

# Derwent Vale Primary and Nursery School

## Computing Curriculum – Progression of Skills



### Computer Science - Hardware

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>Learning how to operate a camera to take photographs of meaningful creations or moments</li> <li>Learning how to explore and tinker with hardware to develop familiarity and introduce relevant vocabulary</li> <li>Learning how to operate a camera</li> <li>Recognising that a range of technology is used in places such as homes and schools</li> <li>Learning what a keyboard is and how to locate relevant keys</li> <li>Learning what a mouse is and developing basic mouse skills such as moving and clicking</li> </ul>	<ul style="list-style-type: none"> <li>Learning how to explore and tinker with hardware to find out how it works</li> <li>Understanding that computers and devices around us use inputs and outputs, identifying some of these</li> <li>Learning where keys are located on the keyboard</li> <li>Learning how to operate a camera</li> </ul>	<ul style="list-style-type: none"> <li>Understanding what a computer is and that it's made up of different components</li> <li>Recognising that buttons cause effects and that technology follows instructions</li> <li>Learning how we know that technology is doing what we want it to do via its output.</li> <li>Using greater control when taking photos with tablets or computers</li> <li>Developing confidence with the keyboard and the basics of touch typing</li> </ul>	<ul style="list-style-type: none"> <li>Understanding what the different components of a computer do and how they work together</li> <li>Drawing comparisons across different types of computers</li> <li>Learning what a server does</li> </ul>	<ul style="list-style-type: none"> <li>Learning about the purpose of routers</li> </ul>	<ul style="list-style-type: none"> <li>Learning that external devices can be programmed by a separate computer</li> <li>Learning the difference between ROM and RAM</li> <li>Recognising how the size of RAM affects the processing of data</li> <li>Understanding the fetch, decode, execute cycle</li> </ul>	<ul style="list-style-type: none"> <li>Learning about the history of computers and how they have evolved over time</li> <li>Using the understanding of historic computers to design a computer of the future</li> <li>Understanding and identifying barcodes, QR codes and RFID</li> <li>Identifying devices and applications that can scan or read barcodes, QR codes and RFID</li> <li>Acknowledging that corruption can happen within data during transfer (for example when downloading, installing, copying and updating files)</li> </ul>

### Computer Science – Networks and data representation

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> <li>Understanding what the internet is</li> </ul>		<ul style="list-style-type: none"> <li>Learning what a network is and its purpose</li> <li>Identifying the key components within a network, including whether they are wired or wireless</li> <li>Recognising links between networks and the internet</li> <li>Learning how data is transferred</li> </ul>	<ul style="list-style-type: none"> <li>Consolidating understanding of the key components of a network</li> <li>Understanding that websites and videos are files that are shared from one computer to another</li> <li>Learning about the role of packets</li> <li>Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Learning the vocabulary associated with data: data and transmit</li> <li>Learning how the data for digital images can be compressed</li> <li>Recognising that computers transfer data in binary and understanding simple binary addition</li> <li>Relating binary signals (Boolean) to</li> </ul>	<ul style="list-style-type: none"> <li>Understanding that computer networks provide multiple services</li> </ul>

## Computer Science - Networks and data representation (Continued)

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					the simple character-based language, <ul style="list-style-type: none"> <li>• ASCII Learning that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary calculations</li> <li>• Understanding how bit patterns represent images as pixels</li> </ul>	

## Computer Science – Computational thinking

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>• Using logical reasoning to read simple instructions and predict the outcome</li> </ul>	<ul style="list-style-type: none"> <li>• Learning that decomposition means breaking a problem down into smaller parts</li> <li>• Using decomposition to solve unplugged challenges</li> <li>• Using logical reasoning to predict the behaviour of simple programs</li> <li>• Developing the skills associated with sequencing in unplugged activities</li> <li>• Learning that an algorithm is a set of step by step instructions used to carry out a task, in a specific order</li> <li>• Follow a basic set of instructions</li> <li>• Assembling instructions into a simple algorithm</li> </ul>	<ul style="list-style-type: none"> <li>• Articulating what decomposition is</li> <li>• Decomposing a game to predict the algorithms used to create it</li> <li>• Using decomposition to decompose a story into smaller parts</li> <li>• Learning what abstraction is</li> <li>• Learning that there are different levels of abstraction</li> <li>• Explaining what an algorithm is</li> <li>• Following an algorithm</li> <li>• Creating a clear and precise algorithm</li> <li>• Learning that computers use algorithms to make predictions</li> <li>• Learning that programs execute by following precise instructions</li> <li>• Incorporating loops within algorithms</li> </ul>	<ul style="list-style-type: none"> <li>• Using decomposition to explain the parts of a laptop computer</li> <li>• Using decomposition to explore the code behind an animation</li> <li>• Using repetition in programs</li> <li>• Understanding that computers follow instructions</li> <li>• Using an algorithm to explain the roles of different parts of a computer</li> <li>• Using logical reasoning to explain how simple algorithms work</li> <li>• Explaining the purpose of an algorithm</li> <li>• Forming algorithms independently</li> </ul>	<ul style="list-style-type: none"> <li>• Solving unplugged problems by decomposing them into smaller parts</li> <li>• Using decomposition to understand the purpose of a script of code</li> <li>• Using decomposition to help solve problems</li> <li>• Identifying patterns through unplugged activities</li> <li>• Using past experiences to help solve new problems</li> <li>• Using abstraction to identify the important parts when completing both plugged and unplugged activities</li> <li>• Creating algorithms for a specific purpose</li> </ul>	<ul style="list-style-type: none"> <li>• Decomposing animations into a series of images</li> <li>• Decomposing a program without support</li> <li>• Decomposing a story to be able to plan a program to tell a story</li> <li>• Predicting how software will work based on previous experience</li> <li>• Writing more complex algorithms for a purpose</li> </ul>	<ul style="list-style-type: none"> <li>• Decomposing a program into an algorithm</li> <li>• Using past experiences to help solve new problems</li> <li>• Writing increasingly complex algorithms for a purpose</li> </ul>

