Walwayne Court - Computing Progression Grid

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National curriculum		
EYFS Development matters Communication and language: Use talk to help work out problems and organise thinking and activities explain how things work and why they might happen. Personal, social and emotional development: Show resilience and perseverance in the face of challenge. Physical development: Develop their small motor skills so that they can use a range of tools competently, safely and confidently.	**KS1 National Curriculum Aims** Pupils should be taught to: • understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions • create and debug simple programs • use logical reasoning to predict the behaviour of simple programs • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.	**KS2 National Curriculum Aims** Pupils should be taught to: • design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • use sequence, selection, and repetition in programs; work with variables and various forms of input and output • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs • understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration • use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content • select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Substantive and Disciplinary Knowledge Progression Substantive knowledge bold items are mandatory

		Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
COMPUTER SCIENCE								
PROGRAMMING	SUBSTANTIVE KNOWLEDGE	- Explore through Wonderblocks, Beebots and Codeapillars. - Follow instructions as part of daily routines. - Encourage language of the steps you put in to have a desired outcome. "If I ask it to move forwards twice, where might it end up?"	**- Understand key vocabulary: command, sprite, compare, programming, area, block, start, run, program, background, delete, reset, value, instructions, design** **- Know how to choose a command for a given purpose** **- Know that a series of commands can be joined together** **- Know that values can be changed** **- Know that each sprite has its own instruction** **- Know how to design a programming project** **- Know how to use an algorithm to create a program**	**- Understand key vocabulary: instruction, sequence, clear, algorithm, program, order, prediction, route, mat, debugging** **- Know that a series of instructions is called a sequence** **- Know what happens when the order of instructions is changed** **- Know that programming projects can have code and artwork** **- Know how to design an algorithm** **- Know how to create and debug a program**	**- Understand key vocabulary: programming, blocks, commands, code, sprite, sequence, design, run, order, note, chord, algorithm, bug, debug** **- Know that commands have an outcome** **- Know that a program has a start** **- Know that a sequence of commands can (and should) have an order** **- Know how to change the appearance of a project in Scratch** **- Know how to create a project in Scratch from a task description**	**- Understand key vocabulary: program, commands, code snippet, algorithm, debug, repeat, decompose, procedure** **- Know that accuracy in programming is important** **- Know how to create a program in a text-based language** **- Know what 'repeat' means** **- Know how to modify a count-controlled loop to produce a given outcome** **- Know how to decompose a task into small steps** **- Know how to create a count-controlled loop to produce a given outcome**	**- Understand key vocabulary: variable, change, name, value, set, design, event, algorithm, improve, evaluate** **- Know that a variable is something that is changeable** **- Know why a variable is used in a program** **- Know how to improve a game by using variables** **- Know how to design a project that builds on a given example** **- Know how to use a design to create a program** **- Know how to evaluate a project**	**- Understand key vocabulary: Micro:bit, MakeCode, input, process, output, USB, selection, condition, if then else, algorithm, test, debug** **- Know how to create a program to run on a controllable device** **- Know that selection can control the flow of a program** **- Know how to update a variable with a user input** **- Know how to use a conditional statement to compare a variable to a value** **- Know how to design and develop a program that uses inputs and outputs on a controllable device**
	DISCIPLINARY KNOWLEDGE	- Explore through Wonderblocks, Beebots and Codeapillars.	- Use commands to move a sprite - Use multiple blocks by joining them together - Use a Start block in a program - Run a program - Change the value and explain what happens - Insert additional sprites into a program - Delete a sprite - Add blocks to multiple sprites - Choose appropriate artwork for the project - Create an algorithm for each sprite - Test the program	- Follow instructions - Give clear instructions - Explain what happens when the order of instructions is changed - Predict the outcome of a program - Explain the choices made during design - Test the design to make sure it is usable - Explain what an algorithm should achieve - Create an algorithm to meet a goal - Use an algorithm to create a program - Test and debug each part of a program	- Identify objects in Scratch - Explain that objects have attributes linked to them - Recognise that commands are represented as blocks - Create a program following a design - Predict the coding blocks used to move an object - Start a program in different ways - Create a sequence of connected commands - Explain that objects will respond exactly to the code - Explain what a sequence is - Combine commands - Order and build objects into a sequence - Implement an algorithm as code	