Computing Golden Threads and Sticky knowledge

Bluebell	Fern	Bramble	Laurel
Using a computer Programming 1: All about instructions Exploring hardware Programming Bee-Bots Introduction to data Online safety	Improving mouse skills Algorithms unplugged Rocket to the moon What is a computer? Algorithms and debugging Word processing Bee-bots Digital imagery Introduction to data Scratch Jr Stop-motion International space station Online safety	Emailing Programming: Scratch Video Trailers Website design Further coding with Scratch Computational thinking Networks and the internet Comparison cards Journey inside a computer Collaborative learning Investigating weather HTML Online safety	Micro:bit Mars Rover 1 Mars Rover 2 Bletchley Park History of computers Inventing a product Programming: Music Stop motion animation Search engines Big data 1 Big data 2 Introduction to Python Online Safety

Golden Threads:

- Digital Literacy: Are responsible, competent, confident and creative users of information and communication technology.
- Information Technology: Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.
- Computer Science: Can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation and can analyse problems using these.

Sticky Knowledge linked to the Golden Threads

Bluebell - Reception

Golden Thread	Why it's good to be me?	How can we make the world a better place?	How do we show kindness to people and places?
Digital Literacy	**Children will know:**	**Children will know:** That the internet is a tool that can be used to find information.	**Children will know:** How to log in and log out

	That items such as computers, televisions, tablets and gaming devices count as technology.	That the internet needs to be used safely and what to do if they come across something that makes them feel worried of uncomfortable.	
Information Technology	**Children will know:** Technology can be used to create art.	**Children will know:** How to participate in group image searches, led by the teacher	**Children will know:** How to represent data through sorting and categorising objects in unplugged scenarios
Computer Science	**Children will know:** Language surrounding technology e.g. programme, laptop, desktop	**Children will know:** How to use programmable toys and logical reasoning to read simple instructions and predict the outcome	**Children will know:** That an algorithm is a set of instructions to carry out a task, in a specific order

Fern - Year 1/2

Golden Thread	What makes a hero? **Kapow units covered:** Online safety: Year 1 Computing systems and networks: Improving mouse skills	Do we value what we've got? **Kapow units covered:** Programming 1: Algorithms unplugged Creating media: Digital imagery	What is a leader? **Kapow units covered:** Computing systems and networks 1: What is a computer? Data handling: Introduction to data	Where does our food come from? **Kapow units covered:** Online safety: Year 2 Data handling: International Space Station	What is play? **Kapow units covered:** Programming 1: Algorithms and debugging Skills showcase: Rocket to the moon	How has communication changed (and stayed the same) through history? **Kapow units covered:** Computing systems and networks 2: Word processing

						Creating media: Stop motion
Digital Literacy	Children will know: • What the internet is and how it can be used • That the internet can affect a persons moods and emotions • How the internet might upset others • Which information is appropriate to share online and which is not	Children will know: • How to explain to someone if something they see makes them feel uncomfortable • Search for and be able to report images on the internet if necessary	Children will know: • How to explain the role of computers in the world around them	Children will know: • What is meant by online information • What information is safe and unsafe to be shared online • How to create a strong password and why it is important it is strong • They need to ask permission before sharing anything online and explain why • They have the right to deny their		

				permission for information to be shared about them online • Name a person they can speak to about any worries • How computers are used in the wider world		
Information Technology	Children will know: • How to use computers purposefully • To log in to the computers using a username and password • How to drag, drop, click and	Children will know: • How to plan a pictorial story using photographic imagery in sequences • How to take clear photos • How to take a photo using a device • How to edit a photo by cropping,	Children will know: • How to name some of the peripherals and their functions • That buttons have cause and effect • That technology follows	Children will know: • Developing confidence with the keyboard and the basics of touch typing. • About creating and labelling images. • About collecting and inputting data into a spreadsheet.	Children will know: • Computers can be used to make lists. • Use a basic range of editing software to design a rocket • Sequence instructions on the computer • Follow instructions to build a rocket	Children will know: • Where the home row is for typing • How to use the space and back bar • How to make simple alterations in word processor

