Singleton Church of England Primary School
Progression of Skills and Knowledge
Computing – Y4

	Year 4 – Unit 4.1 Coding	Year 4 – Unit 4.2 Online Safety	Year 4 - Unit 4.3 Spreadsheets	Year 4 – Unit 4.4 Writing for different audiences
KEY VOCABULARY	Action, alert, algorithm, background, button, code blocks, command, debugging, design, execute, event, flowchart, input, nest, object, implement, prompt, repeat, predict, run	Adfly, attachment, citation, collaborate, cookies, copyright, digital footprint, malware, phishing, plagiarism, SMART, ransomware, spam, virus, watermark	Average, spreadsheet, formula, column, budget, chart, data, decimal, equals, format cell, formula wizard, line graph, percentage, place value, random number tool, timer, row, spin tool.	Campaign, format, font, genre, opinion, reporter, viewpoint
SUBSTANTIVE KNOWLEDGE	• Begin to know what selection is in computer programming. • Know how an IF statement works. • Know how to interpret an IF statement and therefore know how to create a program that includes an IF statement. • Know how to use co-ordinates in computer programming. • Know what the 'repeat until' command is. • Know how an IF/ELSE statement works. • Know what a variable is in programming. • Know how to use variables within their programs. • • To know how to create a playable game using a block coding environment.	• Know that information put online leaves a digital footprint or trail and can expand on prior years' scope of this fact. • Know some of the ways children can protect themselves from online identity theft. • Know that information put online by users could be used for identity theft. • Know the main risks and benefits of installing software and applications. • Know that copying work of others and presenting it as their own is plagiarism. • Knows the consequences of plagiarism. • Knows appropriate behaviour when participating or contributing to collaborative online projects for learning. • Know some of the main positive and negative influences technology has on health and the environment. • Knows the importance of balancing screen time with non-screen time.	• Know what cell formatting is • Know how to format cells as currency, percentage, decimal or fraction • Know how to use formula wizard tools • Know how to combine spreadsheet tools to create a purposeful spreadsheet e.g. a timed times table test • Know how to use a spreadsheet to model a real life situation e.g. budget planner • Know how to add a formula to a cell in order to create automatic calculations.	• Know how font size and style can affect the impact of a text • Know how to use a simulated scenario to produce a news report and campaign using technology.
MAKING CONNECTIONS **Key knowledge / key questions**	**Key Learning** • To begin to understand selection in computer programming. • To understand how an IF statement works. • To understand how to use co-ordinates in computer programming. • To understand the 'repeat until' command. • To understand how an IF/ELSE statement works. • To understand what a variable is in programming. • To use a number variable. • To create a playable game. **Key Questions** **Explain the stages of the design, code, test, debug coding process.** This is a process to go through as you create a program using coding Design: create a design which could be a flowchart, a labelled diagram or a storyboard. This helps to think through the algorithms required • Code: code the algorithms using to code and adapting the design. Test and Debug: see if the program works and fix any errors **How can variables and if/else statements be useful when coding programs with selection?** The variable could be set either to 0 or 1 and this could be changed by user action or a timer. If/else statement outcomes could depend upon the value of the variable. command for selection. **What does selection mean in coding and how can you achieve this in 2Code?** The code will contain commands that require a decision and the next code to run will depend upon the outcome of this decision. In 2Code we used the 'if' command for selection. **What is the difference between the different object types in 2Code Gibbon level?** The different objects have different properties. This makes then suitable for different type of programs. •Buttons can only be clicked and have their colour and text changed. •Vehicles have speed and angle. •Characters have movement in 4 directions. •Turtles have rotation, pen up and down. **Prior Learning Year 3** **Unit 3.1 Coding** • Flowcharts • Timers • Repeat • Code, test, debug process	**Key Learning** • To understand how children can protect themselves from online identity theft. • To understand that information put online leaves a digital footprint or trail and that this can aid identity theft. • To identify the risks and benefits of installing software including apps. • To understand that copying the work of others and presenting it as their own is called 'plagiarism' and to consider the consequences of plagiarism. • To identify appropriate behaviour when participating or contributing to collaborative online projects for learning. • To identify the positive and negative influences of technology on health and the environment. • To understand the importance of balancing game and screen time with other parts of their lives. **Key Questions** **What is meant by a digital footprint?