to commuters. | **Internet Safety Focus**  **Lesson 4: Capturing evidence**  To be able to describe how to capture bullying content as evidence  **Creating media: History of computers**  Writing, recording and editing radio plays set during WWII, looking back in time at how computers have evolved and designing a computer of the future. | **Internet Safety Focus**  **Lesson 5: Password protection**  To manage personal passwords effectively  **Data handling 2: Big Data 2 -**Understanding data usage through the use of mobile data vs WiFi, the Internet of Things, and big data. Identifying high/low data activities and preparing presentations on using Big Data/IoT to improve school efficiency while respecting privacy. | **Internet Safety Focus**  **Lesson 6: Think before you click**  To be aware of strategies to help be protected online  Assessement Year 6 – Online Safety  **Prepare Digital Literacy skills for high school.**  **Skills showcase: Inventing a product**  Designing a new electronic product and using CAD software to design appropriate housing for it. Developing skills in website design, video editing, and persuasive language to promote their product. Evaluating and adapting existing code, debugging programs, and searching for accurate information online. |

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| Progression of skills map | | | | | | |
| **EYFS** | **Year 1** | **Year 2** | **Year 3/4**  **Cycle A** | **Year 3/4**  **Cycle B** | **Year 5** | **Year 6** |
| Computer Science  Coding and programming, and understanding computer networks | | | | | | |
| **Programming 1: All about instructions**  Following instructions as part of practical activities and games. Learning to give simple instructions.  **Programming 2: Programming Bee-Bots**  Experimenting with programming a Bee-bot/Blue- bot and learning how to give simple commands. Learning to debug instructions, with the help of an adult, when things go wrong. | **Computing systems and networks: Improving mouse skills**  Learning how to explore and tinker with hardware to find out how it works.  Learning where keys are located on the keyboard.  **Programming 1: Algorithms unplugged**  Recognising that some devices are input devices and others are output devices.  Learning that decomposition means breaking a problem down into smaller parts.  Using decomposition to solve unplugged challenges.  Developing the skills associated with sequencing in unplugged activities.  Assembling instructions into a simple algorithm.  Learning to debug instructions when things go wrong.  Learning to debug an algorithm in an unplugged scenario.  **Skills showcase: Rocket to the moon**  Using logical reasoning to predict the behaviour of simple programs.  **Programming 2: Bee-Bot**  Programming a floor robot to follow a planned route.  Using programming language to explain how a floor robot works. | **Computing systems and networks 1: What is a computer?**  Understanding what a computer is and that it’s made up of different components.  Recognising that buttons cause effects and that technology follows instructions.  Learning how we know that technology is doing what we want it to do via its output.  Learning how computers are used in the wider world.  **Programming 1: Algorithms and debugging**  Articulating what decomposition is.  Decomposing a game to predict the algorithms used to create it  Learning that there are different levels of abstraction  Explaining what an algorithm is.  Following an algorithm.  Creating a clear and precise algorithm.  Learning that programs execute by following precise instructions  **Programming 2: ScratchJr**  Incorporating loops within algorithms.  Using logical thinking to explore software, predicting, testing and explaining what it does.  Using an algorithm to write a basic computer program  Using loop blocks when programming to repeat an instruction more than once.  **Computing systems and networks 2: Word processing**  Developing confidence with the keyboard and the basics of touch typing. | **Computing systems and networks 1: Networks and the internet**  Learning about the purpose of routers.  Understanding the role of the key components of a network.  Understanding that websites & videos are files that are shared from one computer to another.  Learning about the role of packets.  Understanding how networks work and their purpose.  Identifying the key components within a network, including whether they are wired or wireless.  Recognising links between networks and the internet  Learning how data is transferred.  **Programming: Scratch**  Using decomposition to explore the code behind an animation.  Using repetition in programs.  Using logical reasoning to explain how simple algorithms work.  Explaining the purpose of an algorithm.  Forming algorithms independently.  Using logical thinking to explore more complex software; predicting, testing and explaining what it does  Incorporating loops to make code more efficient.  Continuing existing code  Making reasonable suggestions for how to debug their own and others' code | **Computing systems and networks: Collaborative learning**  Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.  **Programming 1: Further coding with Scratch**  Using decomposition to solve a problem by finding out what code was used.  