



## Progression of Skills - COMPUTING



### Intent

- Children can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- Children can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- Children can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- Children are responsible, competent, confident and creative users of information and communication technology

### Implementation

At Holly Lodge Primary Academy, computing is taught in blocks, employing cross-curricular contexts to motivate children and support them to make connections and remember the steps they have been taught. The implementation of the curriculum covers the key strands of: computer systems and networks, creating media, data/information technology, programming and digital literacy. The children experience these strands in each year group, but the subject knowledge imparted becomes increasingly specific and in depth, building on prior knowledge, as the skills taught become more complex. For example, children in Key Stage 1 learn what algorithms are, which leads them to the design stage of programming in Key Stage 2, where they design, write and debug programmes, explaining the thinking behind their algorithms.

Developing an understanding of how to use technology safely and appropriately is fundamental to the modern world and consequently an essential part of children's learning. Online safety and digital awareness is woven throughout the school year and highlighted on themed days such as Safer Internet Day.

Our children are beginning to capture their learning digitally using Seesaw, a digital platform. They are creating portfolios, enabling them to showcase a journey of learning, not just in computing but across the whole curriculum. Additionally, they can share and evaluate their own learning as well as that of their peers.

We have a computing suite and a set of class iPads to ensure that all year groups have the opportunity to use a range of devices and programmes for many purposes across the wider curriculum, as well as in discrete computing lessons.

### Impact

Through their computing learning, children leave Holly Lodge Primary Academy:

- With a love for computing - both the concepts behind the subject and the creative opportunities it provides.
- With the ability to think creatively and logically to find solutions to digital challenges.
- Equipped with research methods, the ability to use presentation and creative tools, and with critical thinking that they can apply in secondary school and beyond.
- Safe, considerate and well informed digital citizens.



## Progression of Skills - COMPUTING



<b>Computer Systems &amp; networks</b>						
Rec	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<p><b>Technology around us</b> Identify technology</p> <p>Identify a computer and its main parts</p> <p>Use a mouse in different ways</p> <p>Use a keyboard to type</p> <p>Use the keyboard to edit text</p> <p>Create rules for using technology responsibly</p>	<p><b>Information technology around us</b> Recognise the uses and features of information technology</p> <p>Identify information technology in the home</p> <p>Identify information technology beyond school</p> <p>Explain how information technology benefits us</p> <p>Show how to use information technology safely</p> <p>Recognise that choices are made when using information technology</p>	<p><b>Connecting computers</b> Explain how digital devices function</p> <p>Identify input and output devices</p> <p>Recognise how digital devices can change the way we work</p> <p>Explain how a computer network can be used to share information</p> <p>Explore how digital devices can be connected</p> <p>Recognise the physical components of a network</p>	<p><b>The internet</b> Describe how networks physically connect to other networks</p> <p>Recognise how networked devices make up the internet</p> <p>Outline how websites can be shared via the World Wide Web</p> <p>Describe how content can be added and accessed on the World Wide Web</p> <p>Recognise how the content of the WWW is created by people</p> <p>Evaluate the consequences of unreliable content</p>	<p><b>Sharing information</b> Explain that computers can be connected together to form systems</p> <p>Recognise the role of computer systems in our lives</p> <p>Recognise how information is transferred over the internet</p> <p>Explain how sharing information online lets people in different places work together</p> <p>Contribute to a shared project online</p> <p>Evaluate different ways of working together online</p>	<p><b>Communication</b> Identify how to use a search engine</p> <p>Describe how search engines select results</p> <p>Describe how search engines select results</p> <p>Explain how search results are ranked</p> <p>Recognise why the order of results is important, and to whom</p> <p>Recognise how we communicate using technology</p> <p>Evaluate different methods of online communication</p>



## Progression of Skills - COMPUTING

	<p><u>Key Vocab</u> Computer, mouse/trackpad, keyboard, screen, click, drag, input device, shift, space bar, capital letter, full stop, safely, responsibly.</p>	<p><u>Key Vocab</u> Information technology (IT), computer, barcode, scan.</p>	<p><u>Key Vocab</u> Digital device, input, output, process, program, connection, network, network switch, server, wireless access point (WAP).</p>	<p><u>Key Vocab</u> Internet, network, router, network security, network switch, server, wireless access point (WAP), website, web page, web address, routing, route tracing, browser, World Wide Web, content, links, files, download, sharing, ownership, permission, information, sharing, accurate, honest, content, adverts.</p>	<p><u>Key Vocab</u> System, connection, digital, input, process, output, protocol, address, packet, chat, explore, slide deck, reuse, remix, collaboration</p>	<p><u>Key Vocab</u> Search, search engine, refine, index, crawler, bot, search engine, ranking, optimisation, links, content creator, selection, communication, internet, one-way, two-way, one-to-one, one-to-many.</p>
--	--	---	--	---	--	--



