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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

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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. |