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| COMPUTING | **Pedagogical Knowledge**  **How do children learn Computing?**  • Children are natural problem solver and get excited by building, creating. They need meaningful contextualized opportunities to explore, create and manipulate a range  of digital artefacts.  **Examples include:**  • Publishing reports, stories and other material they have created  • Making and remixing multimedia objects  • Creating games, puzzles, greetings card etc.  • Controlling physical objects using digital tools  • Unplugged activities to explore computational thinking  **Computing Pedagogical Knowledge**  • Teaching children to be digitally literate needs to go beyond e-safety and cyberbullying. Critical reading of material on the internet is an important skill. Children may believe that there is an authority such a teacher curating search results. It is important that teaching disrupts these misconceptions to allow children to develop views which are more rational.  • The tinkering stage of learning is of particular importance as identifying problems and solving them mirrors the real-world practices of computer programmers.  • Unplugged activities are lessons in computational thinking that do not involve digital technology. They provide important opportunities for children to problems solve using computer science approaches without having to learn how to use a new tool. | | | | | | | | | |
| Y1&2  Cycle B | **Autumn**  **Movers & Shakers** | | | **Spring**  **Coastline** | | | **Summer**  **Magnificent Monarchs** | | | |
| Online Safety | Online Safety Self-image and identity Online relationships | Online Safety Online reputation | | Online Safety Online bullying | Online Safety Managing online information | | Online Safety Health, Well-being and lifestyle | | | Online Safety Privacy and security Copyright and ownership |
| Unit | ***Digital Literacy***  Information Technology **Connecting systems and networks** | ***Information Technology***  Creating Media  **Digital Painting** | | ***Computer Science*** Programming Block **Moving a Robot** | ***Information Technology***  Data and information  **Grouping Data** | | ***Information Technology***  Creating Media  **Digital Writing** | | | ***Computer Science***  Programming Block B  **Programming Animations** |
| Y1 | ***What technology do we find in school and how do we use it responsibly?***  **Recognising technology in school and using it responsibly.**  **(Paintz.app)**  Technology around us  To identify technology  -To identify a computer and its main parts  -To use a mouse in different ways  -To use a keyboard to type on a computer  -To use the keyboard to edit text  -To create rules for using technology responsibly | ***How can we create art digitally and how does it compare with non-digital art?***  **Choosing appropriate tools in a program to create art and making comparisons with working non-digitally.**  **(Microsoft Paint or similar)**  Digital Painting  -To describe what different freehand tools do  -To use the shape tool and the line tools  -To use a computer on my own to paint a picture | | ***How can we write an algorithm to make a floor robot move?***  **Writing short algorithms and programs for floor robots and predicting program outcomes.**  **(Bee-bot, blue-bot)**  Moving a robot  -To explain what a given command will do  -To act out a given word  -To combine forwards and backwards commands to make a sequence  -To plan a simple program | ***How can we sort and group objects?***  **Exploring object labels, then using them to sort and group objects by properties.**  **(Google slides or Powerpoint)**  Grouping data  -To label objects  -To identify that objects can be counted  -To count objects with the same properties  -To answer questions about groups of objects | | ***How can we use a computer to create text and how is this different from non-digital text?***  **Using a computer to create and format text, before comparing to writing non-digitally.**  **(Google Docs or Microsoft Word)**  Digital writing  -To use a computer to write  -To add and remove text on a computer  -To identify that the look of text can be changed on a computer | | | ***How can we program a character to tell a story?***  **Designing and programming the movement of a character on screen to tell stories.**  **(Scratch Jnr)**  Programming animations  -To describe a simple program on Scratch Jnr  -To identify the effect of changing a value in Scratch Jnr |
| Y1 | To begin to plan and test their instructions. To use digital technology to organise and edit content (e.g., data in a graph, editing images) | | | | | | | | | |
| Y2 | ***What technology do we find in school and how do we use it responsibly?***  **Recognising technology in school and using it responsibly.**  **(Paintz.app)**  Technology around us  To identify technology  -To identify a computer and its main parts  -To use a mouse in different ways  -To use a keyboard to type on a computer  -To use the keyboard to edit text  -To create rules for using technology responsibly | ***How can we create art digitally and how does it compare with non-digital art?***  **Choosing appropriate tools in a program to create art and making comparisons with working non-digitally.**  **(Microsoft Paint or similar)**  Digital Painting  -To make careful choices when painting a digital picture  -To explain why I chose the tools I used  -To compare painting a picture on a computer and on paper | | ***How can we write an algorithm to make a floor robot move?***  **Writing short algorithms and programs for floor robots and predicting program outcomes.**  **(Bee-bot, blue-bot)**  Moving a robot  -To combine four direction commands in a simple program  -To plan a simple program  -To find more than one solution to a problem | ***How can we sort and group objects?***  **Exploring object labels, then using them to sort and group objects by properties.**  **(Google slides or Powerpoint)**  Grouping data  -To compare groups of objects  -To answer questions about groups of objects  - Input information using a date handling program | | ***How can we use a computer to create text and how is this different from non-digital text?***  **Using a computer to create and format text, before comparing to writing non-digitally.**  **(Google Docs or Microsoft Word)**  Digital writing  -To make careful choices when changing text  -To explain why I used the tools that I chose  -To compare typing on a computer to writing on paper | | | ***How can we program a character to tell a story?***  **Designing and programming the movement of a character on screen to tell stories.**  **(Scratch Jnr)**  Programming animations  -To explain that each sprite has its own instructions  -To design the parts of a project  -To use my algorithm to create a program |