	control and cursor on a laptop • Create artwork using software on the computer	filtering and resizing • Organise images on a page, orientating if necessary	instructions • Name different forms of technology • Design an invention with an input and output	• Interpreting data from a spreadsheet.	• Input data about their rocket onto a spreadsheet	• How to search for, input and alter appropriate images for text documents • How to modify text in a document • Use copy and paste in a document
Computer Science		Children will know: • Be able to say that an algorithm is a set of instructions • Write an algorithm using simple blocks • Follow and read a 3 or 4 step algorithm • Explain what an input and output is		Children will know: • That you can enter simple data into a spreadsheet • what steps you need to take to create an algorithm. • what data to use to answer	Children will know: • How to decompose a game to predict the algorithms. • How to give a definition for 'decomposition'. • Write clear and precise algorithms. • Create algorithms to solve problems.	

		• Identify bugs in an algorithm and suggest how to fix them		certain questions. • that computers can be used to monitor supplies.	• Use loops in their algorithms to make their code more efficient. • Explain what abstraction is.	

Bramble – Year 3/4

Golden Thread	What does it mean to be human? Cycle A: Autumn 1- Y3: Emailing Autumn 2- Y3: Programming Scratch	What is respect? Cycle A: Spring 1 – Y3: Video Trailers Spring 2- Y4: Website Design	What's worth fighting for? Cycle A: Summer 1- Y4: Further cording with Scratch Summer 2- Y4: Computational thinking	What is justice? Cycle B: Autumn 1- Y3: Networks and the internet Autumn 2- Y4: Comparison Cards databases	Is it ever ok to break the rules? Cycle B: Spring 1- Y3: Journey inside a Computer Spring 2- Y4: Collaborative Learning	What is a fair society? Cycle B: Summer 1- Investigating Weather Summer 2- Y4: HTML

Digital Literacy	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. **Children will know:** • how to send a simple email with a subject plus 'To' and 'From' in the body of the text. • how to type in the email address correctly and send the email. • how to add an attachment to an email. • how to write an email using positive language, with an awareness of how it will	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. **Children will know:** • How to use most of the tabs (e.g. insert, pages, themes) on Google Sites on their website. • How to create a clear plan for their web page and begin to create it. • How to create a professional looking web page with useful information		Introduction to the concept of networks, learning how devices communicate. Identifying components, learning how information is shared and exploring examples of real-world networks. **Children will know:** • That a network is two or more devices connected. • How information moves around a network and the role of the server. • That networks connect to the internet via a router. • Some of the journey a website goes through to	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. **Children will know:** • What inputs and outputs are and that the computer sends and receives information. • That the parts of a laptop work together and the purpose of each part. • What an algorithm is.	Working collaboratively in a responsible and considerate way as well as looking at a range of collaborative tools. **Children will know:** • The need to be thoughtful when working on a collaborative document. • How to use comments to suggest changes to a document and understand how to resolve comments. • How to use a variety of different slide styles to convey information including images and transitions.

	make the recipient feel. • Recognise unkind behaviour online and know how to report it. • Offer advice to victims of cyberbullying.	and a clear style, which is easy for the user to read and find information from. • How to create four web pages with a range of features on their website.		reach your computer. • That websites are split into small pieces (packets) to be sent via the internet.	• What memory is for inside a computer. • How to make comparisons between different types of computer.	• How to create a Google Form with a range of different questions types that will provide different types of answers, e.g. text, multiple choice or numerical values. • How to export data to a spreadsheet, highlighting data, using conditional formatting and calculating averages and sums of numbers.
Information Technology		Developing filming and editing video skills through the storyboarding and creation of book trailers. **Children will know:**	Developing the four areas of computational thinking through a range of plugged and unplugged activities.			