- Program a computer by typing commands - Explain the effect of changing a value of a command - Create a code snippet - Write an algorithm to produce a given outcome - Test an algorithm in a text-based language - Explain what 'repeat' means - Predict the outcome of a program containing a count-controlled loop - Use a procedure in a program - Design a program that contains a count-controlled loop - Debug a program	- Identify examples of information that is variable - Identify that variables can hold numbers or letters - Identify a variable as a placeholder in memory - Explain that a variable has a name and a value - Recognise that the value of a variable can be changed - Decide where in a program to change a variable - Explain design choices - Create algorithms - Test code - Identify ways own game could be improved/extended - Share work with others	- Test a program on an emulator - Transfer a program to a controllable device - Use a variable in an 'if, then, else' statement to select the flow of a program - Use a condition to change a variable - Explain that checking a variable doesn't change its value - Use an operand (<>=) in a 'if, then' statement - Explain the importance of the order of conditions in 'if, else' statements - Modify a program to achieve a different outcome - Design an algorithm and program flow - Create and test a program

INFORMATION TECHNOLOGY

COMPUTER SYSTEMS & NETWORKS	SUBSTANTIVE KNOWLEDGE	- Learn and understand what common devices are called e.g. computer, iPad, phone - How to log in to iPads - How to use the internet to find facts as a class – teacher modelling this to encourage exposure to vocabulary linked with searching online.	**- Understand key vocab: technology, computer, mouse, trackpad, keyboard, screen, double-click, typing** - How to log in to iPads, Chromebooks & Google Classroom - Know different types of technology - Know what a computer is and what its main parts are **- Know how to use a mouse** **- Know how to use a keyboard** **- Know the rules for using technology responsibly**	**- Understand key vocab: information technology (IT), computer, barcode, scanner/scan** - Recognise uses and features of IT - Know uses of IT in school **- Know uses of IT beyond school** **- Know how IT helps us** **- Know how to use IT safely** - Know that choices are made when using IT	**- Understand key vocab: digital, input, process, output, program, connection, network, switch, cables, sockets** - Know how digital devices function **- Know what input and output devices are** **- Know how digital devices can change the way we work** **- Know how a computer network can be used to share information** - Know how digital devices can be connected - Know the physical components of a network	**- Understand key vocab: internet, network, router, security, server, wireless access point (WAP), website, web page, web address, web browser, World Wide Web, links, files, download, sharing, permission, ownership** - Know how networks physically connect to other networks **- Know how network devices make up the internet** **- Know how websites can be shared via the WWW** - Know how content can be added and accessed online - Know how content of the WWW is created by people **- Know the consequences of unreliable content**	**- Understand key vocab: system, connection, storage, search engine, algorithm, links, ranking** - Know that computers can be connected together to form systems - Know the role of computer systems in our lives **- Know how to use a search engine** **- Know how search engines select results** **- Know how search results are ranked** - Know why the order of results is important and to whom	**- Understand key vocab: communication, data, data packet, Internet Protocol (IP), domain, public, private** **- Know the importance of internet addresses** **- Know how data is transferred across the internet** **- Know how sharing information online can help people to work together** **- Know about different ways of working together online** **- Know how we communicate using technology** **- Know how to evaluate different methods of online communication**
	DISCIPLINARY KNOWLEDGE	- Using iPads in class - Practice how to log in to iPads - Find facts as a class using the internet - Using Beebots - Having technology in role play (phones, computers etc.)	- Locate examples of technology - Explain how these technologies help us - Explain where to go for help regarding concerns about content online - Name the parts of a computer - Switch on and log on to an iPad, Chromebook and Google Classroom - Use a mouse to click and drag, open a program and create a picture - Say what a keyboard is for - Type a name - Save work to a file - Open saved work - Use arrow keys to move the cursor - Delete letters - Identify rules for staying safe	- Practice how to log in to and out of iPads, Chromebooks and Google Classroom - Identify examples of computers - Describe uses of computers - Identify that a computer is part of IT - Identify examples of IT - Sort IT by where it is found and what it is used for - Identify that some IT can be used in more than one way - Demonstrate how IT devices work together - Say why we use IT	- Classify input and output devices - Describe a simple process - Design a digital device - Explain how to use different digital devices for different activities - Recognise similarities differences between digital devices and using non-digital tools - Recognise different connections - Explain how messages are passed through multiple connections - Discuss why we need a network switch	- Describe networked devices and how they connect - Explain that the internet is used to provide many services - Recognise that the WWW contains websites and web pages - Explain