| Y2 | To appreciate that some algorithms are more efficient than others.  To consider when digital technology leads to improvements or has the potential to make things worse.  To use digital technology to organise and edit content (e.g., data in a graph, editing images) | | | | | | | | | |
| Y3&4  Cycle B | **Autumn**  **Invasion** | | | **Spring**  **Misty Mountain, Winding River** | | | **Summer**  **Ancient Civilisations** | | | |
| Online Safety | Online Safety Self-image and identity Online relationships | Online Safety Online reputation | | Online Safety Online bullying | Online Safety Managing online information | | Online Safety Health, Well-being and lifestyle | | | Online Safety Privacy and security Copyright and ownership |
| Unit | ***Digital Literacy***  Connecting systems and networks  **Connecting Computers** | ***Information Technology***  Creating Media  **Stop Frame Animation** | | ***Computer Science*** Programming Block A **Sequencing Sounds** | ***Information Technology***  Data and information  **Branching Databases** | | ***Information Technology***  Creating Media  **Desktop Publishing** | | | ***Computer Science***  Programming Block B  **Events and actions in programs** |
| Y3 | ***What devices have inputs, processes, and outputs?***  **Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks**  **(Painting program)**  Connecting Computers  -To explain how digital devices function  -To identify input and output devices  -To recognise how digital devices can change the way we work | ***How can we use images to produce an animation?***  **Capturing and editing digital still images to produce a stop-frame animation that tells a story.**  **(iMotion)**  Stop frame animation  -To explain that animation is a sequence of drawings or photographs  -To relate animated movement with a sequence of images  -To plan an animation | | ***How can we use programming language to make music?***  **Creating sequences in a block-based programming language to make music**  **(Scratch)**  Sequencing Sounds  -To identify that commands have an outcome  -To explain that a program has a start  -To recognise that a sequence of commands can have an order | ***How can we use a branching database to group objects?***  **Building and using branching databases to group objects using yes/no questions.**  **(j2data Branch and Pictogram)**  Branching databases  -To create questions with yes/no answers  -To identify the attributes needed to collect data about an object  -To create a branching database | | ***How can we create documents for a specific purpose?***  **Creating documents by modifying text, images, and page layouts for a specified purpose.**  **(Canva.com)**  Desktop Publishing  -To recognise how text and images convey information  -To recognise that text and layout can be edited  -To add content to a desktop publishing publication | | | ***How can we write programs for a sequence of actions?***  **Writing algorithms and programs that use a range of events to trigger sequences of actions.**  **(Scratch)**  Events and actions in programs  -To create a program to move a sprite in four directions  -To adapt a program to a new context  -To develop my program by adding features |
| Y3 | To recognise the impact of keyword choice on search engine results (e.g., results ranked according to relevance).  To evaluate content (created researched) against a given goal. | | | | | | | | | |
| Y4 | ***What devices have inputs, processes, and outputs?***  **Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks**  **(Painting program)**  Connecting Computers  -To explain how a computer network can be used to share information  -To explore how digital devices can be connected  -To recognise the physical components of a network | ***How can we use images to produce an animation?***  **Capturing and editing digital still images to produce a stop-frame animation that tells a story.**  **(iMotion)**  Stop frame animation  -To plan an animation  -To identify the need to work consistently and carefully  -To review and improve an animation  -To evaluate the impact of adding other media to an animation | | ***How can we use programming language to make music?***  **Creating sequences in a block-based programming language to make music**  **(Scratch)**  Sequencing Sounds  -To recognise that a sequence of commands can have an order  -To change the appearance of my project  -To create a project from a task description | ***How can we use a branching database to group objects?***  **Building and using branching databases to group objects using yes/no questions.**  **(j2data Branch and Pictogram)**  Branching databases  -To create a branching database  -To plan the structure of a branching database  -To independently create an identification tool | | ***How can we create documents for a specific purpose?***  **Creating documents by modifying text, images, and page layouts for a specified purpose.**  **(Canva.com)**  Desktop Publishing  -To choose appropriate page settings  -To consider how different layouts can suit different purposes  -To consider the benefits of desktop publishing | | | ***How can we write programs for a sequence of actions?***  **Writing algorithms and programs that use a range of events to trigger sequences of actions.**  **(Scratch)**  Events and actions in programs  -To identify and fix bugs in a program  -To design and create a maze-based challenge |