** A digital footprint is the information that exists about a person based upon sites that they have visited, searches that they have done, information that they have shared and other online behaviours. **What is SPAM?** SPAM messages are emails or online messages sent from a computer to many other users. The users are sent the email without requesting it. The purpose of SPAM is for advertising, phishing or malware. **What is meant by plagiarism?** Plagiarism refers to using someone else's work and claiming it to be your own. **Prior Learning Year 3** **Unit 3.2 Online Safety** • Good Passwords and password privacy • Communication methods • Shared blog Email • Evaluating communications • email safety • sharing images - safety • not meeting • attachments • Reliability of information and spoof websites • appropriate ratings • emotional effects • Cyberbullying • reporting problems	**Key Learning** • To format cells as currency, percentage, decimal to different decimal places or fraction. • To use the formula wizard to calculate averages. • To combine tools to make spreadsheet activities such as timed times tables tests. • To use a spreadsheet to model a reallife situation. • To add a formula to a cell to automatically make a calculation in that cell. **Key Questions** **How would you add a formula so that the cell shows the percentage score for a test?** Click on the cell where you want the percentage score to be displayed then click the formula wizard button. Click on the cell that contains the score. Choose the ÷ operation then click on the cell that shows what the test was out of. Click OK. Click on the answer cell and then the format cell button. Choose % as the format. **Give an example of the data that could be best represented by a line graph.** Data where both axes will contain continuous data so that you can see trends in the data. Such as ages and heights, time and temperature, years and costs. **Which tools would you use to create a timed times tables test in 2Calculate?** You could use the random tool, the spin tool, the equal tool and the timer tool. **Explain what a spreadsheet model of a real-life situation is and what it can be used for?** It represents the data of a situation for example budgeting for a party, working out how big a field needs to be for a certain number of animals, working out how to spend your pocket money over time. **Prior Learning Year 3** **Unit 3.3 Spreadsheets** Pie charts and Bar graphs • Boolean comparison tools (<=>) • Spin tool • Advanced mode • Cell references **Unit 3.8 Graphing**	**Key Learning** • To explore how font size and style can affect the impact of a text. • To use a simulated scenario to produce a news report. • To use a simulated scenario to write for a community campaign. **Key Questions** **Why should I change the font when I am writing?** Changing the appearance of the font can help make things easier to read and highlight important parts of the text. **Prior Learning Year 3** **Unit 3.4 Touch typing** Keyboard skills • Typing fluency **Unit 3.5 Email** • Considering communication style • Email simulations **Unit 3.7 Simulations** • Use of 2Simulate • Familiarity with two simulations: Locked Out and The Dark Side of Elpmis • Use of Email simulations **Unit 3.9 Presenting** Use of either MS PowerPoint or Google Slides to learn about good presentations: both content and delivery **Future Learning Year 5** **Unit 5.7 Concept maps** • Use of Concept maps to plan around a theme or question • Presenting ideas starting with a concept map **Unit 5.8 Word processing** Use of either MS Word or Google Docs to develop text skills for effective documents • Familiarity with the formatting and text use for a variety of genres of documents • Applying skills to a more complex environment

	Unit 3.6 Branching Databases • Logical decision processing • Modelling selection on a binary model **Future Learning Year 5** **Unit 5.1 Coding** • Efficient Coding • Simulating a Physical System • Decomposition and Abstraction • Friction and Functions • Introducing Strings • Text Variables and Concatenation	**Unit 3.5 email** • Evaluating communications • email safety • sharing images - safety • not meeting • attachments **Future Learning Year 5** **Unit 5.2 Online safety** • Responsibility to others when sharing • Sources of support • SMART rules • Sharing passwords **Unit 5. 8 Word Processing** • Use of images • Plagiarism • Citing sources	• Data representation in 2Graph • Use software to investigate data **Future Learning Year 5** **Unit 5.3 Spreadsheets** • Converting measures • Count tool • Formulae • Variables in formulae • Event planning **Unit 5.4 Databases** • Data representation in 2Investigate • Creating and interrogating data • Use of filter, sort and search	