the types of media that can be shared online - Explain where websites are stored - Describe how to access websites on the WWW - Explain that not everything online is true - Explain why some information may not be honest, accurate or truthful - Explain why it is necessary to think carefully before sharing or re-sharing content	- Use a web search to find specific information - Refine a web search - Compare results from different search engines - Explain why we should search trustworthy websites and why we should not share personal information online - Explain why we need tools to find things online - Recognise the role of web crawlers in creating an index - Order a list by rank - Explain that a search engine follows rules to rank - Give examples of criteria used by search engines to rank results	- Describe how computers use addresses to access websites - Identify and explain the main parts of a data packet - Explain that data is transferred over networks in packets - Recognise how to access shared files online - Send information over the internet in different ways - Recognise that working together on the internet can be public or private - Explain the different ways people communicate - Select appropriate methods of communication - Decide when and when not to share information online - Explain how to report inappropriate content online

DATA & INFORMATION	SUBSTANTIVE KNOWLEDGE	- Retrieve games/apps and shut down games/apps once finished	**- Understand key vocab: object, label, group, search, image, property, shape, size, value, more, less** **- Know how to label objects** **- Know that objects can be counted** - Know how to describe objects in different ways **- Know how to count objects with the same properties** - Know how to compare groups of objects	**- Understand key vocab: more than, less than, common, organise, tally chart, votes, total, pictogram** **- Know that we can count and compare objects using a tally chart** **- Know that objects can be represented as pictures** **- Know how to create a pictogram** - Know how to select objects by attribute - Know that people can be described by attributes - Know that information can be presented using a computer	**- Understand key vocab: animation, flip book, stop-frame, sequence, image, setting, character, onion skinning, delete, transition** - Know that questions can have yes/no answers - Know the attributes needed to collect data about an object **- Know how to create a branching database** **- Know why it is helpful for a database to be well structured** **- Know how to plan the structure of a branching database** - Know how to create an identification tool	**- Understand key vocab: data point, table, layout, input, device, sensor, logger, analyse, dataset, import, export, log, review** - Know that data gathered over time can be used to answer questions **- Know how to use a digital device to collect data automatically** **- Know that a data logger collects 'data points' from sensors over time** **- Know how a computer can help us analyse data** - Know what data is needed to answer questions - Know how to use data from sensors to answer questions	**- Understand key vocab: database, data, information, record, field, sort, order, group, search, criteria, filter** - Know how to use a form to record information **- Know the difference between paper and computer-based databases** **- Know how you can answer questions by grouping and then sorting data** **- Know that tools can be used to select specific data** - Know that computer programs can be used to compare data visually - Know how to use a real-world database to answer questions	**- Understand key vocab: data, table, spreadsheet, cell, cell reference, format, formula, spreadsheet, range, duplicate, sigma, data set, sum** **- Know how to create and build a data set in a spreadsheet** **- Know that formulas can be used to produce calculated data** **- Know how to apply formulas to data** **- Know how to create a spreadsheet to plan an event** **- Know suitable ways of presenting data**
	DISCIPLINARY KNOWLEDGE	- Using iPads	- Describe objects using labels - Match objects to groups - Count and group objects	- Record data in a tally chart - Compare totals in a tally chart - Enter data into a computer - View data in different formats (inc. pictograms) - Explain what the pictogram shows	- Select objects to arrange in a branching database - Group objects using yes/no questions - Test the branching database - Create yes/no questions using given attributes - Compare two branching database structures - Explain that questions need to be ordered carefully to split objects into similarly sized groups - Independently create questions to use in a branching database - Create questions that will enable objects to be uniquely identified - Create a physical version of a branching database	- Explain what data can be collected from sensors - Use data from a sensor to answer questions - Identify that data from sensors can be recorded - Recognise that a data logger collects data at given points - Identify the intervals used to collect data - Talk about the data that has been captured - View data at different levels of detail - Sort data to find information - Explain that there are different ways to view data	- Explain what a field and a record is in a database - Navigate a flat-file database to compare different views of information - Choose which field to sort data by to answer a given question - Explain that data can be ground using chosen values - Group information using a database - Outline how 'AND' and 'OR' can be used to refine data selection - Choose multiple criteria to answer a question	- Enter data into a spreadsheet - Choose and apply an appropriate format for a cell - Explain which data types can be used in calculations - Create a formula that includes a range of cells - Apply a formula to multiple cells by duplicating it - Use a spreadsheet to answer questions - Explain why data should be organised - Apply a formula to calculate the data needed - Produce a chart - Use a chart to show the answer to a question