		• The purpose of a trailer. • How to create a storyboard for a book trailer. • To consider camera angles when taking photos or videos. • How to import videos and photos into film • To record sounds and add these to a video. • How to evaluate their own and others' trailers	**Children will know:** • that problems can be solved more easily using computational thinking. • what the different code blocks do and create a simple game. • the terms 'pattern recognition' and 'abstraction' and how they help to solve a problem. • How to create a Scratch program which draws a square and at least one other shape. • how computational thinking can help to solve problems and apply			

			computational thinking to problems they face.			
Computer Science	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. **Children will know:** • how to explain what some of the blocks do in Scratch. • what a loop is and include one in their program.		Learning the basics of programming in Scratch, children will create a simple script, use decomposition and understand what variables are. **Children will know:** • how to create a simple script in Scratch – be able to change sprite and prevent the sprite from rotating. • How to use decomposition to identify key features and understand how to decipher actions that make the quiz game work.	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. **Children will know:** • What is meant by 'field,' 'record,' and 'data.' • How to compare paper and computerised databases. • How to put values into a spreadsheet.		Editing the HTML and CSS of a web page to change the layout of a website and the text and images. **Children will know:** • How to add text between the heading and paragraph tags. • How to activate the goggles to investigate a web page. • How to explain how they altered the HTML to create their own posters. • How to change the colours and sizes of their object elements.

	• possible additions to an existing program. • where something on screen is controlled by code. • -what an algorithm is and its purpose.		• what a variable is and how to use the 'say' and 'ask' blocks. • How to create a variable and be able to use a variable to record a score. • what a variable is and how it works within a program.	• How to sort, filter and interpret data in a spreadsheet. • How to create a graph on Google Sheets. • How to explain the purpose of visual representations of data.		Explain how they created their story. • How to adapt the basic elements of a story within a web page using the 'Inspect Elements' tool. • How to change an image within a web page and create their own news story, replacing the text and images of a webpage.

Laurel - Year 5/6

Golden Thread	Where do we come from?	Why do people take risks? What does it mean to be free?	What are rights and responsibilities?	Is exploration always good?	What is friendship?	What is democracy?
Digital Literacy		**Kapow Unit: Online Safety Year 6 unit** **Children will be able to:**	**Kapow Units: Bletchley Park/History of Computing**			**Kapow Unit: Computing systems and networks: Search engines**

		• Discuss a range of issues online that can leave pupils feeling sad, frightened, worried or uncomfortable and can describe numerous ways to get help. • Explain how sharing online can have both positive and negative impacts. • Be aware of how to seek consent from others before sharing material online and can describe how content can still be shared online even if it is set to private. • Explain what a 'digital reputation' is	**Children will know/be able to:** **Bletchley Park** • Explain that codes can be used for a number of different reasons and decode messages. • Explain how to ensure a password is secure and how this works. • Create a simple website with information about Bletchley Park including the need to build electronic thinking machines to solve cipher codes. • Explain the importance of historical figures and their			**CHILDREN WILL BE ABLE TO** • Explain what a search engine is, suggesting several search engines to use and explain how to use them to find websites and information. • Suggest that things online aren't always true and recognise what to check for. • Explain why keywords are important and what TASK stands for, using these strategies to search effectively. • Recognise the terms 'copyright' and 'fair use' and combine

		and what it can consist of. • Understand the importance of capturing evidence of online bullying and can demonstrate some of these methods on the devices used at school. • Describe ways to manage passwords and strategies to add extra security such as two-factor authentication. • Explain what to do if passwords are shared, lost, or stolen. • Describe strategies to	contribution towards computer science. • Present information about their historical figure in an interesting and engaging manner. **History of Computers** • Explain how to record sounds and add in sound effects over the top. • Produce a simple radio play with some special effects and simple edits which demonstrate an understanding of how to use the software. • Create a document			text and images in a poster. • Make parallels between book searching and internet searching, explaining the role of web crawlers and recognising that results are rated to decide rank.

