**Progression of skills**

**Computer Science.** **Computer science**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **EYFS** | **Year 1** | **Year 2** |  |
|  |  |  |  |  |
|  | Learning how to operate a camera to take | Learning how to operate a camera or tablet to take | Understanding what a computer is and that it’s |  |
|  | photographs of meaningful creations or | photos and videos. | made up of different components. |  |
|  | moments. |  |  |  |
|  |  | Learning how to explore and tinker with hardware | Recognising that buttons cause effects and that |  |
|  | Learning how to explore and tinker with | to find out how it works. | technology follows instructions. |  |
|  | hardware to develop familiarity and introduce |  |  |  |
|  | relevant vocabulary. | Recognising that some devices are input devices and | Learning how we know that technology is doing |  |
|  |  | others are output devices. | what we want it to do via its output. |  |
| **Hardware** | Recognising and identifying familiar letters |  |  |  |
| and numbers on a keyboard. | Learning where keys are located on the keyboard. | Using greater control when taking photos with |  |
|  |  |
|  |  |  | cameras, tablets or computers. |  |
|  | Developing basic mouse skills such as moving |  |  |  |
|  | and clicking. |  | Developing confidence with the keyboard and the |  |
|  |  |  | basics of touch typing. |  |
|  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| N/A | N/A | N/A |

**Networks and**

**data**

**representatio**

**n**

.**Page 1**

**Progression of skills**

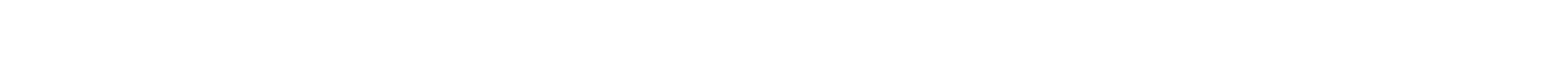
**Computer Science Continued.**

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| --- | --- | --- | --- | --- | --- |
|  | **Year 3** | **Year 4** | **Year 5** | **Year 6** |  |
|  |  |  |  |  |  |
|  | Understanding what the different | Using tablets or digital cameras to | Learning that external devices can be | Learning about the history of |  |
|  | components of a computer do and how | film a weather forecast. | programmed by a separate computer. | computers and how they have evolved over |  |
|  | they work together. |  |  | time. |  |
|  |  | Understanding that weather | Learning the difference between ROM and |  |  |
|  | Drawing comparisons across different | stations use sensors to gather and | RAM. | Using the understanding of historic |  |
|  | types of computers. | record data which predicts the |  | computers to design a computer of the |  |
|  |  | weather. | Recognising how the size of RAM affects | future. |  |
|  | Learning about the purpose of routers. |  | the processing of data. |  |  |
|  |  |  |  | Understanding and identifying barcodes, |  |
| **Hardware** |  |  | Understanding the fetch, decode, execute | QR codes and RFID. |  |
|  |  | cycle. |  |  |
|  |  |  |  | Identifying devices and applications that |  |
|  |  |  |  | can scan or read barcodes, QR codes and |  |
|  |  |  |  | RFID. |  |
|  |  |  |  | Understanding how corruption can happen |  |
|  |  |  |  | within data during transfer (for example |  |
|  |  |  |  | when downloading, installing, copying and |  |
|  |  |  |  | updating files). |  |
|  |  |  |  |  |  |
|  | Understanding the role of the key | Understanding that computer | Learning the vocabulary associated with | Understanding that computer networks |  |
|  | components of a network. | networks provide multiple | data: data and transmit. | provide multiple services. |  |
|  |  | services, such as the World Wide |  |  |  |
|  | Identifying the key components within a | Web, and opportunities for | Learning how the data for digital images |  |  |
|  | network, including whether they are | communication and collaboration. | can be compressed. |  |  |
|  | wired or wireless. |  |  |  |  |
| **Networks and** |  |  | Recognising that computers transfer data |  |  |
| Understanding that websites and videos |  | in binary and understanding simple binary |  |  |
| **data** | are files that are shared from one |  | addition. |  |  |
| **representatio** | computer to another. |  |  |  |  |
|  |  | Relating binary signals (Boolean) to the |  |  |
| **n** | Learning about the role of packets. |  | simple character-based language, ASCII. |  |  |
|  | Understanding how networks work and |  | Learning that messages can be sent by |  |  |
|  | their purpose. |  | binary code, reading binary up to eight |  |  |
|  |  |  | characters and carrying out binary |  |  |
|  | Recognising links between networks and |  | calculations. |  |  |
|  | the internet. |  |  |  |  |
|  |  |  | Understanding how bit patterns |  |  |
|  | Learning how data is transferred. |  | represent images as pixels. |  |  |
|  |  |  |  |  |  |

