Singleton Church of England Primary School
Progression of Skills and Knowledge
Computing - Y5

	Year 5 Unit 5.1 **Coding**	**Year 5 – Unit 5.2** **Online Safety**	**Year 5 – Unit 5.3** **Spreadsheets**	**Year 5 - Unit 5.4** **Databases**
KEY VOCABULARY	Abstraction, action, algorithm, concatenation, debugging, decomposition, efficient, flowchart, event, function, input, nesting, object, output, physical system, properties, repeat, selection, sequence, simplify, timer, variable	Citation, collaborate, communication, copyright, creative commons licence, encrypt, identity theft, malware, ownership, PEGI ratings, phishing, password, personal information, reliable source, SMART rules, validity	Rows, spreadsheets, columns, data, format, formula, advance mode, format, formula bar, formula wizard, variable, totalling tool,	Arrange, avatar, chart, collaborative, data, database, field, group, record, database report, search, sort, statistics.
SUBSTANTIVE KNOWLEDGE	• Begin to know how to simplify code in order to make own programming more efficient • Know how to create a simple simulation using 2Code. For example, a traffic light sequence • Know what decomposition and abstraction are in computer science • Know the need to start coding at a basic level of abstraction to remove superfluous details from own programs • Know how to use decomposition to make a plan of a real-life situation • Know what a function is in coding and know how to use a function in own program to make it more efficient • Know what different variable types are • Know what strings are and how to use them • Know how to set and change variable values in code • Know some of the common ways that text variables can be used in programming • Know and use concatenation in own programs.	• Know in more detail from prior learning of the impact that sharing digital content can have • Know how to think critically about information they share online • Know responsibilities they have for themselves and others regarding online behaviour • Know and have developed knowledge from prior years about maintaining secure passwords • Know about image manipulation using software and the advantages or disadvantages of this when shared online • Know what is meant by appropriate and inappropriate text, photographs and videos • Know about the impact of sharing media such as photographs and videos online • Know about the importance of citing content online from others and know how to do this • Know how to select keywords and search techniques to find relevant information to increase reliability.	• Know how to use formulae within a spreadsheet to convert measurements of length and distance • Know how to use more advanced formulae effectively. For example, to use formulae to calculate area and perimeter of shapes • Know how to create formulae that use text variables. • Know how to use tools within a spreadsheet e.g. 2Calculate and the count tool to answer hypotheses. For example, to answer hypotheses about common letters in use.	• Know how to search for information within a database. • Know the different ways to search for information in a database. • Know how to add information into a shared database. • Know how to create own database. • Know how to create new records. • Know what fields are and know how to correctly add information. • Know how to phrase questions so they can be correctly answered using a search of database.
MAKING CONNECTIONS **Key knowledge / key questions**	**Key Learning** • To begin to simplify code. • To create a playable game. • To understand what a simulation is. • To program a simulation using 2Code. • To know what decomposition and abstraction are in computer science. • To a take a real-life situation, decompose it and think about the level of abstraction. • To understand how to use friction in code. To begin to understand what a function is and how functions work in code. • To understand what the different variables types are and how they are used differently. • To understand how to create a string. • To understand what concatenation is and how it works. **Key Questions** **What does simulating a physical system mean?** Creating a program where the objects behave as they would in the real world. For example, a football program that uses angles, speed and friction to simulate kicking a football. When simulating a physical system, you first must break the system down into parts that can be coded (decomposition). The different parts will come together to make the full simulation. **Describe how you would use variables to make a timer countdown and a scorepad for a game.** Timer countdown: Create a timer variable and set it to the starting number of seconds. Add a Timer command that repeats and subtracts 1 every second. Add a text object in design view to display this number. Score: Create a variable to store the score, each time the user gains a point, change and display the value of the variable.	**Key Learning** • To gain a greater understanding of the impact that sharing digital content can have. • To review sources of support when using technology and children's responsibility to one another in their online behaviour. • To know how to maintain secure passwords. • To understand the advantages, disadvantages, permissions and purposes of altering an image digitally and the reasons for this. • To be aware of appropriate and inappropriate text, photographs and videos and the impact of sharing these online. • To learn about how to reference sources in their work. • To search the Internet with a consideration for the reliability of the results of sources to check validity and understand the impact of incorrect information. To ensure reliability through using different methods of communication. **Key Questions** **Who do I tell if I see anything online that makes me upset or scared?** When you are at school, you should tell the teacher or another adult. At home, you should tell your parent or guardian or another adult that you trust. **Why are passwords so important?