Key Assessment Opportunity	**Task: Use 2code to design and make a game that includes scores.** • Children's design shows that they are thinking of the required task and how to accomplish this in code using coding structures for selection and repetition • Children can identify an error within a program that prevents it following the desired algorithm and then fix it, they apply these techniques to their own code to fix bugs.	**Task: To create a 'top-tips' online safety poster.** • Most children will be able to identify key messages that should be shared with other children and parents about online safety, including identification of reliable content from websites found via common search engines • Children have decided upon the most important online safety messages to communicate and have shared these ideas in their Top Tips for Online Safety publication	**Task: Use a spreadsheet to help plan a party and manage a budget** • Children will present, format and analyse their data and information in a variety of ways and use their spreadsheets to solve and check mathematical problems and concepts • Children can use spreadsheets to collate data and extract information from it to answer questions e.g. children can create line graphs and can use it to identify when something will happen using 2Calculate	**Task: To write a persuasive letter as part of a community campaign.** • Children can use 2Connect to mind-map ideas for a community campaign. • Children can use these ideas to write a persuasive letter or poster as part of the campaign. • Children can assess their texts using criteria to judge their suitability for the intended audience.
Key Skills	• I can turn a real-life situation to solve into an algorithm, using a design that shows how I can accomplish this in code. • I can use repetition in my code. For example, using a loop that continues until a condition is met such as the correct answer being entered. • I can use timers within my program designs more accurately to create repetition effects. For example, I can create a counting machine. • I can use selection (decision) in my programming. For example, using an 'if statement' for a question being asked and the program takes one of two paths. • I can use variables within my program and know how to change the value of variables. • I can use the user inputs and output features within my program, such as 'Print to screen'. • I can identify errors in my code by using different methods, such as steeping through lines of code and fixing them. • I can read programs that contain several steps and predict the outcomes with increasing accuracy. • I can create and improve my solutions to a problem based on feedback. For example, create a program using 2Code. • I can review solutions that others have created, using a checklist of criteria. • I can work collaboratively to create content and solutions.	• I understand that network and communication components can be found in many different devices which allow them to join the internet. • I can create and improve my solutions to a problem based on feedback. For example, create a program using 2Code. • I can review solutions that others have created, using a checklist of criteria. • I have a good understanding of the online safety rules we learn at school. • I can demonstrate how to use different online technologies safely. • I can demonstrate how to use a few different online services safely. • I know I have a right to privacy both on and offline. • I recognise that my wellbeing can be affected by how I use technology. • I can report with ease any concerns with content and contact online and know immediate strategies to keep safe.	• I can work collaboratively to create content and solutions. • I can share digital content using a variety of applications such as: 2Blog, 2Email and Display Boards.	• I can work collaboratively to create content and solutions. • I have a good understanding of the online safety rules we learn at school. • I can demonstrate how to use different online technologies safely. • I can demonstrate how to use a few different online services safely. • I know I have a right to privacy both on and offline. • I recognise that my wellbeing can be affected by how I use technology. • I can report with ease any concerns with content and contact online and know immediate strategies to keep safe.

