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| Computing | **Pedagogical Knowledge**  **How do children learn Computing?**  • Children are natural problem solvers and get excited by building and 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 online-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 A | **Autumn**  **Childhood** | | | **Spring**  **Bright Lights, Big City** | | **Summer**  **School Days** | |
| 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  **Technology Around Us** | | ***Information Technology***  Creating Media  **Digital Photography** | ***Computer Science*** Programming Block **Robot algorithms** | ***Information Technology***  Data and information  **Pictograms** | ***Information Technology***  Creating Media  **Making music** | ***Computer Science***  Programming Block  **Introduction to quizzes** |
| Y1 | ***How can IT improve our world in school and beyond?***  **Information technology around us Identifying IT and how its responsible use improves our world in school and beyond. (Google Slides/ PowerPoint**)  Information technology around us  -To recognise the uses and features of information technology  -To identify the uses of information technology in the school  -To identify information technology beyond school | | ***How can you change photographs for different purposes?***  **Capturing and changing digital photographs for different purposes. (Digital camera/Ipads)**  Digital photography  -To use a digital device to take a photograph  -To make choices when taking a photograph  -To describe what makes a good photograph | ***How can we create and debug programs?***  **Creating and debugging programs and using logical reasoning to make predictions. (Bee-bot, Blue-bot)**  Robot algorithms  -To describe a series of instructions as a sequence  -To explain what happens when we change the order of instructions  -To use logical reasoning to predict the outcome of a program | ***How can we collect and organize data on a computer?***  **Collecting data in tally charts and using attributes to organise and present data on a computer.** **(j2data pictogram)**  Pictograms  -To recognise that we can count and compare objects using tally charts  -To recognise that objects can be represented as pictures  -To create a pictogram | ***How can we use programming language to make music?***  **Using a computer as a tool to explore rythms and melodies, before creating a musical composition.**  **(Chrome Music Lab)**  Digital music  -To say how music can make us feel  -To identify that there are patterns in music  -To experiment with sound using a computer  -To use a computer to create a musical pattern | ***How can we design a program to create an interactive quiz?***  **Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz. (Scratch Jnr)**  Programming quizzes  -To explain that a sequence of commands has a start  -To explain that a sequence of commands has an outcome  -To create a program using a given design |
| Y1  GD | 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 | ***How can IT improve our world in school and beyond?***  **Information technology around us Identifying IT and how its responsible use improves our world in school and beyond. (Google Slides/ PowerPoint**)  Information technology around us  -To explain how information technology helps us  -To explain how to use information technology safely  -To recognise that choices are made when using information technology | | ***How can you change photographs for different purposes?***  **Capturing and changing digital photographs for different purposes. (Digital camera/Ipads)**  Digital photography  -To decide how photographs can be improved  -To use tools to change an image  -To recognise that photos can be changed | ***How can we create and debug programs?***  **Creating and debugging programs and using logical reasoning to make predictions.**  **(Bee-bot, Blue-bot)**  Robot algorithms  -To explain that programming projects can have code and artwork  -To design an algorithm  -To create and debug a program that I have written | ***How can we collect and organize data on a computer?***  **Collecting data in tally charts and using attributes to organise and present data on a computer.** **(j2data pictogram)**  Pictograms  -To create a pictogram  -To select objects by attribute and make comparisons  -To recognise that people can be described by attributes  -To explain that we can present information using a computer | ***How can we use programming language to make music?***  **Using a computer as a tool to explore rythms and melodies, before creating a musical composition.**  **(Chrome Music Lab)**  Digital music  -To use a computer to create a musical pattern  -To create music for a purpose  -To review and refine our computer work | ***How can we design a program to create an interactive quiz?***  **Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz. (Scratch Jnr)**  Programming quizzes  -To create a program using a given design  -To change a given design  -To create a program using my own design  -To decide how my project can be improved |
| Y2  GD | 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 A | **Autumn**  **Through The Ages** | | | **Spring**  **Rocks, Relics and Rumbles** | | **Summer**  **Emperors and Empires** | |