** Passwords protect your information and stop other people accessing it. Passwords are like a toothbrush; they should not be shared with anyone else. **Why is it important to reference sources in my work?** If you use a book or article written by someone else, then you must reference it, so people know where you got the information from. If you don't do this then it is known as plagiarism. **Prior Learning Year 4** **Unit 4.2 Online safety**	**Key Learning** • To use formulae within a spreadsheet to convert measurements of length and distance. • To use the count tool to answer hypotheses about common letters in use. • To use a spreadsheet to model a real-life problem. • To use formulae to calculate area and perimeter of shapes. • To create formulae that use text variables. • To use a spreadsheet to help plan a school cake sale. **Key Questions** **How would you add a formula so that the cell shows the product of two other cells?** Click on the cell where you want the product to be displayed then click the formula wizard button. Click on the cell that contains the first number. Choose the x operation then click on the second number. Click OK. **What would you use in 2Calculate to have a cell that automatically calculates the number of days since a certain date?** You could use formulae and the totalling tools. To make the spreadsheet easier to understand, you could use named variables. **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. Using the existing data to predict what time your shadow will be a certain length etc. **Prior Learning Year 4** **Unit 4.3 Spreadsheets** Formula wizard • Cell formatting • Timer, random number and spin buttons • Budget planner sheet • Line graphs **Future Learning Year 6**	**Key Learning** • To learn how to search for information in a database. • To contribute to a class database. • To create a database around a chosen topic. **Key Questions** **What is a database?** A collection of data organised in such a way that it can be searched, and information found easily. Database usually refers to data stored on computers. **Why is the collaborative feature important?** Making a database collaborative allows lots of people to enter information into the database at the same time. This is a lot quicker than one person entering the data by themselves. **In what ways can I sort information in a database?** A database can hold lots of information so it is essential that information can be effectively investigated. In 2Investigate, data can be searched and sorted in a variety of ways. It can also be presented pictorially. **Prior Learning Year 4** **Unit 4.3 Spreadsheets** • Inputting and Interrogating data • Presenting data through line graphs **Future Learning Year 6** **Unit 6.7 Quizzing** • Answering and setting questions based on the interpretation of a database **Unit 6.9 Spreadsheets** Spreadsheets with MS Excel or Google Sheets • Organising data • Creating graphs and charts

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	Give examples of how you could use the Launch command in 2Code. Clicking on a button or other object in the program to opens another 2Code program or a webpage. **What do the terms decomposition and abstraction mean?** Use examples to explain them. Decomposition is breaking a task into its component parts so that each part can be coded separately. If you were coding a game of chess, you could decompose into the moves of the different pieces and the setup of the playing space. Abstraction is removing unnecessary details to get the program functioning. In the example, the colour and size of the squares is not important to game play. **<u>Prior Learning Year 4</u>** **Unit 4.1 Coding** Code, test, debug process • IF statements • Repeat Until and IF/ ELSE Statements • Number Variables **Unit 4.5 Logo** Text-based coding • Utilize understanding of coding structures **Unit 4.6 Animation** Sequencing and animation in logical steps **<u>Future Learning Year 6</u>** **Unit 6.1 Coding** Using Functions • Flowcharts and Control Simulations • User Input **Unit 6.5 Text adventures** Development from text-based coding • Maintaining a mental map • Debugging skills **Unit 6.8 Binary** Use of 2Code to understand binary conversion algorithms	Phishing • Digital footprint • Malware and viruses • Plagiarism • Screen time **<u>Unit 4.7 Effective searching</u>** Reliable sources • Search algorithms - impact on what you see **<u>Future Learning Year 6</u>** **Unit 6.2 Online safety** Responsibility to others when sharing • Minimising exposure to risks • Sources of support • Screen time • Being a bystander **Unit 6.4 Blogging** • Impact of communication on the audience • Appropriate comments	**Unit 6.3 Spreadsheets** Spreadsheets for computational models • Probability using random functionality • Budgeting • Event planning	
Key Assessment Opportunity	**Task: There are guided activities embedded within each lesson which include challenges at the end. Children should be assessed against each challenge.** • Children can create more complex programs and are beginning to understand that there are ways to simplify code to make their programming more efficient. They are able to recall and apply previous coding knowledge in their code.	**Task: Design and make a comic strip to teach their peers about Online safety** • Children demonstrate an understanding of their responsibility to others as well as to themselves when communicating and sharing content online. • Children demonstrate a clear understanding of what the SMART rules are and how they should be applied to using technology safely and respectfully	**Task: To use a given spreadsheet to help plan a school cake sale.** • Most children can use 2Calculate to produce functional spreadsheets with clear purpose and their spreadsheets are set up so that interrogation of data is easily achieved. They demonstrate they can use formulae such as converting between measures and incorporating text variables to perform calculations. Automatic graph creation from data sets is easily achieved by the children, including appropriate labelling and graph type for data type.	**Task: To create a database around a chosen topic.** • Children can create their own database on a chosen topic. • Children can add records to their database. • Children know what a database field is and can correctly add field information. • Children understand how to word questions so that they can be effectively answered using a search of their database