**Page 2**

**Progression of skills**

**Computer Science Continued.**

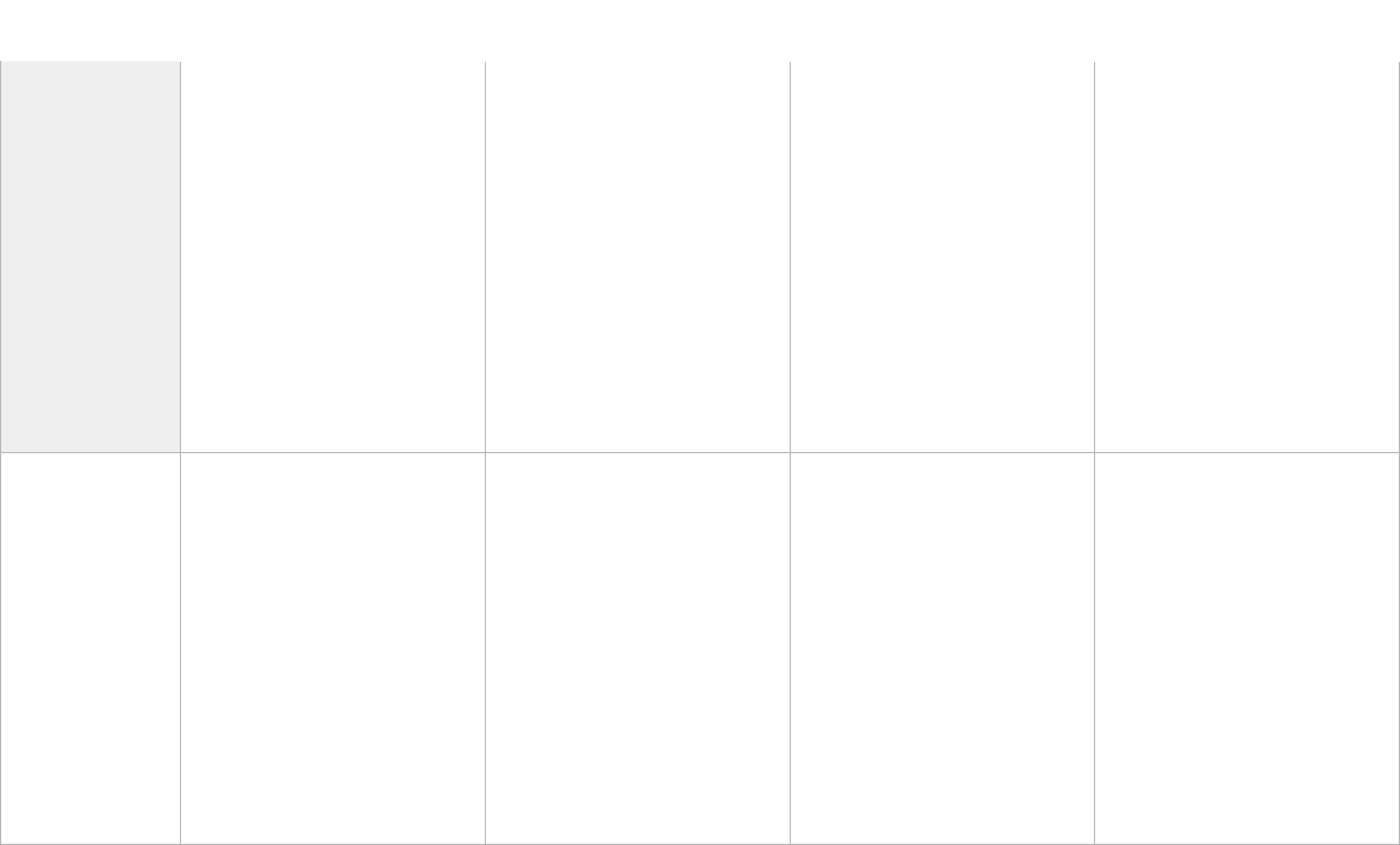


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| --- | --- | --- | --- | --- |
|  | **EYFS** | **Year 1** | **Year 2** |  |
|  |  |  |  |  |
|  | Using logical reasoning to understand simple | Learning that decomposition means breaking a | Articulating what decomposition is. |  |
|  | instructions and predict the outcome. | problem down into smaller parts. |  |  |
|  |  |  | Decomposing a game to predict the algorithms used |  |
|  |  | Using decomposition to solve unplugged challenges. | to create it. |  |
|  |  | Using logical reasoning to predict the behaviour of | Learning that there are different levels of |  |
|  |  | simple programs. | abstraction. |  |
| **Computationa** |  | Developing the skills associated with sequencing in | Explaining what an algorithm is. |  |
| **l thinking** |  | unplugged activities. | Following an algorithm. |  |
|  |  |  |  |
|  |  | Following a basic set of instructions. |  |  |
|  |  |  | Creating a clear and precise algorithm. |  |
|  |  | Assembling instructions into a simple algorithm. |  |  |
|  |  |  | Learning that programs execute by following precise |  |
|  |  |  | instructions. |  |
|  |  |  | Incorporating loops within algorithms. |  |
|  |  |  |  |  |
|  | Following instructions as part of practical | Programming a Floor robot to follow a planned | Using logical thinking to explore software, |  |
|  | activities and games. | route. | predicting, testing and explaining what it does. |  |
|  | Learning to give simple instructions. | Learning to debug instructions when things go | Using an algorithm to write a basic computer |  |
|  |  | wrong. | program. |  |
|  | Experimenting with programming a |  |  |  |
|  | Bee-bot/Blue- bot and learning how to give | Using programming language to explain how a floor | Using loop blocks when programming to repeat an |  |
| **Programming** | simple commands. | robot works. | instruction more than once. |  |
|  |  |  |  |
|  | Learning to debug instructions, with the help | Learning to debug an algorithm in an unplugged |  |  |
|  | of an adult, when things go wrong. | scenario. |  |  |
|  |  |  |  |  |