| 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 systems and networks** | | ***Information Technology***  Creating Media  **Audio Production** | ***Computer Science***  Programming Block  **Repetition in Shapes** | ***Information Technology***  Data and information  **Data logging** | ***Information Technology***  Creating Media  **Photo editing** | ***Computer Science***  Programming Block  **Repetition in games** |
| Y3 | ***What is the internet and why should we evaluate content?***  **The internet Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.**  **(Various websites)**  The internet  -To describe how networks physically connect to other networks  -To recognise how networked devices make up the internet  -To outline how websites can be shared via the World Wide Web (WWW) | | ***How can we capture and edit audio produce a podcast?***  **Capturing and editing audio to produce a podcast, ensuring that copyright is considered. (audacity)**  Audio Production  -To identify that sound can be recorded  -To explain that audio recordings can be edited  -To recognise the different parts of creating a podcast project | ***How can we use programming language for controlled loops when drawing shapes?***  **Using a text-based programming language to explore count-controlled loops when drawing shapes.**  **(FMSLogo/Turtle academy)**  Repetition in shapes  -To identify that accuracy in programming is important  -To create a program in a text-based language  -To explain what ‘repeat’ means | ***How can we collect data over time and why is it useful?***  **Recognising how and why data is collected over time, before using data loggers to carry out an investigation.**  **(Data logger or similar)**  Data logging  -To explain that data gathered over time can be used to answer questions  -To use a digital device to collect data automatically  -To explain that a data logger collects ‘data points’ from sensors over time  -To recognise how a computer can help us analyse data | ***How can we manipulate images to fulfil a purpose?***  **Manipulating digital images and reflecting on the impact of changes and whether the required purpose is fulfilled. (Paint.NET)**  Photo editing  -To explain that the composition of digital images can be changed  -To explain that colours can be changed in digital images  -To explain how cloning can be used in photo editing | ***How can we create infinite loops using block-based programming language?***  **Using a block-based programming language to explore count-controlled and infinite loops when creating a game.**  **(Scratch)**  Repetition in games  -To develop the use of count-controlled loops in a different programming environment  -To explain that in programming there are infinite loops and count controlled loops  -To develop a design that includes two or more loops which run at the same time |
| Y3  GD | 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 is the internet and why should we evaluate content?***  **The internet Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.**  **(Various websites)**  The internet  -To describe how content can be added and accessed on the World Wide Web (WWW)  -To recognise how the content of the WWW is created by people  -To evaluate the consequences of unreliable content | | ***How can we capture and edit audio produce a podcast?***  **Capturing and editing audio to produce a podcast, ensuring that copyright is considered. (audacity)**  Audio Production  -To recognise the different parts of creating a podcast project  -To apply audio editing skills independently  -To combine audio to enhance my podcast project  -To evaluate the effective use of audio | ***How can we use programming language for controlled loops when drawing shapes?***  **Using a text-based programming language to explore count-controlled loops when drawing shapes.**  **(FMSLogo/Turtle academy)**  Repetition in shapes  -To modify a count-controlled loop to produce a given outcome  -To decompose a task into small steps  -To create a program that uses count-controlled loops to produce a given outcome | ***How can we collect data over time and why is it useful?***  **Recognising how and why data is collected over time, before using data loggers to carry out an investigation. (Data logger or similar)**  Data logging  -To use a digital device to collect data automatically  -To identify the data needed to answer questions  -To use data from sensors to answer questions | ***How can we manipulate images to fulfil a purpose?***  **Manipulating digital images and reflecting on the impact of changes and whether the required purpose is fulfilled. (Laptops-Paint.NET)**  Photo editing  -To explain how cloning can be used in photo editing  -To explain that images can be combined  -To combine images for a purpose  -To evaluate how changes can improve an image | ***How can we create infinite loops using block-based programming language?***  **Using a block-based programming language to explore count-controlled and infinite loops when creating a game.**  **(Scratch)**  Repetition in games  -To develop a design that includes two or more loops which run at the same time  -To modify an infinite loop in a given program  -To design a project that includes repetition  -To create a project that includes repetition |
| Y4  GD | 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 A** | **Autumn**  **Dynamic Dynasties** | | | **Spring**  **Sow Grow and Farm** | | **Summer**  **Groundbreaking Greeks** | |
| Online Safety | Online Safety  Self-image and identity Online relationships | | Online Safety  Online reputation | Online Safety  Online bullying | Online Safety  online information | Online Safety  Health, Well-being and lifestyle | Online Safety  Privacy and security Copyright and ownership |