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	Year 4 – Unit 4.5 Logo	Year 4 – Unit 4.6 Animation	Year 4 - Unit 4.7 Effective Searching	Year 4 – Unit 4.8 Hardware investigators
KEY VOCABULARY	Debugging, grid, logo, commands, multi-line mode, pen down, pen up, prediction, procedure. Repeat, run speed, SETPC, SETPS	Animation, FPS, frame, onion skimming, pause, stop motion	Balanced view, easter eggs, internet, key words, reliability, results page, search engine	Components, CPU, graphics card, hard drive, input, motherboard, network card, output, peripherals, RAM, software,
SUBSTANTIVE KNOWLEDGE	• Know the structure of the coding language of Logo. • Know how to input simple instructions in Logo language environment. • Know how to create letter shapes using Logo. • Know what the repeat function in Logo is and its usefulness. Use it to create shapes such as squares. • • Know what procedures are and use this knowledge to build procedures in Logo.	• Know how animations are created by hand • Know how animations are created using computers • Know what onion skinning is when referring to animation • Know that animations can be enhanced using features in software such as background and sounds • Know what 'stop motion' animation is.	• Know how to find information from a search results page • Know how to search effectively to find out information • Know how to identify if an information source is true and reliable	• Know there are key parts that make up a computer • Know what each of the key parts is called and the function of them.
MAKING CONNECTIONS **Key knowledge / key questions**	**Key Learning** • To learn the structure of the coding language of Logo. • To input simple instructions in Logo. • Using 2Logo to create letter shapes. • To use the Repeat function in Logo to create shapes. • To use and build procedures in Logo **Key Questions** **What is Logo?** Logo is a text-based coding language used to control an on-screen turtle to create mathematical patterns. **Prior Learning Year 3** **Unit 3.1 Coding** Familiarity with a code environment • Logical planning of sequences • Debugging skills **Unit 3.6 Branching databases** Logical decision processing • Forward planning to achieve a solution **Future Learning Year 5** **Unit 5.1 Coding** • Familiarity with a code environment • Logical planning of sequences and repetition. • Debugging skills **Unit 5.5 Game creator** Themed art. • Art in 3D • Animating 3D characters. • Adding a gaming element to animation **Unit 5.6 3D modelling** Art effects in 3D • Moving and designing in 3 dimensions • Precision art tool use	**Key Learning** • To discuss what makes a good animated film or cartoon. • To learn how animations are created by hand. • To find out how animation can be created in a similar way using the computer. • To learn about onion skinning in animation. • To add backgrounds and sounds to animations. • To be introduced to 'stop motion' animation. • To share animation on the class display board and by blogging. **Key Questions** **What is an animation?** Animation is the process of giving the illusion of movement to drawings, models, or inanimate objects. Animated motion pictures and television shows are highly popular forms of entertainment. **What is meant by onion skinning?** Onion skinning is a 2D computer graphics term for a technique used in creating animated cartoons and editing movies to see several frames at once. **What is meant by stop motion animation?** Stop motion animation is a filming technique in which objects (such as clay models) are photographed in a series of slightly different positions so that the objects seem to move. **Prior Learning Year 2** **Unit 2.6 Creating Pictures** 2Paint a Picture: art effects, collage effects **Future Learning Year 5** **Unit 5.5 Game creator** Themed art • Art in 3D • Animating 3D characters • Adding a gaming element to animation **Unit 5.6 3D modelling** Art effects in 3D • Moving and designing in 3 dimensions • Precision art tool use	**Key Learning** • To locate information on the search results page. • To use search effectively to find out information. • To assess whether an information source is true and reliable. **Key Questions** **What is a search engine?** A search engine is a piece of software that allows the user to find and display pages from the World Wide Web. **Prior Learning Year 3** **Unit 3.2 Online Safety** • Reliability of information and spoof websites • Appropriate ratings • Reporting problems **Future Learning Year 5** **Unit 5.2 Online Safety** Responsibility to others when sharing • Sources of support • SMART rules • Image manipulation • Citing sources • Searching • Reliability **Unit 5.8 Word processing** Plagiarism • Citing sources	**Key Learning** • To understand the different parts that make up a computer. • To recall the different parts that make up a computer. **Key Questions** **What is the difference between hardware and software?** Hardware refers to the physical parts of a computer or device. The parts inside the computer casing are often called the components. The parts that are attached to the computer case are called peripherals. Software describes the programs that run on the computer. **Prior Learning Year 3** **Unit 3.5 Email** Using device functions for 2-way communication via the World Wide Web