**Page 3**

**Progression of skills**

**Computer Science Continued.**



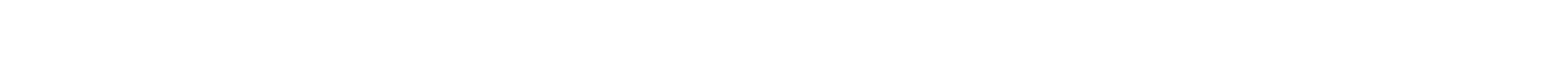
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| --- | --- | --- | --- | --- | --- |
|  | **Year 3** | **Year 4** | **Year 5** | **Year 6** |  |
|  |  |  |  |  |  |
|  | Using decomposition to explain the | Using decomposition to solve a problem | Decomposing animations into a series of | Decomposing a program into an |  |
|  | parts of a laptop computer. | by finding out what code was used. | images. | algorithm. |  |
|  | Using decomposition to explore the | Using decomposition to understand the | Decomposing a program without | Using past experiences to help solve |  |
|  | code behind an animation. | purpose of a script of code. | support. | new problems. |  |
|  | Using repetition in programs. | Identifying patterns through unplugged | Decomposing a story to be able to plan a | Writing increasingly complex algorithms |  |
|  |  | activities. | program to tell a story. | for a purpose. |  |
| **Computational** | Using logical reasoning to explain how |  |  |  |  |
| simple algorithms work. | Using past experiences to help solve | Predicting how software will work based |  |  |
| **thinking** | Explaining the purpose of an algorithm. | new problems. | on previous experience. |  |  |
|  |  |  |  |  |
|  |  | Using abstraction to identify the | Writing more complex algorithms for a |  |  |
|  | Forming algorithms independently. | important parts when completing both | purpose. |  |  |
|  |  | plugged and unplugged activities. |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Using logical thinking to explore more | Creating algorithms for a specific | Programming an animation. | Debugging quickly and effectively to |  |
|  | complex software; predicting, testing | purpose. |  | make a program more efficient. |  |
|  | and explaining what it does. |  | Iterating and developing their |  |  |
|  |  | Coding a simple game. | programming as they work. | Remixing existing code to explore a |  |
|  | Incorporating loops to make code more |  |  | problem. |  |
|  | efficient. | Using abstraction and pattern | Confidently using loops in their |  |  |
|  |  | recognition to modify code. | programming. | Using and adapting nested loops. |  |
|  | Continuing existing code. |  |  |  |  |
| **Programming** |  | Incorporating variables to make code | Using a more systematic approach to | Programming using the language |  |
| Making reasonable suggestions for how | more efficient. | debugging code, justifying what is wrong | Python. |  |
|  | to debug their own and others' code. |  | and how it can be corrected. |  |  |
|  |  |  |  | Changing a program to personalise it. |  |
|  |  |  | Writing code to create a desired effect. |  |  |
