Computing: Progression of Skills

Birchwood Junior School

By computing role · Years 3 to 6

Our computing roles

Data handler | Programmer | Problem solver | Engineer | Publisher | Risk assessor

What children can do in each computing role, by year group. Each statement completes the sentence 'I can …'.

	Year 3	Year 4	Year 5	Year 6
Data handler	**Branching databases** • Create questions with yes/no answers • Choose questions that will divide objects into evenly sized subgroups • Repeatedly create subgroups of objects • Identify an object using a branching database • Retrieve information from different levels of branching database	**Data logging** • Use a digital device to collect data automatically • Choose how often to automatically collect data samples • Use a set of logged data to find information • Use a computer program to sort data by one attribute • Export information to different formats	**Mars Rover** • Learn the vocabulary associated with data: data and transmit • Recognise that computers transfer data in binary • Understand simple binary addition • Relate binary signals (Boolean) to the simple character-based language, ASCII • Read binary up to eight characters and carry out binary calculations **Flat-file databases** • Choose different ways to view data • Choose which attribute and value to search by to answer a given question (operands) • Ask questions that need more than one attribute to answer • Choose which attribute to sort data by to answer a given question • Choose multiple criteria to search data to answer a given question (AND and OR) • Select an appropriate graph to visually compare data • Choose suitable ways to present information to people	**Big data** • Understand and identify barcodes, QR codes and RFID • Identify devices and applications that can scan or read barcodes, QR codes and RFID • Understand how barcodes, QR codes and RFID work • Gather and analyse data in real time • Create formulas within spreadsheets • Sort data within spreadsheets **Spreadsheets** • Calculate data using a formula for each operation • Use functions to create new data • Use existing cells within a formula • Choose suitable ways to present spreadsheet data
Programmer	**Programming (Scratch)** • Build a sequence of commands • Combine commands in a program • Order commands in a program • Create a sequence of commands to produce a given outcome	**Programming (Scratch)** • List an everyday task as a set of instructions including repetition • Use an indefinite loop to produce a given outcome • Use a count-controlled loop to produce a given outcome • Plan a program that includes appropriate loops to produce a given outcome • Recognise tools that enable more than one process to be run at the same time (concurrency) • Create two or more sequences that run at the same time	**Programming (Scratch)** • Create a condition-controlled loop • Use a condition in an 'if … then …' statement to start an action • Use selection to switch the program flow in one of two ways • Use a condition in an 'if … then … else …' statement to produce given outcomes **Physical computing (Crumble)** • Create a condition-controlled loop • Use a condition in an 'if … then …' statement to start an action • Use selection to switch the program flow in one of two ways • Use a condition in an 'if … then … else …' statement to produce given outcomes	**HTML** • Remix existing code • Build a web page • Create content for a web page **Python** • Decompose a program into an algorithm • Write algorithms for a purpose • Debug quickly and effectively to make a program more efficient • Remix existing code to explore a problem • Use and adapt nested loops • Program using the language Python • Change a program to personalise it • Evaluate code to understand its purpose

	Year 3	Year 4	Year 5	Year 6
Risk assessor	• Identify whether information is safe or unsafe to be shared online • Create a strong password • Be respectful of others when sharing online • Ask people for their permission before sharing content • Check if something I read online is true • Understand how to stay safe when talking to people online • Say what to do if I see or hear something online that makes me feel upset or uncomfortable	• Recognise how social media platforms are used to interact • Recognise that different information is shared online including facts, beliefs and opinions • Identify reliable information when searching online • Stay safe on social media • Consider the impact technology can have on mood	• Understand why some results come before others when searching • Understand that information found by searching the internet is not all grounded in fact • Make judgements about the accuracy of online searches • Identify forms of advertising online • Reflect on the positives and negatives of time online • Identify respectful and disrespectful online behaviour • Recognise that information on the Internet might not be true or correct and that some sources are more trustworthy than others	• Demonstrate the positive and negative impacts of sharing online • Use strategies to create a positive online reputation • Create strong passwords • Capture evidence of online bullying in order to seek help • Be aware that updated software can help to prevent data corruption and hacking
Problem solver	• Create algorithms for use when programming • Decompose tasks (such as animations) into separate steps to create an algorithm • Identify patterns in an algorithm • Use repetition in algorithms	• Use abstraction to focus on what's important in my design • Write increasingly more precise algorithms for use when programming • Use simple selection in algorithms • Use logical reasoning to detect and correct errors in programs	• Solve problems by decomposing them into smaller parts • Use selection in algorithms • Recognise the need for conditions in repetition within algorithms • Use logical reasoning to explain how a variety of algorithms work • Use logical reasoning to detect and correct errors in algorithms • Evaluate my work and identify errors	• Recognise and make use of patterns across programming projects • Write precise algorithms for use when programming • Identify variables needed and their use in selection and repetition • Decompose code into sections for effective debugging • Critically evaluate my work and suggest improvements
Engineer	**Desktop computing** • Show that a page orientation can be changed • Add text to a placeholder • Organise text and image placeholders in a page layout • Edit text in a placeholder • Choose fonts and apply effects to text • Review a document	**PowerPoint** • Show that a page orientation can be changed • Add text to a placeholder • Organise text and image placeholders in a page layout • Edit text in a placeholder • Choose fonts and apply effects to text • Review a document • Add images, videos and sound • Add transitions	**Sharing information** • Describe the input and output of a search engine • Demonstrate that different search terms produce different results	**Computing systems: communication** • Outline methods of communicating and collaborating using the internet • Evaluate different methods of online communication and collaboration • Decide what you should and should not share online • Choose methods of internet communication and collaboration for given purposes
Publisher	**Creating media** • Use logical thinking to explore more complex software; predict, test and explain what it does • Take photographs and record video to tell a story • Use software to edit and enhance a video adding music, sounds and text on screen with transitions	**Photo editing** • Use an application to change the **whole** of a digital image – Change the composition by rotating and flipping – Change the composition by cropping – Adjust colours – Apply filters – Apply effects • Use an application to change **part** of a digital image – Select part of a digital image – Use clone, copy and paste to change the composition – Use cloning to retouch • Use an application to **add** to the composition of a digital image – Add text	**Vectors** • Add an object to a vector drawing • Select one object or multiple objects • Delete objects • Move objects between layers of drawing • Duplicate objects using copy and paste • Modify objects • Reposition objects • Group and ungroup selected objects • Combine options to achieve a desired effect • Create a vector drawing for a given purpose	**3D modelling** • Position 3D shapes relative to one another • Use digital tools to modify 3D objects • Combine objects to create a 3D digital artefact • Use digital tools to accurately size 3D objects • Construct a 3D model which reflects a real-world object