| Unit | ***Digital Literacy***  Connecting systems and networks  **Communication and collaboration** | | ***Information Technology***  Creating Media  **Webpage creation** | ***Computer Science***  Programming Block  **Selection in physical computing** | ***Information Technology***  Data and information  **Flat file databases** | ***Information Technology***  Creating Media  **Introduction to vector graphics** | ***Computer Science***  Programming Block B  **Sensing Movement** |
| Y5 | ***How is data transferred to allow us to work collaboratively?***  **Exploring how data is transferred by working collaboratively online.**  **(Google Slides)**  Communication and collaboration  -To explain the importance of internet addresses  --To recognise how we communicate using technology  -To evaluate different methods of online communication | | ***How can we design and create a webpage?***  **Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation. (Google sites)**  Webpage creation  -To review an existing website and consider its structure  -To plan the features of a web page  -To recognise the need to preview pages | ***How can we program a microcontroller?***  **Exploring conditions and selection using a programmable microcontroller.**  **(BBC Microbit)**  Selection in Physical computing  -To control a simple circuit connected to a computer  -To write a program that includes count-controlled loops  -To explain that a loop can stop when a condition is met  -To create a program that controls a physical computing project | ***How can we use a database to answer questions?***  **Using a database to order data and create charts to answer questions.**  **(j2data Database)**  Flat file databases  -To use a form to record information  -To compare paper and computer-based databases  -To outline how you can answer questions by grouping and then sorting data  -To explain that tools can be used to select specific data  -To explain that computer programs can be used to compare data visually  -To use a real-world database to answer questions | ***How can we use layers to create digital images?***  **Creating images in a drawing program by using layers and groups of objects.**  **(Google Drawings/Publisher)**  Introduction to vector graphics  -To identify that drawing tools can be used to produce different outcomes  -To create a vector drawing by combining shapes  -To use tools to achieve a desired effect  -To recognise that vector drawings consist of layers  -To group objects to make them easier to work with  -To apply what I have learned about vector drawings | ***How can we code a project that uses inputs from a physical device?***  **Designing and coding a project that captures inputs from a physical device.**  **(Microbit and Microsoft Make Code)**  -To create a program to run on a controllable device  -To explain that selection can control the flow of a program  -To design a project that uses inputs and outputs on a controllable device |
| Y5  GD | 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 | ***How is data transferred to allow us to work collaboratively?***  **Exploring how data is transferred by working collaboratively online.**  **(Google Slides)**  Communication and collaboration  -To explain the importance of internet addresses  -To recognise how data is transferred across the internet  -To explain how sharing information online can help people to work together  -To evaluate different ways of working together online | ***How can we design and create a webpage?***  **Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation. (Google sites)**  Webpage creation  -To consider the ownership and use of images (copyright)  To outline the need for a navigation path  -To recognise the implications of linking to content owned by other people | | ***How can we program a microcontroller?***  **Exploring conditions and selection using a programmable microcontroller.**  **(BBC Microbit)**  Selection in Physical computing  -To control a simple circuit connected to a computer  -To explain that a loop can be used to repeatedly check whether a condition has been met  -To design a physical project that includes selection | ***How can we use a database to answer questions?***  **Using a database to order data and create charts to answer questions.**  **(j2data Database)**  Flat file databases  -To explain that tools can be used to select specific data  -To explain that computer programs can be used to compare data visually  -To use a real-world database to answer questions | ***How can use layers to create digital images?***  **Creating images in a drawing program by using layers and groups of objects.**  **(Google Drawings/Publisher)**  Introduction to vector graphics  -To recognise that vector drawings consist of layers  -To group objects to make them easier to work with  -To apply what I have learned about vector drawings | ***How can we code a project that uses inputs from a physical device?***  **Designing and coding a project that captures inputs from a physical device.**  **(Microbit and Microsoft Make Code)**  -To create a program to run on a controllable device  -To design a project that uses inputs and outputs on a controllable device  -To develop a program to use inputs and outputs on a controllable device |
| Y6  GD | 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. | | | | | | |