Using decomposition to understand the purpose of a script of code.  Creating algorithms for a specific purpose  Coding a simple game  Incorporating variables to make code more efficient.  Remixing existing code.  **Programming 2: Computational thinking**  Using past experiences to help solve new problems.  Using abstraction to identify the important parts when completing both plugged and unplugged activities.  Using abstraction and pattern recognition to modify code.  Identifying patterns through unplugged activities.  **Data handling: Investigating weather**  Understanding that weather stations use sensors to gather and record data which predicts the weather. | **Programming 1: Music**  Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.  Writing code to create a desired effect.  Using a range of programming commands.  Using repetition within a program.  Amending code within a live scenario.  **Programming 2: Micro:bit**  Decomposing a program without support.  Programming an animation.  Amending code within a live scenario.  **Skills showcase: Mars Rover 2**  Understanding how bit patterns represent images as pixels.  Learning the difference between ROM and RAM  Understanding the fetch, decode, execute cycle. | **Computing systems and networks: Bletchley Park**  Learning about the history of computers and how they have evolved over time.  Using past experiences to help solve new problems.  Writing increasingly complex algorithms for a purpose.  Debugging quickly and effectively to make a program more efficient.  Remixing existing code to explore a problem.  Changing a program to personalise it.  Evaluating code to understand its purpose.  Predicting code and adapting it to a chosen purpose.  **Programming: Intro to Python**  Decomposing a program into an algorithm.  Using and adapting nested loops.  Programming using the language Python.  **Data handling 1: Big Data 1**  Understanding and identifying barcodes, QR codes and RFID.  Identifying devices and applications that can scan or read barcodes, QR codes and RFID.  **Creating media: History of computers**  Using the understanding of historic computers to design a computer of the future. |
| Information Technology  Word processing, presentations, data handling | | | | | | |
| **Data handling: Introduction to data**  Representing data through sorting and categorising objects in unplugged scenarios.  Representing data through pictograms.  Exploring branch databases through physical games. | **Online Safety:**  Recognising common uses of information technology, including beyond school  Recognising devices that are connected to the internet.  Understanding that we are connected to others when using the internet.  Understanding some of the ways we can use the internet.  **Computing systems and networks: Improving mouse skills**  Recognising devices that are connected to the internet.  Developing understanding of different software tools  Developing control of the mouse through dragging, clicking and resizing of images to create different effects.  Using a basic range of tools within graphic editing software.  **Skills showcase: Rocket to the moon**  Editing Photographs  Understanding that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc.  **Creating media: Digital imagery**  Searching and downloading images from the internet safely  **Data handling: Introduction to data**  Using data representations to answer questions about data  Using software to explore and create pictograms and branching databases | **Computing systems and networks 1: What is a computer?**  Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts.  Using word processing software to type and reformat text  Creating and labelling images  **Computing systems and networks 2: Word processing**  Searching for appropriate images to use in a document  Understanding what online information is.  **Programming 2: ScratchJr**  Using software (and unplugged means) to create story animations.  **Data handling: International Space Station**  Collecting and inputting data into a spreadsheet.  Interpreting data from a spreadsheet | **Computing systems and networks 2: Emailing**  Learning to log in and out of an email account.  Writing an email including a subject, ‘to’ and ‘from’.  Sending an email with an attachment.  Replying to an email.  Understanding the purpose of emails.  **Online Safety**  Recognising how social media platforms are used to interact. | **Computing systems and networks: Collaborative learning**  Use online software for documents, presentations, forms and spreadsheets.  Using software to work collaboratively with others.  Understanding that software can be used collaboratively online to work as a team.  **Creating media: Website design**  Designing and creating a webpage for a given purpose.  Building a web page and creating content for it.  **Skills showcase: HTML**  Understanding that information found by searching the internet is not all grounded in fact.  **Data handling: Investigating weather**  Understanding that data is used to forecast weather  Sorting data in a spreadsheet to compare using the ‘sort by…’ option.  Recording data in a spreadsheet independently.  Designing a device which gathers and records sensor data.  Searching the internet for data.  Using keywords to effectively search for information on the internet.  **Online Safety**  Understanding why some results come before others when searching. | **Computing systems and networks: Search engines**  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  Learn about different forms of communication that have developed with the use of technology  **Programming 1: Music**  Identify ways to improve and edit programs, videos, images etc.  Identify ways to improve and edit programs, videos, images etc.  Using logical thinking to explore software more independently, making predictions based on their previous experience.  **Data handling: Mars Rover 1**  Learn about different forms of communication that have developed with the use of technology  Understanding how data might be used to tell us about a location.  Understanding how data is collected in remote or dangerous places.  **Skills showcase: Mars Rover 2**  Independently learning how to use 3D design software package TinkerCAD. | **Computing systems and networks: Bletchley Park**  Using search and word processing skills to create a presentation.  Understanding how search engines work  **Programming: Intro to Python**  Using logical thinking to explore software independently, iterating ideas and testing continuously.  **Data handling 1: Big Data 1**  Understanding how barcodes, QR codes and RFID work.  Gathering and analysing data in real time.  Creating formulas and sorting data within spreadsheets.  Learning how ’big data’ can be used to solve a problem or improve efficiency  **Creating media: History of computers**  Planning, recording and editing a radio play.  Creating and editing sound recordings for a specific purpose  **Data handling 2: Big Data 2**  Learning about the Internet of Things and how it has led to ‘big data’.  **Skills showcase: Inventing a product**  Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions.  Using design software TinkerCAD to design a product.  Creating a website with embedded links and multiple pages. |
| Digital Literacy  Using technology safely and analysing digital content | | | | | | |
| **Online Safety**  Knowing how to stay safe while watching videos online.  Knowing how to stay gaming online.  Knowing how to stay safe while sharing pictures.  Knowing how to stay safe while chatting online. | **Online Safety**  When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable.  Understanding how to interact safely with others online.  Recognising how actions on the internet can affect others.  To be able to recognise what a digital footprint is and how to be careful about what we "post".  **Computing systems and networks: Improving mouse skills**  Logging in and out and saving work on their own account.  **Creating media: Digital imagery**  When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable | **Computing systems and networks 2: Word processing**  Identifying whether information is safe or unsafe to be shared online.  **Online Safety**  Understanding how to stay safe when talking to people online and what to do if they see or hear something online that makes them feel upset or uncomfortable.  Learning how to create a strong password.  Learning to be respectful of others when sharing online and ask for their permission before sharing content.  Learning strategies for checking if something they read online is true. | **Computing systems and networks 2: Emailing**  Learning about cyberbullying.  Learning that not all emails are genuine, recognising when an email might be fake and what to do about it.  **Creating media: Video trailers**  Using software to edit and enhance their video adding music, sounds and text on screen with transitions.  Taking photographs and recording video to tell a story.  **Online Safety**  Recognising that different information is shared online including facts, beliefs and opinions.  Considering the impact technology can have on mood.  Learning how to identify reliable information when searching online.  Learning how to stay safe on social media. | **Computing systems and networks: Collaborative learning**  Recognising what appropriate behaviour is when collaborating with others online.  **Skills showcase: HTML**  Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others  **Online Safety**  Identifying respectful and disrespectful online behaviour.  Reflecting on the positives and negatives of time online  Identifying forms of advertising online.  Learning to make judgements about the accuracy of online searches | **Computing systems and networks: Search engines**  Recognising that information on the Internet might not be true or correct and learning ways of checking validity  **Online Safety**  Identifying possible dangers online and learning how to stay safe.  Evaluating the pros and cons of online communication.  Learning what to do if they experience bullying online.  Learning to use an online community safely. | **Computing systems and networks: Bletchley Park**  Understanding the importance of secure passwords and how to create them.  Using search engines safely and effectively.  **Online Safety**  Learning about the positive and negative impacts of sharing online.  Learning strategies to create a positive online reputation  Learning strategies to capture evidence of online bullying in order to seek help  Recognising that updated software can help to prevent data corruption and hacking |