|  |  |  |  | Evaluating code to understand its |  |
|  |  |  | Using a range of programming | purpose. |  |
|  |  |  | commands. |  |  |
|  |  |  |  | Predicting code and adapting it to a |  |
|  |  |  | Using repetition within a program. | chosen purpose. |  |
|  |  |  | Amending code within a live scenario. |  |  |
|  |  |  |  |  |  |

**Page 4**

**Progression of skills**

**Information Technology.**

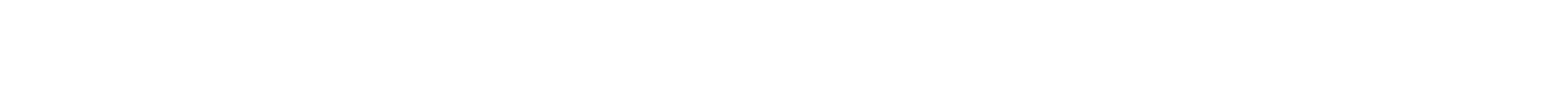


|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **EYFS** | **Year 1** | **Year 2** |  |
|  |  |  |  |  |
|  | Using a simple online paint tool to create digital art. | Using a basic range of tools within graphic editing | Developing word processing skills, including altering text, |  |
|  |  | software. | copying and pasting and using keyboard shortcuts. |  |
|  |  | Taking and editing photographs. | Using word processing software to type and reformat |  |
| **Using** |  |  | text. |  |
|  | Developing control of the mouse through dragging, |  |  |
| **software** |  |  |  |
|  | clicking and resizing of images to create different effects. | Using software (and unplugged means) to create story |  |
|  |  |  | animations. |  |
|  |  | Developing understanding of different software tools. |  |  |
|  |  |  | Creating and labelling images. |  |
|  |  |  |  |  |
|  | N/A | Recognising devices that are connected to the internet. | Searching for appropriate images to use in a document. |  |
| **Using email** |  | Searching and downloading images from the internet | Understanding what online information is. |  |
|  | safely. |  |  |
| **and internet** |  | Understanding that we are connected to others when |  |  |
| **searches** |  |  |  |
|  | using the internet. |  |  |
|  |  |  |  |  |
|  | Representing data through sorting and | Understanding that technology can be used to represent | Collecting and inputting data into a spreadsheet. |  |
|  | categorising objects in unplugged scenarios. | data in different ways: pictograms, tables, pie charts, bar |  |  |
|  |  | charts, block graphs etc. | Interpreting data from a spreadsheet. |  |
|  | Representing data through physical pictograms. |  |  |  |
| **Using data** |  | Using representations to answer questions about data. |  |  |
| Exploring branch databases through physical |  |  |  |
|  |  |  |  |
|  | games. | Using software to explore and create pictograms and |  |  |
|  |  | branching databases. |  |  |
|  |  |  |  |  |
|  | N/A | Recognising common uses of information technology, | Learning how computers are used in the wider world. |  |
|  |  | including beyond school. |  |  |
| **Wider use of** |  | Understanding some of the ways we can use the internet. |  |  |
|  |  |  |  |
| **technology** |  |  |  |  |
|  |  |  |  |  |