Key Assessment Opportunity	Task: **Create a rotating shape pattern using squares, triangles or hexagons.** • Children can follow 2Logo code to predict the outcome. • Children can create shapes using the Repeat command. • Children can find the most efficient way to draw shapes. • Children can use the Procedure feature. • Children can create 'flowers' or 'crystals' using 2Logo	Task: Design and make an animation with a 'cracking contraption' in. • Children know what the Onion Skin tool does in animation. • Children can use the Onion Skin tool to create an animated image. • Children can use backgrounds and sounds to make more complex and imaginative animations. • Children know what 'stop motion' animation is and how it is created. • Children have used ideas from existing 'stop motion' films to recreate their own animation.	Task: Role play a situation between friends who are questioning the reliability of their internet search. • Children can use search engines to provide helpful information to support their learning . They can search for intended information with a degree of accuracy and thus know that key words can be more effective than sentences when searching. • Most children will be able to locate information from the internet via a search engine using effective techniques such as truncating a question into just key words or concise phrases. They will be aware of the lack of need to use capital letters or punctuation when using this search technique.	Task: Produce a leaflet about the parts of a computer. • Children recognise the main component parts of hardware which allow computers to join and form a network • Children can create their own leaflet to share their understanding of Computer Hardware

			Most children will be able to analyse the contents of a web page for obvious clues about the credibility of the information. They will be able to work in small groups to decide collectively if a website has questionable credibility	
Key Skills	- I can turn a real-life situation to solve into an algorithm, using a design that shows how I can accomplish this in code. - I can read programs that contain several steps and predict the outcomes with increasing accuracy.	- I have a good understanding of the online safety rules we learn at school. - I can demonstrate how to use different online technologies safely. - I can demonstrate how to use a few different online services safely. - I know I have a right to privacy both on and offline. - I recognise that my wellbeing can be affected by how I use technology. - I can report with ease any concerns with content and contact online and know immediate strategies to keep safe.	- I understand that network and communication components can be found in many different devices which allow them to join the internet. - I understand the purpose of a search engine and the main features within it. - I can look at information on a webpage and make predictions about the accuracy of information contained within it.	- I recognise the main component parts of hardware which allow computers to join and form a network. - I understand that network and communication components can be found in many different devices which allow them to join the internet.

	Year 4 – Unit 4.9 **Making Music**
KEY VOCABULARY	BPM, dynamics, harmonious, melody, pitch, pulse, rhythm, tempo, texture, synths
SUBSTANTIVE KNOWLEDGE	• Know the main elements of music. • Know what rhythm and tempo is and able to use this knowledge to experiment with it • Know that computers can be used to create music compositions • Know how to apply knowledge of music to create own composition using software
MAKING CONNECTIONS **Key knowledge / key questions**	**Key Learning** • To identify and discuss the main elements of music. • To understand and experiment with rhythm and tempo. • To create a melodic phrase. • To electronically compose a piece of music. **Key Questions** **What is the difference between melody and rhythm**? A rhythm is a pattern of sounds based on the length of the notes and the silences. A melody is a pattern of notes based on the pitch and rhythm, which make up a memorable tune. **Prior Learning Year 2** **Unit 2.7 making music** Digitally creating music and sound effects on 2Sequence Future Learning Year 5 **Unit 5.5 Game creator** • Adding sound effects and background music to themed 3D games
Key Assessment Opportunity	**Task: Use 'Busy Beats' to compose a piece of electronic music.** • Children distinguish between rhythm and tempo, they are able to create a simple rhythm, experimenting with BPM in 'Busy Beats'. • Children can utilise the tools within Busy Beats to create a melodic phrase experimenting with pitch (Lesson3). Through experimentation, children are able to compose a piece of electronic music, where they have considered pitch, rhythm and melody, successfully utilising the tools within 'Busy Beats'
Key Skills	• I have a good understanding of the online safety rules we learn at school • I can demonstrate how to use different online technologies safely • I can demonstrate how to use a few different online services safely • I know I have a right to privacy both on and offline • I recognise that my wellbeing can be affected by how I use technology • I can report with ease any concerns with content and contact online and know immediate strategies to keep safe.