| Technical Knowledge | | | | | | |
| **Programming 1:**  To know that being able to follow and give simple instructions is important in computing.  To understand that it is important for instructions to be in the right order.  To understand why a set of instructions may have gone wrong.  **Programming 2:**  To know that you can program a Bee-Bot with some simple commands  To understand that debugging means how to fix some simple programming errors.  To understand that an algorithm is a set of clear and precise instructions.  **Data Handling:**  To know that sorting objects into various categories can help you locate information.  To know that using yes/no questions to find an answer is known as a branching database.  To know that a pictogram is a way of showing information. | **Computing systems and networks: Improving mouse skills**  To know that "log in and log out" means to begin and end a connection with a computer.  To know that a computer and mouse can be used to click, drag, fill, select, also add backgrounds, text, layers, shapes, and clip art.  To know that passwords are important for security.  **Programming 1: Algorithms unplugged**  To understand that an algorithm is when instructions are put in an exact order.  To know that input devices get information into a computer and that output devices get information out of a computer.  To understand that decomposition means breaking a problem into manageable chunks and that it is important in computing.  To know that we call errors in an algorithm 'bugs' and fixing these 'debugging'.  **Skills showcase: Rocket to the moon**  To know that when we create something on a computer it can be more easily saved and shared than a paper version.  To know some of the simple graphic design features of a piece of online software.  To know that a spreadsheet is an electronic ‘table’ for sorting data.  **Programming 2: Bee-Bot**  To understand the basic functions of a Bee-Bot  To know that you can use a camera/tablet to make simple videos.  To know that algorithms move a Bee-Bot accurately to a chosen destination.  **Creating media: Digital imagery**  To understand that holding the camera still and considering angles and light are important to take good pictures.  To know that you can edit, crop and filter photographs.  To know how to search safely for images online.  **Data handling: Introduction to data**  To know how that charts and pictograms can be created using a computer.  To understand that a branching database is a way of classifying a group of objects.  To know that computers understand different types of 'input'.  **Online Safety**  To know that the internet is many devices connected to one another  To know what to do if you feel unsafe or worried online - tell a trusted adult.  To know that people you do not know on the internet (online) are strangers and are not always who they say they are.  To know that to stay safe online it is important to keep personal information safe.  To know that 'sharing' online means giving something specific to someone else via the internet and ‘posting’ online means placing information on the internet. | **Computing systems and networks 1: What is a computer?**  To know the difference between a desktop and laptop computer.  To know that people control technology  To know some input devices that give a computer an instruction about what to do (output).  To know that computers often work together.  **Programming 1: Algorithms and debugging**  To understand what machine learning is and how it enables computers to make predictions.  To know that loops in programming are where you set a certain instruction (or instructions) to be repeated  To know that abstraction is the removing of unnecessary detail to help solve a problem.  **Computing systems and networks 2: Word processing**  To know that touch typing is the fastest way to type.  To know that I can make text a different style, size and colour.  To know that "copy and paste" is a quick way of duplicating text.  **Creating media: Stop motion**  To understand that an animation is made up of a sequence of photographs.  To know that small changes in my frames will create a smoother looking animation.  To understand what software creates simple animations and some of its features e.g. onion skinning.  **Data handling: International Space Station**  To understand that you can enter simple data into a spreadsheet.  To understand what steps you need to take to create an algorithm.  To know what data to use to answer certain questions.  To know that computers can be used to monitor supplies.  **Online Safety**  To understand the difference between online and offline.  To understand what information I should not post online.  To know what the techniques are for creating a strong password.  To know that you should ask permission from others before sharing about them online and that they have the right to say 'no.'  To understand that not everything I see or read online is true. | **Computing systems and networks 1: Networks and the internet**  To understand what a network is and how a school network might be organised.  To know that a server is central to a network and responds to requests made.  To know how the internet uses networks to share files.  To know that a router connects us to the internet.  