## Computer Science - Programming

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>Following instructions as part of practical activities and games and learning to debug when things go wrong</li> <li>Learning to give simple instructions</li> <li>Learning that an algorithm is a set of instructions to carry out a task, in a specific order</li> <li>Experimenting with programming a Bee-bot/Bluebot and learning how to give simple commands</li> <li>Learning to debug instructions, with the help of an adult, when things go wrong</li> </ul>	<ul style="list-style-type: none"> <li>Programming a Bee-bot/Virtual Bee-bot to follow a planned route</li> <li>Learning to debug instructions when things go wrong</li> <li>Developing a how to video to explain how the Bee-bot works</li> <li>Learning to debug an algorithm in an unplugged scenario</li> </ul>	<ul style="list-style-type: none"> <li>Using logical thinking to explore software, predicting, testing and explaining what it does</li> <li>Using an algorithm to write a basic computer program</li> <li>Learning what loops are Incorporating loops to make code more efficient</li> </ul>	<ul style="list-style-type: none"> <li>Using logical thinking to explore more complex software; predicting, testing and explaining what it does</li> <li>Incorporating loops to make code more efficient</li> <li>Remixing existing code</li> <li>Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected</li> </ul>	<ul style="list-style-type: none"> <li>Understanding that websites can be altered by exploring the code beneath the site</li> <li>Coding a simple game</li> <li>Using abstraction and pattern recognition to modify code</li> <li>Incorporating variables to make code more efficient</li> <li>Remixing existing code</li> <li>Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected</li> </ul>	<ul style="list-style-type: none"> <li>Programming an animation</li> <li>Iterating and developing their programming as they work</li> <li>Beginning to use nested loops (loops within loops)</li> <li>Debugging their own code</li> <li>Writing code to create a desired effect</li> <li>Using a range of programming commands</li> <li>Using repetition within a program</li> <li>Amending code within a live scenario</li> </ul>	<ul style="list-style-type: none"> <li>Debugging quickly and effectively to make a program more efficient</li> <li>Remixing existing code to explore a problem</li> <li>Using and adapting nested loops</li> <li>Programming using the language Python</li> <li>Changing a program to personalise it</li> <li>Evaluating code to understand its purpose</li> <li>Predicting code and adapting it to a chosen purpose</li> <li>Altering a website's code to create changes</li> </ul>

## Information Technology – Using software

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>Using a simple online paint tool to create digital art</li> </ul>	<ul style="list-style-type: none"> <li>Using a basic range of tools within graphic editing software</li> <li>Taking and editing photographs</li> <li>Understanding how to create digital art using an online paint tool</li> <li>Developing control of the mouse through dragging, clicking and resizing of images to create different effects</li> <li>Developing understanding of different software tools</li> </ul>	<ul style="list-style-type: none"> <li>Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts</li> <li>Using word processing software to type and reformat text</li> <li>Using software to create story animations</li> <li>Creating and labelling images</li> </ul>	<ul style="list-style-type: none"> <li>Taking photographs and recording video to tell a story</li> <li>Using software to edit and enhance their video adding music, sounds and text on screen with transitions</li> </ul>	<ul style="list-style-type: none"> <li>Building a web page and creating content for it</li> <li>Designing and creating a webpage for a given purpose</li> <li>Use Google online software for documents, presentations, forms and spreadsheets</li> <li>Work collaboratively with others</li> </ul>	<ul style="list-style-type: none"> <li>Using logical thinking to explore software more independently, making predictions based on their previous experience</li> <li>Using a software programme (Sonic Pi or Scratch) to create music</li> <li>Using video editing software or animation software to animate</li> <li>Identify ways to improve and edit programs, videos, images etc.</li> <li>Independently learning how to use 3D design software package TinkerCAD</li> </ul>	<ul style="list-style-type: none"> <li>Using logical thinking to explore software independently, iterating ideas and testing continuously</li> <li>Using search and word processing skills to create a presentation</li> <li>Planning, recording and editing a radio play</li> <li>Creating and editing sound recordings for a specific purpose</li> <li>Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert</li> <li>Using design software TinkerCAD to design a product</li> <li>Creating a website with embedded links and multiple pages</li> </ul>