## Progression of Skills - COMPUTING



### Creating Media

Rec	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Use simple programs on a computer or tablet.</p> <p>Recognise that a range of technology is used in places such as homes and schools.</p> <p>Show an interest in technological toys with knobs and pulleys, or real objects such as cameras, or mobile devices.</p>	<p><b>Digital painting</b> Describe what different freehand tools do</p> <p>Use the shape tool and the line tools</p> <p>Make careful choices when painting a digital picture</p> <p>Explain why I chose the tools I used</p> <p>Use a computer on my own to paint a picture</p> <p>Compare painting a picture on a computer and on paper</p> <p><b>Digital writing</b> Use a computer to write</p> <p>Add and remove text on a computer</p> <p>Identify that the look of text can be changed on a computer</p>	<p><b>Digital photography</b> Know what devices can be used to take photographs</p> <p>Use a digital device to take a photograph</p> <p>Describe what makes a good photograph</p> <p>Decide how photographs can be improved</p> <p>Use tools to change an image</p> <p>Recognise that images can be changed</p> <p><b>Making music</b> Say how music can make us feel</p> <p>Identify that there are patterns in music</p> <p>Describe how music can be used in different ways</p>	<p><b>Stop-frame animation</b> Explain that animation is a sequence of drawings or photographs</p> <p>Relate animated movement with a sequence of images</p> <p>Plan an animation</p> <p>Identify the need to work consistently and carefully</p> <p>Review and improve an animation</p> <p>Evaluate the impact of adding other media to an animation</p> <p><b>Desktop publishing</b> Recognise how text and images convey information</p> <p>Recognise that text and layout can be edited</p> <p>Choose appropriate page settings</p>	<p><b>Audio editing</b> Identify that sound can be digitally recorded</p> <p>Use a digital device to record sound</p> <p>Explain that a digital recording is stored as a file</p> <p>Explain that audio can be changed through editing</p> <p>Show that different types of audio can be combined and played together</p> <p>Evaluate editing choices made</p> <p><b>Photo editing</b> Explain that digital images can be changed</p> <p>Change the composition of an image</p> <p>Describe how images can be changed for different uses</p>	<p><b>Video editing</b> Recognise video as moving pictures, which can include audio</p> <p>Identify digital devices that can record video</p> <p>Capture video using a digital device</p> <p>Recognise the features of an effective video</p> <p>Identify that video can be improved through reshooting and editing</p> <p>Consider the impact of the choices made when making and sharing a video</p> <p><b>Vector drawing</b> Identify that drawing tools can be used to produce different outcomes</p> <p>Create a vector drawing by combining shapes</p>	<p><b>Web page creation</b> Review an existing website and consider its structure</p> <p>Plan the features of a web page</p> <p>Consider the ownership and use of images (copyright)</p> <p>Recognise the need to preview pages</p> <p>Outline the need for a navigation path</p> <p>Recognise the implications of linking to content owned by other people</p> <p><b>3D modelling</b> Use a computer to create and manipulate three-dimensional (3D) digital objects</p> <p>Compare working digitally with 2D and 3D graphics</p>