To know what a packet is and why it is important for website data transfer.  **Programming: Scratch**  To know that Scratch is a programming language and some of its basic functions.  To understand how to use loops to improve programming  To understand how decomposition is used in programming  To understand that you can remix and adapt existing code.  **Computing systems and networks 2: Emailing**  To understand that email stands for 'electronic mail.'  To know that an attachment is an extra file added to an email.  To understand that emails should contain appropriate and respectful content.  To know that cyberbullying is bullying using electronics such as a computer or phone.  **Computing systems and networks 3: Journey inside a computer**  To know the roles that inputs and outputs play on computers  To know what some of the different components inside a computer are e.g. CPU, RAM, hard drive, and how they work together.  To know what a tablet is and how it is different from a laptop/desktop computer.  **Creating media: Video trailers**  To know that different types of camera shots can make my photos or videos look more effective.  To know that I can edit photos and videos using film editing software.  To understand that I can add transitions and text to my video.  **Online Safety**  To know that not everything on the internet is true: people share facts, beliefs and opinions online.  To understand that the internet can affect your moods and feelings.  To know that privacy settings limit who can access your important personal information such as your name, age, gender etc.  To know what social media is and that age restrictions apply. | **Computing systems and networks: Collaborative learning**  To understand that software can be used collaboratively online to work as a team.  To know what type of comments and suggestions on a collaborative document can be helpful.  To know that you can use images, text, transitions and animation in presentation slides.  **Programming 1: Further coding with Scratch**  To understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch.  To know what a conditional statement is in programming.  To understand that variables can help you to create a quiz on Scratch.  **Creating media: Website design**  To know that a website is a collection of pages that are all connected.  To know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks.  To know that websites should be informative and interactive  **Skills showcase: HTML**  To understand and identify examples of HTML tags  To understand what changing the HTML and CSS does to alter the appearance of an object on the web.  To understand that copyright means that those images are protected and to understand that we should do a "creative commons" image search if we wish to use images from the internet.  To know what "fake news" is and ways to spot websites that carry this type of misinformation  To know what the "inspect" elements tool is and ways of using it to explore and alter text and images.  **Programming 2: Computational thinking**  To know that combining computational thinking skills can help you to solve a problem.  To understand that pattern recognition means identifying patterns to help them work out how the code works.  To understand that algorithms can be used for a number of purposes e.g. animation, games design etc.  **Data handling: Investigating weather**  To know that computers can use different forms of input to sense the world around them so that they can record and respond to data (‘sensor data’).  To know that a weather machine is an automated machine that respond to sensor data  To understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.  **Online Safety**  To understand some of the methods used to encourage people to buy things online.  To understand that technology can be designed to act like or impersonate living things.  To understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology  To understand what behaviours are appropriate in order to stay safe and be respectful online. | **Computing systems and networks: Search engines**  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  **Programming 1: Music**  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 music while performing  **Data handling: Mars Rover 1**  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.  **Programming 2: Micro:bit**  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).  **Creating media: Stop motion animation**  To know that decomposition of an idea is important when creating stop-motion animations.  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 editing is an important feature of making and improving a stop motion animation.  **Skills showcase: Mars Rover 2**  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).  **Online Safety**  To know different ways we can communicate online.  To understand how online information can be used to form judgements.  To understand some ways to deal with online bullying.  To know that apps require permission to access private information and that you can alter the permissions.  To know where I can go for support if I am being bullied online or feel that my health is being affected by time online. | **Computing systems and networks: Bletchley Park**  To understand the importance of having a secure password and what "brute force hacking" is.  