**Page 5**

**Progression of skills**

**Information Technology Continued.**

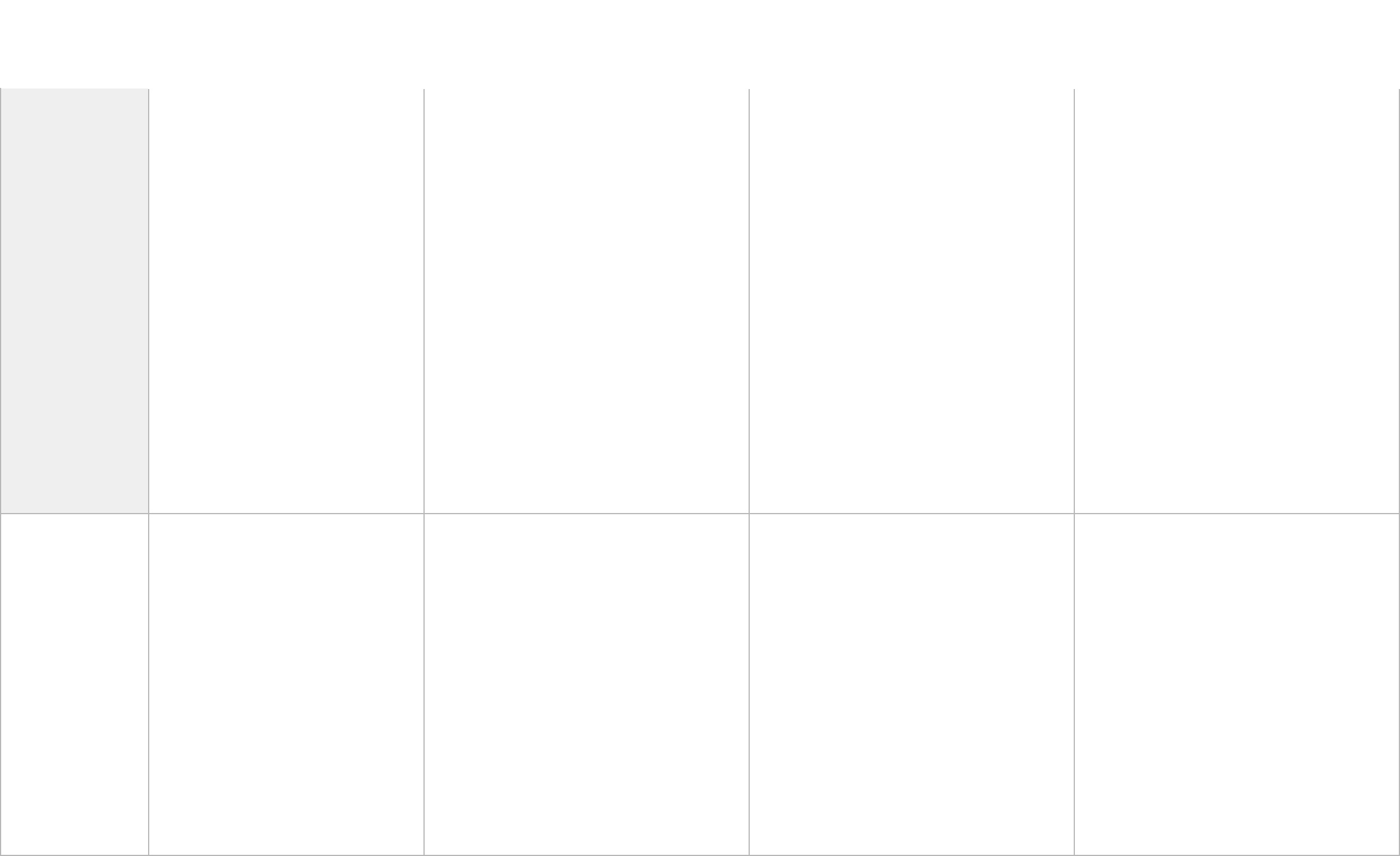


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| --- | --- | --- | --- | --- | --- |
|  | **Year 3** | **Year 4** | **Year 5** | **Year 6** |  |
|  |  |  |  |  |  |
|  | Taking photographs and recording | Building a web page and creating content | Using logical thinking to explore software | Using logical thinking to explore software |  |
|  | video to tell a story. | for it. | more independently, making predictions | independently, iterating ideas and testing |  |
|  |  |  | based on their previous experience. | continuously. |  |
|  | Using software to edit and enhance | Designing and creating a webpage for a |  |  |  |
|  | their video adding music, sounds and | given purpose. | Using software programme Sonic | Using search and word processing skills to |  |
|  | text on screen with transitions. |  | Pi/Scratch to create music. | create a presentation. |  |
|  |  | Use online software for documents, |  |  |  |
|  |  | presentations, forms and spreadsheets. | Using the video editing software to | Creating and editing sound recordings for a |  |
|  |  |  | animate. | specific purpose. |  |
| **Using** |  | Using software to work collaboratively with |  |  |  |
|  | others. | Identify ways to improve and edit | Creating and editing videos, adding |  |
| **software** |  |  | programs, videos, images etc. | multiple elements: music, voiceover, sound, |  |
|  |  |  |  | text and transitions. |  |
|  |  |  | Independently learning how to use 3D |  |  |
|  |  |  | design software package TinkerCAD. | Using design software TinkerCAD to design |  |
|  |  |  |  | a product. |  |
|  |  |  |  | Creating a website with embedded links |  |
|  |  |  |  | and multiple pages. |  |
|  |  |  |  |  |  |
|  | Learning to log in and out of an email | Understanding why some results come | Developing searching skills to help find | Understanding how search engines work. |  |
|  | account. | before others when searching. | relevant information on the internet. |  |  |
|  | Writing an email including a subject, | Using keywords to effectively search for | Learning how to use search engines |  |  |
|  | ‘to’ and ‘from.’ | information on the internet. | effectively to find information, focussing on |  |  |
