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|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| **Computer Science** | **Hardware:**  • Learning how to explore and tinker with hardware to find out how it works  • Understanding that computers and devices around us use inputs and outputs, identifying some of these  • Learning where keys are located on the keyboard  • Learning how to operate a camera  **Networks and data** **representation**   * Understanding what the internet is   **Computational thinking.**   * Learning that decomposition means breaking a problem down into smaller parts (sequences) to solve unplugged challenges   • Using logical reasoning to predict the behaviour of simple programs  • Learning and assembling an algorithm and understanding that it is a set of step-by-step instructions used to carry out a task, in a specific order.  **Programming**  • Programming a Bee-bot/Virtual Bee-bot to follow a planned route  • Learning to debug instructions/algorithms when things go wrong  • Developing a how to video to explain how the Bee-bot works. | **Hardware**  • 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.  • Using greater control when taking photos with tablets or computers  • Developing confidence with the keyboard and the basics of touch typing.  **Computational thinking**   * Articulating what decomposition is   • Decomposing a game to predict the algorithms used to create it  • Using decomposition to decompose a story into smaller parts  • Learning what abstraction is  • Learning that there are different levels of abstraction  • Explaining and following an algorithm  • Following an algorithm  • Creating a clear and precise algorithm  • Learning that computers use algorithms to make predictions  • Learning that programs execute by following precise instructions  • Incorporating loops within algorithms  Programming  • Using logical thinking to explore software, predicting, testing and explaining what it does  • Using an algorithm to write a basic computer program  • Learning what loops are  • Incorporating loops to make code more efficient | **Hardware**   * Understanding what the different components of a computer do and how they work together   • Drawing comparisons across different types of computers  • Learning what a server does    **Networks and data representation**   * Learning what a network is and its 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    **Computational thinking**  • Using decomposition to explore and explain the parts of a laptop including behind animation computer   * Using repetition in programs      * Understanding that computers follow instructions * Using logical reasoning to explain how simple algorithms work * Forming algorithms independently   **Programming**  • Using logical thinking to explore more complex software; predicting, testing and explaining what it does   * Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected | **Hardware**  • Learning about the purpose of routers    **Networks and data representation**  • Consolidating understanding 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 that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication    **Computational thinking**  • Solving unplugged problems by decomposing them into smaller parts  • Using decomposition to understand the purpose of a script of code  • Using decomposition to help solve problems  • Identifying patterns through unplugged activities    • Using past experiences to help solve new problems    • Using abstraction to identify the important parts when completing both plugged and unplugged activities  • Creating algorithms for a specific purpose    **Programming**  • Understanding that websites can be altered by exploring the code beneath the site  • Coding a simple game  • Using abstraction and pattern recognition to modify code  • Incorporating variables to make code more efficient  • Remixing existing code  • Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected    **Using software**   * Building a web page and creating content for it   • Designing and creating a webpage for a given purpose  • Use Google online software for documents, presentations, forms and spreadsheets.  • Work collaboratively with others    **Using email and the internet**  • Understanding why some results come before others when searching  • Understanding that information on the internet is not all grounded in fact | **Hardware**   * Learning that external devices can be programmed by a separate computer   • Learning the difference between ROM and RAM  • Recognising how the size of RAM affects the processing of data  • Understanding the fetch, decode, execute cycle    **Networks and data representation**  • Learning the vocabulary associated with data: data and transmit  • Learning how the data for digital images can be compressed  • Recognising that computers transfer data in binary and understanding simple binary addition  • Relating binary signals (Boolean) to the simple character-based language, ASCII  • Learning that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary calculations  • Understanding how bit patterns represent images as pixels    **Computational thinking**   * Decomposing animations into a series of images   • Decomposing a program without support  • Decomposing a story to be able to plan a program to tell a story    • Predicting how software will work based on previous experience  • Writing more complex algorithms for a purpose    **Programming**  • Debugging quickly and effectively to make a program more efficient  • Remixing existing code to explore a problem  • Using and adapting nested loops  • Programming using the language Python  • Changing a program to personalise it  • Evaluating code to understand its purpose  • Predicting code and adapting it to a chosen purpose  • Altering a website’s code to create changes | **Hardware**   * Learning the history of computers and how they have evolved over time   • Using the understanding of historic computers to design a computer of the future  • Understanding and identifying barcodes, QR codes and RFID  • Identifying devices and applications that can scan or read barcodes, QR codes and RFID  • Acknowledging that corruption can happen within data during transfer (for example when downloading, installing, copying and updating files)  **Networks and data representation**  • Understanding that computer networks provide multiple services  **Computational thinking.**  • Decomposing a program into an algorithm  • Using past experiences to help solve new problems  • Writing increasingly complex algorithms for a purpose  **Programming**  • Debugging quickly and effectively to make a program more efficient  • Remixing existing code to explore a problem  • Using and adapting nested loops • Programming using the language Python  • Changing a program to personalise it  • Evaluating code to understand its purpose  • Predicting code and adapting it to a chosen purpose  • Altering a website’s code to create changes |