To know that the first computers were created at Bletchley Park to crack the Enigma code to help the war effort in World War 2  To know about some historical figures that contributed to technological advances in computing.  To understand what techniques are required to create a presentation using appropriate software.  **Programming: Intro to Python**  To know that there are text-based programming languages such as Logo and Python.  To know that nested loops are loops inside of loops  To understand the use of random numbers and remix Python code.  **Data handling 1: Big Data 1**  To know that data contained within barcodes and QR codes can be used by computers.  To know that infrared waves are a way of transmitting data.  To know that Radio Frequency Identification (RFID) is a more private way of transmitting data.  To know that data is often encrypted so that even if it is stolen it is not useful to the thief.  **Creating media: History of computers**  To know that radio plays are plays where the audience can only hear the action so sound effects are important.  To know that sound clips can be recorded using sound recording software.  To know that sound clips can be edited and trimmed  **Data handling 2: Big Data 2**  To know that data can become corrupted within a network but this is less likely to happen if it is sent in ‘packets’  I know that devices or that are not updated are most vulnerable to hackers.  To know the difference between mobile data and WiFi.  **Skills showcase: Inventing a product**  To know what designing an electronic product involves.  To know which programming software/ language is best to achieve a purpose  To know the building blocks of computational thinking e.g. sequence, selection, repetition, variables and inputs and outputs.  **Online Safety**  To know that a digital footprint means the information that exists on the internet as a result of a person's online activity.  To know what steps are required to capture bullying content as evidence.  To understand that it is important to manage personal passwords effectively.  To understand what it means to have a positive online reputation.  To know some common online scams. |
| Vocabulary | | | | | | |
| **Vocab per topic** | | | | | | |
| **All about instructions:**  adjective, algorithm, bend down, blindfold, debug, describe, duck, first, follow, give, hop, instructions, last, left, next, order, predict, prediction, right, run, second, sequence, shuffle, skip, stand still, step over, stop, straight on, third, tiptoe, timer, turn, two-part instructions, under, walk around  **Programming Bee-Bots**  algorithm, arrow, back, backwards, Bee-Bot, circle, debug, direction, directions, forward, instructions, left, program, right, route, sequence, straight on, turn  **Introduction to data**  altogether, bigger than, branch database, categorise, category, colour, collect, column, count, data, describe, divide, equal, graph, group, height, in total, least popular, length, less, more, most popular, pattern, pictogram, record, row, share, size, smaller than, sort, square, texture, thicker than, thinner than, weight | **Computing systems**  **and networks:**  **Improving mouse**  **Skills**  account, click, ctrl, cursor, drag, drag and drop, digital photograph, drop, duplicate, keyboard, layers, log on/ in, log out/ off, menu, mouse, mouse pointer, password, right click, screen (monitor), software, tool, username  **Programming 1: Algorithms unplugged**  algorithm, automatic, bug, chunks, clear, code, debug, decompose, decomposition, device, directions, input, instructions, manageable, motion, order, organise, output, precise, programming, problem, robot, sensor, sequence, solution, specific, steps, tasks, virtual assistant  **Skills showcase: Rocket to the moon**  annotate, cells, components, create, data, debug, designing, digital content, digital image, document, e-document, edit, editing program, evaluate, folder, input, instructions, log in, photo, program, order, robot, save, sequence, share, software, spreadsheet, table  **Programming 2: Bee-Bots**  algorithm, artificial intelligence, Bee-Bot, clear, code, debug, demonstration, filming, inputting, instructions, pause, precise, predict, program, tinker, video, video recording (Option 2 only: emulator, virtual)  **Data handling: Introduction to data**  bar chart, block graph, branching database, categorise, chart, click and drag, compare, count, data, data collection, data record, data representation, edit, input, keyboard, line graph, mouse, information, label, pictogram, pie chart, process, record, resize, sort, table, tally, values  **Online safety:**  communicate, connect, console, devices, digital footprint, emotion, feelings, instructions, internet, internet safety, laptop, mood, online, personal information, phone, posting, predict, respect, sharing, smart device, smartphone, smart TV, smartwatch, strangers, tablet, trust, wired, wireless | **Computing systems and networks 1: What is a computer?