CREATING MEDIA	SUBSTANTIVE KNOWLEDGE	- Make marks/drawings using technology	**- Understand key vocab: word processor, keyboard, keys, letters, numbers, type, space, backspace, cursor, capital letters, toolbar, bold, italic, underline, select, font, undo, redo, format** **- Know that you can use a computer to write** **- Know how to add and remove text on a computer** **- Know that the look of text on a computer can be changed** **- Know how to change text**	**- Understand key vocab: camera, photograph, capture, landscape, portrait, framing, subject, light source, flash, background, editing** **- Know how to use a digital device to take a photograph** **- Know when best to use portrait and landscape** **- Know what makes a good photograph** **- Know how to improve photographs** **- Know that photographs can be changed**	**- Understand key vocab: animation, stop-frame, flip book, frame, sequence, setting, onion skinning, delete, transition, image** **- Know that animation is a sequence of drawings or photographs** **- Know how to relate animated movements with a sequence of images** **- Know how to plan an animation** **- Know the need to work consistently and carefully** **- Know how to review and improve an animation** **- Know how to evaluate the impact of adding other media to an animation**	**- Understand key vocab: audio, microphone, podcast, trim, align, layer, import, playback, MP3, feedback, record** **- Know that sound can be recorded** **- Know that audio recordings can be edited** **- Know the different parts of creating a podcast project** **- Know how to edit audio recordings** **- Know how to combine audio to enhance a project** **- Know how to evaluate the effective use of audio**	**- Understand key vocab: video, audio, talking head, panning, lens, range, moving subject, side-by-side, zoom, tilt, split, trim** **- Know what makes a video effective** **- Know how to use a digital device to record video** **- Know how to use a range of techniques to capture video** **- Know how to create a storyboard** **- Know that video can be improved through reshooting and editing** **- Know the impact of choices made when making and sharing a video**	**- Understand key vocab: TinkerCAD, 2D, 3D, shapes, select, move, perspective, view, handles, resize, recolour, cylinder, cone, sphere, cuboid, pyramid** **- Know that you can work in 3D on a computer** **- Know that digital 3D objects can be modified** **- Know that objects can be combined in a 3D model** **- Know how to plan a 3D model** **- Know how to create a 3D model for a given purpose**
	DISCIPLINARY KNOWLEDGE	- Using iPads	- Open a word processor - Recognise, identify and find keys on a keyboard - Enter text into a computer - Use the letter, number and Space keys - Use Backspace to remove text - Type capital letters - Explain what each key does - Identify the toolbar - Use bold, italics and underline - Select a word by double-clicking - Select multiple words by clicking and dragging - Change the font - Make careful choices when changing text - Explain why the chosen tools have been used - Use 'Undo' to remove changes - Explain the difference between typing and writing on paper. - Explain a preference for typing or writing on paper	- Explain how to take a photograph - Explain what makes a good photograph - Identify what is good/not good about a photograph - Improve photographs by retaking them - Explain the effect of light on a photograph - Explain how images can be changed - Identify photos that have been changed	- Draw a sequence of pictures to create a flip-book animation - Explain how an animation/ flip-book works - Predict what an animation will look like - Explain why small changes are needed for each frame - Create an effective stop-frame animation - Plan an animation - Use onion skinning to make small changes - Review, evaluate and improve the quality of own animation - Add other media to an animation and explain why this has been done	- Identify the input and output devices used to record and play sound - Use a computer to record audio - Explain that the person who records the sound can say who is allowed to use it - Re-record the voice to improve the recording - Trim a recording - Explain what sounds can be combined to make a podcast more engaging - Save work so that the different parts remain editable - Plan and record content - Review and improve recordings - Explain the difference between saving a project and exporting an audio file	- Explain that video is a visual media format - Identify and compare features of videos - Explain what to do if you come across content that makes you uncomfortable - Experiment with different camera angles - Use a microphone - Suggest filming techniques for a given purpose - Capture video using a range of techniques - Review how effective a video is - Outline scenes of a video - Create and save video content - Store, retrieve and export a recording to a computer - Select the right tools to make edits to a video - Recognise that choices made will affect the final outcome - Evaluate a video and share opinions	- Add 3D shapes to a project - View 3D shapes from different perspectives - Move 3D shapes relative to each other - Resize an object in 3D - Lift/lower 3D objects - Recolour a 3D object - Rotate 3D objects - Duplicate 3D objects - Group 3D objects - Show that placeholders can create holes in 3D objects - Analyse a 3D model - Combine 3D objects - Design and construct a 3D model - Explain how a 3D model could be improved - Modify and improve a 3D model