| **Using** |  |  | keyword searches and evaluating search |  |  |
| Sending an email with an attachment. | Understanding that information found by | returns. |  |  |
| **email and** |  | searching the internet is not all grounded in |  |  |  |
| Replying to an email. | fact. |  |  |  |
| **internet** |  |  |  |
|  | Searching the internet for data. |  |  |  |
| **searches** |  |  |  |  |
|  |  |  |  |  |
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**Page 6**

**Progression of skills**

**Information Technology Continued.**



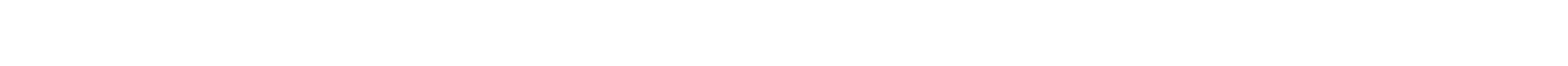
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| --- | --- | --- | --- | --- | --- |
|  | **Year 3** | **Year 4** | **Year 5** | **Year 6** |  |
|  |  |  |  |  |  |
|  | Understanding the vocabulary to do | Understanding that data is used to forecast | Understanding how data is collected in | Understanding how barcodes, QR codes |  |
|  | with databases: field, record, data. | weather. | remote or dangerous places. | and RFID work. |  |
|  | Learning about the pros and cons of | Recording data in a spreadsheet | Understanding how data might be used to | Gathering and analysing data in real time. |  |
|  | digital versus paper databases. | independently. | tell us about a location. |  |  |
|  |  |  |  | Creating formulas and sorting data within |  |
|  | Sorting and filtering databases to | Sorting data in a spreadsheet to compare |  | spreadsheets. |  |
|  | easily retrieve information. | using the ‘sort by…’ option. |  |  |  |
|  | Creating and interpreting charts | Designing a device which gathers and |  |  |  |
| **Using data** | and graphs to understand data. | records sensor data. |  |  |  |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Understanding the purpose of | Understanding that software can be used | Learn about different forms of | Learning about the Internet of Things and |
|  | emails. | collaboratively online to work as a team. | communication that have developed with | how it has led to ‘big data’. |
|  |  |  | the use of technology. |  |
|  | Recognising how social media |  |  | Learning how ’big data’ can be used to solve |
|  | platforms are used to interact. |  |  | a problem or improve efficiency. |
| **Wider use** |  |  |  |  |
| **of** |  |  |  |  |
| **technology** |  |  |  |  |
|  |  |  |  |  |