| Y4  Cumulative skill | To design and create content on a computer in response to a given goal, paying attention to the needs of a known audience.  To give reasons for errors in programs and explain how they have corrected these  To explain an algorithm using sequence, repetition and selection in their own words. | | | | | | | | | |
| Y5&6  Cycle B | **Autumn**  **Maafa** | | | **Spring**  **Frozen Kingdoms** | | | **Summer**  **Britain at War** | | | |
| Online Safety | Online Safety Self-image and identity Online relationships | | Online Safety Online reputation | Online Safety Online bullying | | Online Safety Managing online information | Online Safety Health, Well-being and lifestyle | | Online Safety Privacy and security Copyright and ownership | |
| Unit | **Digital Literacy**  Connecting systems and networks  **Systems and searching** | | ***Information Technology***  Creating Media  **Video Production** | ***Computer Science*** Programming Block A **Variables in Games** | | ***Information Technology***  Data and information  **Introduction to spreadsheets** | ***Information Technology***  Creating Media  **3D Modelling** | | ***Computer Science***  Programming Block  **Selection in quizzes** | |
| Y5 | ***What IT systems are around the world and how do they help us search the internet?***  **Recognising IT systems in the world and how some can enable searching on the internet.**  **(Google Slides)**  .  Systems and searching  -To explain that computers can be connected together to form systems  -To recognise the role of computer systems in our lives  -To experiment with search engines  -To describe how search engines select results | | ***How can we produce a short film?***  **Planning, capturing, and editing video to produce a short film.**  **(Microsoft Photos)**  Video Production  -To explain what makes a video effective  -To identify digital devices that can record video  -To capture video using a range of techniques  -To create a storyboard | ***How can we create variables to code a game?***  **Exploring variables when designing and coding a game.**  **(Scratch)**  Variables in games  -To define a ‘variable’ as something that is changeable  -To explain why a variable is used in a program  -To improve a game by using variables | | ***How can we use a spreadsheet to organise and calculate data?***  **Answering questions by using spreadsheets to organise and calculate data.**  **(Google sheets/Excel)**  Introduction to spreadsheets  -To create a data set in a spreadsheet  -To build a data set in a spreadsheet  -To explain that formulas can be used to produce calculated data | ***How can we develop a 3D computer model of a physical object?***  **Planning, developing, and evaluating 3D computer models of physical objects.**  **(Tinkercad)**  3D Modelling  -To recognise that you can work in three dimensions on a computer  -To identify that digital 3D objects can be modified  -To create a 3D model for a given purpose | ***How can we design and code an interactive quiz?***  **Exploring selection in programming to design and code an interactive quiz.**  **(Scratch)**  -To explain how selection is used in computer programs  -To relate that a conditional statement connects a condition to an outcome  -To explain how selection directs the flow of a program  -To design a program which uses selection  -To create a program which uses selection  -To evaluate my program | | |
| Y5 | To make a multimedia presentation that contains: sound; animation; video and buttons to navigate.  To save an image document as a gif or j peg. file format using the command (e.g. “save as”).  To evaluate content according to its effectiveness and impact on a target audience.  To write programs that have sequences, repetitions and variables.  To consider the audience when editing a simple film and justify their choices. | | | | | | | | | |
| Y6 | ***What IT systems are around the world and how do they help us search the internet?***  **Recognising IT systems in the world and how some can enable searching on the internet.**  **(Google Slides)**  Systems and searching  -To describe how search engines select results  -To explain how search results are ranked  -To recognise why the order of results is important, and to whom | | ***How can we produce a short film?***  **Planning, capturing, and editing video to produce a short film.**  **(Microsoft Photos)**  Video Production  -To capture video using a range of techniques  -To identify that video can be improved through reshooting and editing  -To consider the impact of the choices made when making and sharing a video | ***How can we create variables to code a game?***  **Exploring variables when designing and coding a game.**  **(Scratch)**  Variables in games  -To design a project that builds on a given example  -To use my design to create a project  -To evaluate my project | | ***How can we use a spreadsheet to organise and calculate data?***  **Answering questions by using spreadsheets to organise and calculate data.**  **(Google sheets/Excel)**  Introduction to spreadsheets  -To apply formulas to data  -To create a spreadsheet to plan an event  -To choose suitable ways to present data | ***How can we develop a 3D computer model of a physical object?***  **Planning, developing, and evaluating 3D computer models of physical objects.**  **(Tinkercad)**  3D Modelling  -To create a 3D model for a given purpose  -To plan my own 3D model  -To create my own digital 3D model | ***How can we design and code an interactive quiz?***  **Exploring selection in programming to design and code an interactive quiz.**  **(Scratch)**  -To explain how selection is used in computer programs  -To relate that a conditional statement connects a condition to an outcome  -To explain how selection directs the flow of a program  -To design a program which uses selection  -To create a program which uses selection  -To evaluate my program | | |
| Y6 | To incorporate graphics where appropriate, using the most effective text wrapping formats.  To compare the information provided on two tabbed websites looking for bias and perspective.  To check and refine a series of instructions. | | | | | | | | | |