DIGITAL LITERACY								
ONLINE SAFETY	SUBSTANTIVE KNOWLEDGE	- Digi Duck – what do I do when a pop up comes up on a screen? - Staying close to adults when using technology	**- Understand key vocabulary: device, avatar, alert, login, icon, private, my work area, password** **- Understand the importance of keeping personal information such as usernames and passwords private** **- Understand the importance of telling a trusted adult if they are exposed to any unsafe content/behaviour (images, communication etc).** **- Learn about the features of their private space on a device such as computer drive or online drive (Google Drive)**	**- Understand key vocabulary: attachment, filter, internet, private information, digital footprint, secure, search** **- Know the implications of inappropriate online searches** **- Begin to understand how things are shared electronically** **- Develop an understanding of using email safely and how to report inappropriate behaviours** **- Know that some websites may include pop ups that take me away from the main site (including videos on YouTube)** **- Know ways of reporting inappropriate behaviours and content to a trusted adult.**	**- Understand key vocabulary: appropriate, inappropriate, personal information, password, permission, reputable source, spoof, blog, vlog, verify, website** **- Know that the information on the internet may not be accurate or reliable** **- Understand the importance of creating an anonymous presence/username online to ensure my safety and privacy is kept secure** **- Learn the negative implications of failure to keep passwords safe and secure.** **- Understand the importance of staying safe online** **- Learn more than one way of reporting inappropriate content online**	**- Understand key vocabulary: collaborate, attachment, cookies, phishing, malware, digital footprint, plagiarism, spam, virus** **- Understand that if they make personal information available online, it may be seen and used by others (e.g. online quizzes, forms they can fill out, usernames etc)** **- Know that cyber bullying is unacceptable and will be sanctioned in line with the school's policy** **- Understand that it is unsafe to arrange to meet unknown people from online**	**- Understand key vocabulary: collaborate, communicate, PEGI ratings, Malware, phishing, ownership, personal information, password, validity** **- Implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others.** **- Develop their understanding on reliability of internet sources including that information may be used for bias, manipulation or persuasion** **- Understand the potential risks of using internet communication tools and understand how to minimise those risks** **- Understand that it is unacceptable to publish other peoples pictures or tag them on the internet without permission (including the difficulties in removing content that is uploaded)**	**- Understand key vocabulary: data analysis, location services, PEGI ratings, screen time, secure websites, print screen** **- Learn about more discrete inappropriate behaviour through critical thinking** **- Recognise the value in preserving their privacy when online for their own and other people's Safety.** **- Understand that some material on the internet is copyrighted and may not be copied or downloaded** **- Understand that online environments have security settings which may be altered to protect the user**

	DISCIPLINARY KNOWLEDGE	- Modelling this in class and monitoring use on iPads.	- Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies. - Take ownership of their work and save this in their own private space - Actively demonstrate keeping their information secure and safe when using the devices in school - Use a password to access their own safe space on the computer and to become increasingly more aware of how to keep this safe - Follow the school's safer internet / computing policy	- Use technology safely and respectfully as agreed by the school's computing/safer internet policy - Identify what to do if they find something inappropriate online (or something they are unsure of) including identifying people who can help, minimising the screen and online - Take ownership of their work and save this in their own private space	- Use technology safely, respectfully and responsibly - Recognise acceptable/ unacceptable behaviour - Identify a range of ways to report concern about content and contact. - Use strategies to verify information e,g. cross checking	- Use technology safely, respectfully and responsibly - Recognise acceptable/ unacceptable behaviour - Explore key concepts relating to online safety using concept mapping. - Identify a range of ways to report concern about content and contact. - Identify how to report cyberbullying in line with the schools online/computing policy	- Use technology safely, respectfully and responsibly - Recognise acceptable/ unacceptable behaviour - Identify a range of ways to report concern about content and contact. - Critically evaluate websites for bias, manipulative or persuasive content and to know how to respond appropriately (e.g. thinking about the intention of the website creators e.g. for you to spend money. - Identify how to report malicious or harmful communication when using online communication tools	- Use technology safely, respectfully and responsibly - Identify ways in which they can keep themselves safe online including creating strong passwords and managing them so that they remain strong - Recognise acceptable/ unacceptable behaviour - Identify a range of ways to report concern about content and contact.