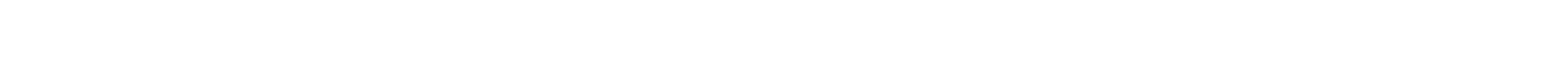
**Page 7**

**Progression of skills**

**Digital Literacy**



|  |  |  |
| --- | --- | --- |
| **EYFS** | **Year 1** | **Year 2** |
|  |  |  |
| Recognising that a range of technology is used | Logging in and out and saving work on their | Learning how to create a strong password. |
| for different purposes. | own account. |  |
|  |  | Understanding how to stay safe when talking to people online and what to do if they see or hear |
| Learning to log in and log out. | When using the internet to search for images, | something online that makes them feel upset or uncomfortable |
|  | learning what to do if they come across |  |
|  | something online that worries them or makes | Identifying whether information is safe or unsafe to be shared online. |
|  | them feel uncomfortable. |  |
|  |  | Learning to be respectful of others when sharing online and ask for their permission before sharing |
|  | Understanding how to interact safely with | content. |
|  | others online. |  |
|  |  | Learning strategies for checking if something they read online is true. |
|  | Recognising how actions on the internet can |  |
|  | affect others. |  |
|  | Recognising what a digital footprint is and how |  |
|  | to be careful about what we post. |  |
|  |  |  |



|  |  |  |  |
| --- | --- | --- | --- |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
|  |  |  |  |
| Recognising that different information is | Recognising that information on the internet | Identifying possible dangers online and learning | Learning about the positive and negative |
| shared online including facts, beliefs and | might not be true or correct and that some | how to stay safe. | impacts of sharing online. |
| opinions. | sources are more trustworthy than others. |  |  |
|  |  | Evaluating the pros and cons of online | Learning strategies to create a positive online |
| Learning how to identify reliable information | Learning to make judgements about the | communication. | reputation. |
| when searching online. | accuracy of online searches. |  |  |
|  |  | Recognising that information on the internet | Understanding the importance of secure |
| Learning how to stay safe on social media. | Identifying forms of advertising online. | might not be true or correct and learning ways | passwords and how to create them. |
|  |  | of checking validity. |  |
| Considering the impact technology can have on | Recognising what appropriate behaviour is |  | Learning strategies to capture evidence of |
| mood. | when collaborating with others online. | Learning what to do if they experience bullying | online bullying in order to seek help. |
|  |  | online. |  |
| Learning about cyberbullying. | Reflecting on the positives and negatives of |  | Using search engines safely and effectively. |
|  | time spent online. | Learning to use an online community safely |  |
| Learning that not all emails are genuine, |  |  | Recognising that updated software can help to |
| recognising when an email might be fake and | Identifying respectful and disrespectful online |  | prevent data corruption and hacking. |
| what to do about it. | behaviour. |  |  |
|  |  |  |  |

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