**  battery, buttons, camera, computer, desktop, device, digital, digital recorder, electricity, function, input, invention, keyboard, laptop, monitor, mouse, output, paying till, scanner, screen, system, tablet, technology, video, wires  **Programming 1:**  **Algorithms and**  **Debugging**  abstraction, algorithm, artificial intelligence, bug, clear, correct, data, debug, decompose, error, key features, loop, predict, unnecessary  **Computing systems**  **and networks 2: Word**  **processing**  backspace, bold, copy, copyright, cut, delete, forward button, highlight, home row, home screen, image, import, italics, keyboard, keyboard character, keyword, layout, navigate, paste, redo, search, space bar, text, text effects, touch typing, underline, undo, word processing  **Programming 2:**  **Scratch Jr**  algorithm, animation, blocks, bug, button, CGI, computer code, code (verb), debug, fluid, icon, imitate, instructions, loop, ‘on tap’, programming, repeat, Scratch JR, sequence, sound recording  **Creating media: Stop motion**  Animation, animator, background, digital device, drawing, flipbook, frames, moving images, opinion skinning, still images  (Option 3- as above, plus: debug, effects, evaluate, fluid, pen tool, static)  **Data handling: International space station**  algorithm , astronaut, data, digital, digital content, experiment, galaxy, insulation, interactive map, International Space Centre, International Space Station, interpret, laboratory, monitor, planet, satellite, sensor, space, temperature, thermometer, water reservoir  **Online safety**  accept, comment, consent, content, deny, emojis, offline, online, password, permission, personal information, pop-ups, pressure, private information, reliable, share, terms and conditions, trusted adult | **Computing systems and networks 1: Networks and the internet**  cables, component, connection, corrupted, data, desktop, device, DSL (digital subscriber line), fibre, file, internet, laptop, network, network map, network switch, packets, radio waves, router, server, submarine cables, tablet, text map, The Cloud, web server, website, website trackers, WiFi, wired, wireless, Wireless Access Points, World Wide Web  **Programming: Scratch**  algorithm, animation, application, code, code block, coding application, debug, decompose, interface, game, loop, predict, program, remixing code, repetition code, review, Scratch, sprite, tinker  **Computing systems and networks 2: Emailing**  attachment, bcc (blind carbon copy) cc (carbon copy), compose, content, cyberbullying, document, domain, download, email, email account, email address, emoji, emotions, fake, font, genuine, hacker, icons, inbox, information, link, log in, log out, negative language, password, personal information, positive language, reply, responsible digital citizen, scammer, settings, send, sign in, spam email, subject bar, theme, tone, username, virus, WiFi  **Computing systems and networks 3: Journey inside a computer**  algorithm, assemble, CPU (central processing unit), data, decompose, desktop, disassemble, GPU (graphics processing unit), hard drive, HDD (hard disk drive), infinite loop, input, keyboard, laptop, memory, microphone, monitor, mouse, output, photocopier, program, QR code, RAM (random access memory), ROM (read only memory), storage, tablet device, technology, touchscreen, touchpad  **Creating media: Video trailers**  application, camera angle, clip, edit,film editing software, graphics, import, key events, photo, plan, recording, sound effects, storyboard, time code, trailer,transition, video, voiceover (Option 1 - as above, plus: cross blur, cross fade, cross zoom, desktop, digital device, dip to black, directional wipe, laptop)  **Data handling: Comparison cards databases**  categorise, category, chart, data, database, fields , filter, graph, information, interpret, PDF, questionnaire, record, representation, sort, spreadsheet  **Online safety**  accurate, age restricted, autocomplete, beliefs, block, content, digital devices, fact, fake news, internet, opinion, password, persuasive, privacy settings, reliable, report, requests, search engine, security questions, sharing, smart devices, social media platforms, social networking, wellbeing | **Computing systems and networks: Collaborative learning**  animations, average, bar chart, collaboration, comment, conditional formatting, contribution, data, edited, email account, format, freeze, icon, images, insert, link, multiple choice, numerical data, pie chart, presentations, resolved, reviewing comments, share, slides, software, spreadsheets, suggestions, survey, teamwork, themes, transitions (Microsoft version add in: rating)  **Programming 1: Further coding with Scratch**  broadcast block, code blocks, conditional, coordinates, decomposition, features, game, information, negative numbers, orientation, parameters, position, program, project, script, sprite, stage, tinker, variables  **Creating media: Website design**  assessment, audience, collaboration, content, contribution, create, design, embed, evaluate, features, hyperlinks, images, insert, online, plan, progress, review, web page, website, World Wide Web (Microsoft version add in: design view, information, Microsoft Sway, stack, storyline view, style, transform, web browser)  **Skills showcase: HTML**  code, component, content, copyright, CSS, end tag, fake news, hacking, heading, headline, hex code, HTML, input, internet browser, output, paragraph, permission, remixing, script, start tag,tags, text, URL, webpage  **Programming 2: Computational thinking**  abstraction, algorithm, code, computational