		identify scams. • Explain ways to increase their privacy settings and understand why it is important to keep their software updated.	that includes correct date information and facts about the computers and how they made a difference. • Demonstrate a clear understanding of their device and how it affected modern computers, including well-researched information with an understanding of the reliability of their sources. • Describe all of the features that we'd expect a computer to have including RAM, ROM, hard drive and processor,			

			but of a higher specification than currently available.			
Information Technology	K**apow Unit: Big Data 1 and 2** **Children will know/be able to Unit 1** • Understand why barcodes and QR codes were created. • Create (and scan) their own QR code using a QR code generator website. • Explain how infrared can be used to transmit a			K**apow Unit: Mars Rover 1 and 2** **Children will know/be able to Unit 1** • Identify some of the types of data that the Mars Rover could collect (for example, photos). • Explain how the Mars Rover transmits the data back to Earth and the challenges	K**apow Unit: Big Data 1 and 2** • . **Unit 2** • Recognise that data can become corrupted within a network and that data sent in packets is more robust, as well as identify the need to update devices and software. • Recognise differences between mobile data and WiFi	K**apow Unit: Inventing a product** **Children will know/be able to** • Evaluate code, understanding what it does and adapt existing to code for a specific purpose. • Debug programs and make them more efficient using sequence, selection,

	Boolean type signal. • Explain how RFID works, recall a use of RFID chips, and type formulas into spreadsheets. • Take real-time data and enter it effectively into a spreadsheet. • Presenting the data collected as an answer to a question. • Recognising the value of analysing real-time data. Analyse and evaluate transport data and consider how this provides a useful service to commuters			involved in this. • Read any number in binary, up to eight bits. • Identify input, processing and output on the Mars Rovers. • Read binary numbers and grasp the concept of binary addition. • Relate binary signals (Boolean) to a simple character-based language, ASCII. **Unit 2** • Create a pixel picture, explaining that a pixel is the smallest element of a digital image and that binary is used to code	and use a spreadsheet to compare and identify high-use data activities and low-use data activities. • Make links between the Internet of Things and Big Data and give a basic example of how data analysis/analytics can lead to improvement in town planning. • Explain ways that Big Data or IoT principles could be used to solve a problem or improve efficiency within the school and prepare a presentation about their idea, considering the privacy of some data. • Present their ideas about how Big Data/IoT can improve the school and	repetition or variables. • Design appropriate housing for their product using CAD software, including any input or output devices needed to make it work. • Create an appealing website for their product, aimed at their target audience which explains what their product is and what it does, using persuasive language. • Create an edited video of their project, articulating the key benefits. • Describe and show how to

				and transfer this data. • Save a JPEG as a bitmap and recognise the difference in file size as well as explaining how pixels are used to transfer image data. • Explain the 'fetch, decode, execute' cycle in relation to real-world situations. • Create a profile with a safe and suitable username and password and begin to use 3D design tools. • Independently take tutorial lessons, applying what they	provide feedback to others on their presentations.	search for information online and be aware of the accuracy of the results presented.

				have learnt to their design and understand the importance of using an online community responsibly.		
Computer Science	K**apow Unit: Introduction to Python** **Children will know how to** • Iterate ideas, testing and changing throughout the lesson and explain what their program does. • Use nested loops in their designs, explaining why they need two repeats.	K**apow Unit: Programming 1: Music** **Children will know how to** • Iterate ideas, testing and changing throughout the lesson. Explain what the basic commands do. • Explain how their program links to the theme. Include a loop in their work. Correct their own			K**apow Unit:** **Programming 2: Micro:bit** **Children will know how to** • Clip blocks together and predict what will happen. Make connections with previous programming interfaces they've used, e.g. Scratch. • Create their own images to make the animation and recognise the difference between 'on start' and 'forever'.	

	• Alter the house drawing using Python commands; use comments to show a level of understanding around what their code does. • Use loops in Python and explain what the parts of a loop do. • Recognise that computers can choose random numbers; decompose the program into an algorithm and modify a program to personalise it.	simple mistakes. • Explain their scene in the story. Link musical concepts to their scene. Include a repeat and explain its function to enhance music. • Code a piece of music that combines a variety of structures. Use loops in their programming. • Recognise that programming music is a way to apply their skills			• Recognise blocks they've used previously, identifying inputs and outputs used and make predictions about how variables work. • Choose appropriate blocks to complete the program and attempt the challenges independently. Break a program down into smaller steps, suggesting appropriate blocks and match the algorithm to the program.	