## Progression of Skills - COMPUTING



	<p>Make careful choices when changing text</p> <p>Explain why I used the tools that I chose</p> <p>Compare writing on a computer with writing on paper</p>	<p>Show how music is made from a series of notes</p> <p>Create music for a purpose</p> <p>Review and refine our computer work</p>	<p>Add content to a desktop publishing publication</p> <p>Consider how different layouts can suit different purposes</p> <p>Consider the benefits of desktop publishing</p>	<p>Make good choices when selecting different tools</p> <p>Recognise that not all images are real</p> <p>Evaluate how changes can improve an image</p>	<p>Use tools to achieve a desired effect</p> <p>Recognise that vector drawings consist of layers</p> <p>Group objects to make them easier to work with</p> <p>Evaluate my vector drawing</p>	<p>Construct a digital 3D model of a physical object</p> <p>Identify that physical objects can be broken down into a collection of 3D shapes with</p> <p>Design a digital model by combining 3D objects</p> <p>Develop and improve a digital 3D model</p>
<p><u>Key Vocab</u> Program, app.</p>	<p><u>Key Vocab</u> Paint program, tool, paintbrush, erase, fill, undo, primary colours, shape tools, line tool, fill tools, undo tool, brush style, brush size, like, prefer, dislike, word processor, keyboard, keys, letters, numbers, space, backspace, text cursor, toolbar, bold, italic, underline.</p>	<p><u>Key Vocab</u> Device, camera, photograph, capture, image, digital, landscape, portrait, horizontal, vertical, field of view, narrow, wide, format, framing, focal point, subject matter, compose, natural lighting, artificial lighting, flash, focus, background, foreground, editing, tools, colour, filter, format, changed, real, open, edit.</p>	<p><u>Key Vocab</u> Animation, flip book, stop frame animation, frame, sequence, image, photograph, setting, character, events, onion skinning, consistency, evaluation, delete, media, import, transition, test, images, advantages, disadvantages, communicate, font, style, template, landscape, portrait, orientation, placeholder, copy, paste, layout, purpose, benefits.</p>	<p><u>Key Vocab</u> Audio, record, playback, microphone, speaker, headphones, input, output, sound, playback, start, pause, podcast, sound, playback, start, pause, stop, podcast, save, file, edit, selection, open, mixing, time shift, export, evaluate, feedback, image, arrange, select, digital, crop, undo, save, copyright, composition, pixels, crop, rotate, flip, adjustments, effects, colours, hue/saturation, sepia, adjust, sharpen, brighten, composite, publication, elements, layer.</p>	<p><u>Key Vocab</u> Video, audio, recording, storyboard, script, soundtrack, dialogue, capture, zoom, storage, digital, tape, AV (audio-visual), videographer, recording, zoom, pan, tilt, angle, lighting, setting, content, export, split, trim/clip, titles, end credits, timeline, transitions, audio soundtrack, retake, special effects, vector, drawing tools, shapes, object, icons, toolbar, duplicate, organise, rotate, alignment, grid, resize, handles, modify, consistency, layers, order, group, ungroup, reuse.</p>	<p><u>Key Vocab</u> Website, webpage, browse, media, Hypertext Markup Language (HTML), logo, layout, header, media, purpose, copyright, fair use, home page, preview, device, navigation, hyperlink, subpage, implication, external link, embed, 2D, 3D, view, resize, colour, lift, rotate, position, select, duplicate, dimensions, placeholder, hole, group, ungroup.</p>



# Progression of Skills - COMPUTING





## Progression of Skills - COMPUTING



### Data & Information

Rec	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<p><b>Grouping data</b> Label objects</p> <p>Identify that objects can be counted</p> <p>Describe objects in different ways</p> <p>Count objects with the same properties</p> <p>Compare groups of objects</p> <p>Answer questions about groups of objects</p>	<p><b>Pictograms</b> Recognise that we can count and compare objects using tally charts</p> <p>Recognise that objects can be represented as pictures</p> <p>Create a pictogram</p> <p>Select objects by attribute and make comparisons</p> <p>Recognise that people can be described by attributes</p> <p>Explain that we can present information using a computer</p>	<p><b>Branching databases</b> Create questions with yes/no answers</p> <p>Identify the object attributes needed to collect relevant data</p> <p>Create a branching database</p> <p>Identify objects using a branching database</p> <p>Explain why it is helpful for a database to be well structured</p> <p>Compare the information shown in a pictogram with a branching database</p>	<p><b>Data logging</b> Explain that data gathered over time can be used to answer questions</p> <p>Use a digital device to collect data automatically</p> <p>Explain that a data logger collects 'data points' from sensors over time</p> <p>Use data collected over a long duration to find information</p> <p>Identify the data needed to answer questions</p> <p>Use collected data to answer questions</p>	<p><b>Flat-file databases</b> Use a form to record information</p> <p>Compare paper and computer-based databases</p> <p>Outline how grouping and then sorting data allows us to answer questions</p> <p>Explain that tools can be used to select specific data</p> <p>Explain that computer programs can be used to compare data visually</p> <p>Apply my knowledge of a database to ask and answer real-world questions</p>	<p><b>Spreadsheets</b> Identify questions which can be answered using data</p> <p>Explain that objects can be described using data</p> <p>Explain that formula can be used to produce calculated data</p> <p>Apply formulas to data, including duplicating</p> <p>Create a spreadsheet to plan an event</p> <p>Choose suitable ways to present data</p>
	<p style="text-align: center;"><u>Key Vocab</u></p> <p>Object, label, group, search, image, property, colour, size, shape, value, label, data set, more, less, most, fewest, same.</p>	<p style="text-align: center;"><u>Key Vocab</u></p> <p>More than, less than, most, least, organise, data, object, tally chart, votes, total, pictogram, enter, tally char, compare, count,</p>	<p style="text-align: center;"><u>Key Vocab</u></p> <p>Attribute, value, questions, table, objects, branching database, database, equal, even, separate, structure, compare, order, organise,</p>	<p style="text-align: center;"><u>Key Vocab</u></p> <p>Data, table, input device, sensor, data logger, logging, data point, interval, analyse, data set, import, export, collection, review, conclusion.</p>	<p style="text-align: center;"><u>Key Vocab</u></p> <p>Data, information, record, field, sort, order, group, search, criteria, graph, chart, axis, compare, filter</p>	<p style="text-align: center;"><u>Key Vocab</u></p> <p>Spreadsheet, data, data heading, data set, cells, columns, rows, format, common attribute, calculation, input, output, cell reference, formula,</p>