| **Information Technology** | **Using software**   * Using a basic range of tools within graphic editing software   • Taking and editing photographs  • Understanding how to create digital art using an online paint tool  • Developing control of the mouse through dragging, clicking and resizing of images to create different effects  • Developing understanding of different software tools.    **Using email and the internet**     * Searching and downloading images from the internet safely   • Understanding that we are connected to others when using the internet    **Using data**     * Introduction to spreadsheets   • Representing data in tables, charts and pictograms  • Sorting data and creating branching databases  • Identifying where digital content can have advantages over paper when storing and manipulating data    **Wider use of technology**    • Recognising common uses of information technology, including beyond school | **Using Software**   * Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts   • Using word processing software to type and reformat text  • Using software to create story animations  • Creating and labelling images.    **Using Email and Internet.**   * Understanding that personal information should not be shared on the internet. * Learning how to be respectful to others when sharing content online.   **Using Data**   * Collecting and inputting data into a spreadsheet     • Interpreting data  Wider use of technology  • Learning how computers are used in the wider world | **Using software**  • Taking photographs and recording video to tell a story.  • Using software to edit and enhance their video adding music, sounds and text on screen with transitions    **Using the internet and email**  • 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  • Identifying useful terms and phrases for search engines    **Using data**   * Understanding the vocabulary associated with databases: field, record, data   • Learning about the pros and cons of digital versus paper databases  • Sorting and filtering databases to easily retrieve information  • Creating and interpreting charts and graphs to understand data    **Wider use of technology**  • Understanding the purpose of emails.    • Learning what a search engine is  • Recognising how social media platforms are used to interact | **Using software**   * Building a web page and creating content for it   • Designing and creating a webpage for a given purpose  • Use Google online software for documents, presentations, forms and spreadsheets.  • Work collaboratively with others    **Using email and the internet**  • Understanding why some results come before others when searching  • Understanding that information on the internet is not all grounded in fact    **Using data**  Designing a weather station which gathers and records sensor data    Wider use of technology  Understanding that software can be used collaboratively online to work as a team | **Using Software**  • Using logical thinking to explore software independently, iterating ideas and testing continuously  • Using search and word processing skills to create a presentation  • Planning, recording and editing a radio play  • Creating and editing sound recordings for a specific purpose  • Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert  • Using design software TinkerCAD to design a product  • Creating a website with embedded links and multiple pages.    **Using Email and the internet**     * Understanding how search engines work   **Using data**   * Understanding how barcodes, QR codes and RFID work   • Gathering and analysing data in real time  • Creating formulas and sorting data within spreadsheets  Wider use of technology  • Learning about the Internet of Things and how it has led to ‘big data’.  • Learning how ’big data’ can be used to solve a problem or improve efficiency. | **Using software**   * Using logical thinking to explore software independently, iterating ideas and testing continuously   • Using search and word processing skills to create a presentation  • Planning, recording and editing a radio play  • Creating and editing sound recordings for a specific purpose  • Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert  • Using design software TinkerCAD to design a product  • Creating a website with embedded links and multiple pages  **Using email and the internet.**  • Understanding how search engines work  **Using data**   * Understanding how barcodes, QR codes and RFID work   • Gathering and analysing data in real time  • Creating formulas and sorting data within spreadsheets  **Wider use of technology**   * Learning about the Internet of Things and how it 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| **Digital Literacy** | **Online safety**   * Logging in and out and saving work on their own account   • Understand the importance of a password  • 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  • Recognising when someone has been unkind online  • Learning some top tips for staying safe online  • Understanding how we ‘share’ information on the internet | **Online Safety**  • Understanding that personal information should not be shared on the internet.  • Learning how to be respectful to others when sharing content online. | **Online safety**   * • Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind   • Learning about cyberbullying  • Learning that not all emails are genuine, recognising when an email might be fake and what to do about it  • Learning that not all information on the internet is factual  • Understanding who personal information should/ should not be shared with | **Online Safety**  • Recognising what appropriate behaviour is when collaborating with others online  • Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others  • Learning about different forms of advertising on the internet. | **Using Software**  • Using logical thinking to explore software independently, iterating ideas and testing continuously  • Using search and word processing skills to create a presentation  • Planning, recording and editing a radio play  • Creating and editing sound recordings for a specific purpose  • Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert  • Using design software TinkerCAD to design a product  • Creating a website with embedded links and multiple pages.    **Using Email and the internet**     * Understanding how search engines work   **Using data**   * Understanding how barcodes, QR codes and RFID work   • Gathering and analysing data in real time  • Creating formulas and sorting data within spreadsheets  Wider use of technology  • Learning about the Internet of Things and how it has led to ‘big data’.  • Learning how ’big data’ can be used to solve a problem or improve efficiency. | **Online Safety**  • Understanding the importance of secure passwords and how to create them, along with two-step authentication  • Using search engines safely and effectively  • Recognising that updated software can help to prevent data corruption and hacking  • Considering their digital footprint and online reputation and future implications they may have  • Learning about how to collect evidence and report online bullying concerns. |