thinking, decomposition, input, logical reasoning, output, pattern recognition, script, sequence, variable  **Data handling: Investigating weather**  accurate, backdrop, climate zone, cold, collaboration, condensation, cylinder, degrees, evaporation, extreme weather, forecast, heat sensor, lightning, measurement, pinwheel, presenter, rain, satellite, script, sensitive, sensor data, solar panel, tablet/digital camera, temperature, thermometer, tornado, warm, weather, weather forecast, wind  **Online safety**  accuracy, advantages, advertisements, belief, bot, chatbot, computer, distractions, fact, hashtag, implications, in-app purchases, influencer, opinion, program, recommendations, reliable, risks, screen time, search results, snippets, sponsored, trustworthy | **Computing systems and networks: Search engines**  algorithm, appropriate, copyright, correct, credit, data leak, deceive, fair, fake, inappropriate, incorrect, index, information, keywords, network, privacy, rank, real, search engine, TASK, web crawler, website  **Programming 1: Music**  beat, bugs, coding, command, debug, decompose, error, instructions, loop, melody, mindmap, music, output, performance, pitch, play, predict, programming, rhythm, tempo, timbre, tinker, tutorials, typing (Sonic Pi version add in: buffer, format, live loops, rehearsal, repetition, sleep, Sonic Pi, soundtrack, spacing, typo) (Scratch version add in: plan, repeat, scratch, soundtrack, spacing)  **Data handling: Mars Rover 1**  8-bit binary, addition, ASCII, binary code, boolean, byte, communicate, construction, CPU, data transmission, decimal numbers, design, discovery, distance, hexadecimal, input, instructions, internet, Mars Rover, moon, numerical data, output, planet, radio signal, RAM, research, scientist, sequence, signal, simulation, space, subtraction, technology, transmit  **Programming 2: Micro:bit**  algorithm, animation, app, blocks, bluetooth, code block, connection, create, debug, decompose, designing, desktop, device, download, images, input, instructions, laptop, load, loop, Micro:bit, outputs, pairing, pedometer, polling, predict, program, repetition, reset, sabotage, scoreboard, screen, systematic, tablet, tinkering, USB, variables, wifi, wireless, wires  **Creating media: Stop motion**  animation, animator, background, character, decomposition, design, edit, evaluate, flip book, fluid movement, frame, model, moving images, still image, storyboard, thaumatrope, zoetrope (Option 1 add in: digital device, onion skinning, stop motion) (Option 2 add in: effects, photos, script)  **Skills showcase: Mars**  **Rover 2** 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, safe  **Online safety**  accurate information, advice, app permissions, application, apps, bullying, communication, emojis, health, in-app purchases, information, judgement, memes, mental health, mindfulness, mini-biography, online communication, opinion, organisation, password, personal information, positive contributions, private information, real world, strong password, summarise, support, technology, trusted adult, wellbeing | **Computing systems and networks: Bletchley Park**  acrostic code, brute force hacking, caesar cipher, chip and pin system, cipher, code, combination, contribute, convince, date shift cipher, discovery, hero, invention, Nth Letter Cipher, password, Pig Latin, Pigpen cipher, present, scrambled, secret, secure, technological advancement, trial and error  **Programming: Introduction to Python**  algorithm, code, command, design, import, indentation, input, instructions, loop, output, patterns, random, remix, repeat, shape  **Data handling 1: Big data 1**  algorithms, barcode, binary, Boolean, brand, chips, commuter, contactless, data, encrypted, infrared, MagicBand, privacy, proximity, QR code, QR scanner, radio waves, RFID, signal, systems/data analyst, transmission, wireless  **Creating media: History of computers**  background noise, byte, computer, devices, file, FX, gigabyte, graphics, hard drive, hardware, kilobytes, megabyte, memory storage, mouse, operating system, overlay, play, processor, radio play, RAM, Raspberry Pi, record, reverb, ROM, script, smartphone, sound, sound effects, terrabytes, touch screen, track, trackpad, trailer  **Data handling 2: Big data 2**  Big Data, bluetooth, corrupted, data, energy, GPS, improve, infrared, Internet of Things, personal, privacy, QR codes, revolution, RFID, SIM, simulation, Smart city, Smart school, stop motion, threat, wifi, wireless  **Skills showcase: Inventing a product**  adapt, advert, algorithm, bugs, coding, debugging, design, edit, electronic, evaluate, facts, image rights, images, influence, information, inputs, loops, manipulation, opinions, output, photos, product, program, repetition, screenshot, search engine, selection, sequence, snippets, software, structures, variables, video, website  **Online safety**  anonymity, antivirus, biometrics, block and report, consent, copy, cigital footprint, digital personality, financial information, hacking, inappropriate, malware, online bullying, online reputation, password, paste, personal information, personality, phishing, privacy settings, private, reliable source, report, reputation, respect, scammers, screengrab, secure, settings, software updates, two factor authenication, URL, username |