## Progression of Skills - COMPUTING



		explain, more common, least common, attribute, group, same, different, conclusion, sharing.	information, selecting, decision tree.			range, supplicate sigma,
--	--	---	---	--	--	-----------------------------



## Progression of Skills - COMPUTING



### Programming

Rec	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Understand that many everyday devices respond to commands.</p> <p>Begin to follow simple instructions.</p>	<p><b>Moving a robot</b> Explain what a given command will do</p> <p>Act out a given word</p> <p>Combine forwards and backwards commands to make a sequence</p> <p>Combine four direction commands to make sequences</p> <p>Plan a simple program</p> <p>Find more than one solution to a problem</p> <p><b>Introduction to animation</b> Choose a command for a given purpose</p> <p>Show that a series of commands can be joined together</p> <p>Identify the effect of changing a value</p> <p>Explain that each sprite has its own instructions</p>	<p><b>Robot algorithms</b> Describe a series of instructions as a sequence</p> <p>Explain what happens when we change the order of instructions</p> <p>Use logical reasoning to predict the outcome of a program (series of commands)</p> <p>Explain that programming projects can have code and artwork</p> <p>Design an algorithm</p> <p>Create and debug a program that I have written</p> <p><b>Introduction to quizzes</b> Explain that a sequence of commands has a start</p> <p>Explain that a sequence of commands has an outcome</p>	<p><b>Sequence in music</b> Explore a new programming environment</p> <p>Identify that each sprite is controlled by the commands I choose</p> <p>Explain that a program has a start</p> <p>Recognise that a sequence of commands can have an order</p> <p>Change the appearance of my project</p> <p>Create a project from a task description</p> <p><b>Events and actions</b> Explain how a sprite moves in an existing project</p> <p>Create a program to move a sprite in four directions</p> <p>Adapt a program to a new context</p>	<p><b>Repetition in shapes</b> Identify that accuracy in programming is important</p> <p>Create a program in a text-based language</p> <p>Explain what 'repeat' means</p> <p>Modify a count-controlled loop to produce a given outcome</p> <p>Decompose a program into parts</p> <p>Create a program that uses count-controlled loops to produce a given outcome</p> <p><b>Repetition in games</b> Develop the use of count-controlled loops in a different programming environment</p> <p>Explain that in programming there are</p>	<p><b>Selection in physical computing</b> Control a simple circuit connected to a computer</p> <p>Write a program that includes count-controlled loops</p> <p>Explain that a loop can stop when a condition is met, eg number of times</p> <p>Conclude that a loop can be used to repeatedly check whether a condition has been met</p> <p>Design a physical project that includes selection</p> <p>Create a controllable system that includes selection</p> <p><b>Selection in games</b> Explain how selection is used in computer programs</p>	<p><b>Variables in games</b> Define a 'variable' as something that is changeable</p> <p>Explain why a variable is used in a program</p> <p>Choose how to improve a game by using variables</p> <p>Design a project that builds on a given example</p> <p>Use my design to create a project</p> <p>Evaluate my project</p> <p><b>Sensing</b> Create a program to run on a controllable device</p> <p>Explain that selection can control the flow of a program</p> <p>Update a variable with a user input</p>