## Information Technology – Using email and the internet

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>Participating in group image searches, led by the teacher</li> </ul>	<ul style="list-style-type: none"> <li>Searching and downloading images from the internet safely</li> <li>Understanding that we are connected to others when using the internet</li> </ul>	<ul style="list-style-type: none"> <li>Understanding that personal information should not be shared on the internet</li> <li>Learning how to be respectful to others when sharing content online</li> </ul>	<ul style="list-style-type: none"> <li>Learning to log in and out of an email account</li> <li>Writing an email including a subject, 'to' and 'from'</li> <li>Sending an email with an attachment</li> <li>Replying to an email</li> <li>Identifying useful terms and phrases for search engines</li> </ul>	<ul style="list-style-type: none"> <li>Understanding why some results come before others when searching</li> <li>Understanding that information on the internet is not all grounded in fact</li> </ul>	<ul style="list-style-type: none"> <li>Developing searching skills to help find relevant information on the internet</li> <li>Understanding how apps can access our personal information and how to alter the permissions</li> </ul>	<ul style="list-style-type: none"> <li>Understanding how search engines work</li> </ul>

## Information Technology – Using data

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>Representing data through sorting and categorising objects in unplugged scenarios</li> <li>Representing data through pictograms</li> <li>Exploring branch databases through physical games</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to spreadsheets</li> <li>Representing data in tables, charts and pictograms</li> <li>Sorting data and creating branching databases</li> <li>Identifying where digital content can have advantages over paper when storing and manipulating data</li> </ul>	<ul style="list-style-type: none"> <li>Collecting and inputting data into a spreadsheet</li> <li>Interpreting data</li> </ul>	<ul style="list-style-type: none"> <li>Understanding the vocabulary associated with databases: field, record, data</li> <li>Learning about the pros and cons of digital versus paper databases</li> <li>Sorting and filtering databases to easily retrieve information</li> <li>Creating and interpreting charts and graphs to understand data</li> </ul>	<ul style="list-style-type: none"> <li>Designing a weather station which gathers and records sensor data</li> </ul>	<ul style="list-style-type: none"> <li>Understanding how data is collected</li> </ul>	<ul style="list-style-type: none"> <li>Understanding how barcodes, QR codes and RFID work</li> <li>Gathering and analysing data in real time</li> <li>Creating formulas and sorting data within spreadsheets</li> </ul>

## Information Technology – Wider use of technology

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> <li>Recognising common uses of information technology, including beyond school</li> <li>Understanding some of the ways we can use the internet</li> </ul>	<ul style="list-style-type: none"> <li>Learning how computers are used in the wider world</li> </ul>	<ul style="list-style-type: none"> <li>Understanding the purpose of emails</li> <li>Learning what a search engine is</li> <li>Recognising how social media platforms are used to interact</li> </ul>	<ul style="list-style-type: none"> <li>Understanding that software can be used collaboratively online to work as a team</li> </ul>	<ul style="list-style-type: none"> <li>Learn about different forms of communication that have developed with the use of technology</li> </ul>	<ul style="list-style-type: none"> <li>Learning about the Internet of Things and how it has led to 'big data'</li> <li>Learning how 'big data' can be used to solve a problem or improve efficiency</li> </ul>

## Digital Literacy

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>• Recognising that a range of technology is used in places such as homes and schools</li> <li>• Learning to log in and log out</li> <li>• When using the internet alongside an adult, or independently, learning what to do if they come across something that worries them or makes them feel uncomfortable</li> </ul>	<ul style="list-style-type: none"> <li>• Logging in and out and saving work on their own account</li> <li>• Understand the importance of a password</li> <li>• 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</li> <li>• Recognising when someone has been unkind online</li> <li>• Learning some top tips for staying safe online</li> <li>• Understanding how we 'share' information on the internet</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding that personal information should not be shared on the internet</li> <li>• Learning how to be respectful to others when sharing content online</li> </ul>	<ul style="list-style-type: none"> <li>• Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind</li> <li>• Learning about cyberbullying</li> <li>• Learning that not all emails are genuine, recognising when an email might be fake and what to do about it</li> <li>• Learning that not all information on the internet is factual</li> <li>• Understanding who personal information should/ should not be shared with</li> </ul>	<ul style="list-style-type: none"> <li>• Recognising what appropriate behaviour is when collaborating with others online</li> <li>• Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others</li> <li>• Learning about different forms of advertising on the internet</li> </ul>	<ul style="list-style-type: none"> <li>• Learning about how permissions work and how to change them</li> <li>• Identifying possible issues with online communication</li> <li>• Considering the effects of screen-time on physical and mental wellbeing</li> <li>• Learning about online bullying and where to seek advice</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding the importance of secure passwords and how to create them, along with two-step authentication</li> <li>• Using search engines safely and effectively</li> <li>• Recognising that updated software can help to prevent data corruption and hacking</li> <li>• Considering their digital footprint and online reputation and future implications they may have</li> <li>• Learning about how to collect evidence and report online bullying concerns</li> </ul>