## Progression of Skills - COMPUTING



	<p>Design the parts of a project</p> <p>Use my algorithm to create a program</p>	<p>Create a program using a given design</p> <p>Change a given design</p> <p>Create a program using my own design</p> <p>Decide how my project can be improved</p>	<p>Develop my program by adding features</p> <p>Identify and fix bugs in a program</p> <p>Design and create a maze-based challenge</p>	<p>infinite loops and count controlled loops</p> <p>Develop a design which includes two or more loops which run at the same time</p> <p>Modify an infinite loop in a given program</p> <p>Design a project that includes repetition</p> <p>Create a project that includes repetition</p>	<p>Relate that a conditional statement connects a condition to an outcome</p> <p>Explain how selection directs the flow of a program</p> <p>Design a program which uses selection</p> <p>Create a program which uses selection</p> <p>Evaluate my program</p>	<p>Use a conditional statement to compare a variable to a value</p> <p>Design a project that uses inputs and outputs on a controllable device</p> <p>Develop a program to use inputs and outputs on a controllable device</p>
<p><u>Key Vocab</u> Equipment, buttons, movement, device.</p>	<p><u>Key Vocab</u> Forwards, backwards, turn, clear, go, commands, instructions, directions, plan, algorithm, program, route, sprite, compare, programming, block, joining, start block, run, background, delete, reset, predict, effect, change, value</p>	<p><u>Key Vocab</u> Instruction, sequence, clear, unambiguous, algorithm, program, order, commands, prediction, design, route, mat, debugging, run, start, blocks, sprite, modify, change, match, features, evaluate.</p>	<p><u>Key Vocab</u> Programming, blocks, commands, code, sprite, costume, stage, backdrop, motion, turn, point in direction, go to, glide, event, task, design, run the code, sequence, order, algorithm, bug, debug, motion, event, logic, move, resize, extension block, pen up, set up, action, errors, test.</p>	<p><u>Key Vocab</u> Program, turtle, commands, code snippet, algorithm, design, debug, pattern, repeat, repetition, count-controlled loop, algorithm, value, trace, value, decompose, procedure, sprite, loop, forever, infinite, loop, duplicate, modify, evaluate.</p>	<p><u>Key Vocab</u> Microcontroller, components, LED, crocodile clips, connect, battery box, program, repetition, infinite, loop, count-controlled loop, switch, motor, condition, output devices, selection, action, conditional statement, algorithm, program, debug, input, outcomes, implement, design, test</p>	<p><u>Key Vocab</u> Variable, change, name, value, set, design, event, algorithm, code, task, design, artwork, project, test, debug, improve, evaluate, share, input, process, output, selection, condition, if... then..., else, variable, random, sensing.</p>



## Progression of Skills - COMPUTING



### Digital literacy / E-Safety

Rec	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Say when I am on the internet and when I am not.</p>	<p>Log in and out and save work on their own account.</p> <p>Understand the importance of a password.</p> <p>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.</p> <p>Explain what personal information is.</p> <p>Talk about why it is important to be kind online.</p>	<p>Understand how to stay safe when talking to people online.</p> <p>Understand not to share personal information and what to do if they see or hear something online that makes them feel upset or uncomfortable.</p> <p>Explain why you should go online for a short amount of time.</p> <p>Recognise that not everyone who is who they say they are on the internet.</p>	<p>Articulate how to be a responsible digital citizen; understand their responsibilities to treat others respectfully and recognise when digital behaviour is unkind.</p> <p>Understand and articulate cyberbullying.</p> <p>Understand that not all emails are genuine, and how to recognise when an email might be fake and what to do about it.</p>	<p>Recognise what appropriate behaviour is when collaborating with others online.</p> <p>Recognise that information on the Internet might not be true or correct and that some sources are more trustworthy than other.</p>	<p>Identify possible dangers online and learning how to stay safe.</p> <p>Create an animation about digital safety.</p> <p>Recognise that information on the Internet might not be true or correct and learning ways of checking validity.</p> <p>Demonstrate the use of an online community safely.</p>	<p>Understand the importance of secure passwords and how to create them.</p> <p>Understand the consequences of sharing too much personal information.</p> <p>Use search engines safely and effectively.</p> <p>Recognise that updated software can help to prevent data corruption and hacking.</p> <p>Explain the consequences of spending too much time online or on a game.</p> <p>Explain how and why it is important to protect a computer or device from harm on the internet.</p>



## Progression of Skills - COMPUTING

<u>Key Vocab</u>	<u>Key Vocab</u>	<u>Key Vocab</u>	<u>Key Vocab</u>	<u>Key Vocab</u>	<u>Key Vocab</u>	<u>Key Vocab</u>
Choices Internet Website	Rules Online Private information Email	Appropriate/inappropriate sites Cyber-bullying Digital footprint Keyword searching	E-safety rules Secure passwords Report abuse button Gaming Blogs	E-safety rules Secure passwords Report abuse button Gaming Blogs	Responsible online communication Informed choices Virus threats Blogs Messaging	Responsible online communication Informed choices Virus threats Blogs Messaging