Key Skills	• I can make more complex real-life problems into algorithms for a program. • I can test and debug my programs as I work. • I can convert (translate) algorithms that contain sequence, selection and repetition into code that works • I can use sequence, selection, repetition, and some other coding structures in my code. • I can organise my code carefully for example, naming variables and using tabs. I know this will help me debug more efficiently. • I can use logical methods to identify the cause of any bug with support to identify the specific line of code	• I know the importance of computer networks and how they help solve problems and enhance communication. • I recognise the main dangers that can be perpetuated via computer networks. • I can explain what personal information is and know strategies for keeping this safe. • I can use the most appropriate form of online communication according to the digital content. For example, use 2Email, 2Blog and Display Boards. • I can search precisely when using a search engine. For example, I know I can add additional words or removes words to help find better results. • I can explain in detail how accurate, safe and reliable the content is on a webpage. • I have a secure knowledge of online safety rules taught at school. • I can demonstrate the safe and respectful use of different online technologies and online services. • I always relate appropriate online behaviour to my right to have personal privacy. • I know how to not let my mental wellbeing or others be affected by use of online technologies and services.	• I can use a spreadsheet to model a real-life situation and come up with solutions that can be practically applied. • I can make appropriate improvements to digital work I have created • I can comment on how successful a digital solution is that I have created. For example, a program built in 2Code that sorts decimals numbers • I can work collaboratively with others creating solutions to problems using appropriate software such as 2Code.	• I can use the most appropriate form of online communication according to the digital content. For example, use 2Email, 2Blog and Display Boards. • I can make appropriate improvements to digital work I have created. • I can comment on how successful a digital solution is that I have created. For example, a program built in 2Code that sorts decimals numbers. • I can work collaboratively with others creating solutions to problems using appropriate software such as 2Code.

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	Year 5 Unit 5.5 **Game creator**	**Year 5 – Unit 5.6** **3D Modelling**	**Year 5 – Unit 5.7** Concept maps	**Year 5 - Unit 5.8** **Word processing**
KEY VOCABULARY	Animation, image, texture, computer game, instructions, perspective, customise, interactive, evaluation, screenshot, playability	2D, 3D, 3D printing, CAD, design brief, pattern fill, points, net, template	Concept, connection, collaborate, node, presentation mode, story mode	Bulleted lists, caps lock, captions, copy and paste, copyright, creative commons, cursor, document, font, hyperlink, merge cells, page orientation, formatting, text wrapping, readability, word art
SUBSTANTIVE KNOWLEDGE	• Know what some of the main elements are that make a successful game. • Know how to plan a playable game. • Know how to incorporate media such as sound and images. • Know how to manipulate media including adding animation. • Know how to successfully evaluate games.	• Know what modelling software is and the skills of computer aided design. • Know the effect of moving points when designing. • Know how to design a 3D model to fit certain criteria. • Know how to refine and print a model.	• Know the need for visual representations when generating and discussing complex ideas. • Know the uses of a 'concept map'. • Know what is meant by 'concept map', 'stage', 'nodes' and 'connections.' • Know how to create a concept map using software such as 2Connect. • Know that concept maps can be used to retell stories and information. • Know how to present a concept map to an audience.	• Know what a word processing tool is for. • Know how to create a word processing document. • Know how to alter the look of text and navigate around a document. • Know how to alter page layout including heading and columns. • Know how to add and edit images. • Know how to add features to enhance look and usability within a document. For example: textboxes, hyperlinks, contents pages. • Know how to use tables to present information. .
MAKING CONNECTIONS **Key knowledge / key questions**	**<u>Key Learning</u>** • To plan a game. • To design and create the game environment. • To design and create the game quest. • To finish and share the game. • To self and peer evaluate. **<u>Key Questions</u>** **What is the 2DIY3D tool on Purple Mash?** 2DIY 3D allows users to create a playing area, such as a maze, in 2D and then turn it into a 3D computer game. The aim is to avoid the 'baddies' and collect 'treasure'. **What makes a good computer game?** A good game designer gives the player continuous challenges in a visually stimulating environment, each of which leads to another challenge, to keep the game challenging and fun. **Why is it important to continually evaluate your game?** Evaluating your game as you make it allows you to think about ways in which it can be improved. Evaluation may also involve the views of other people who play your game. **<u>Prior Learning Year 4</u>** **Unit 4.6 Animation** Create a stop motion animation using 2Animate • Use of sounds, backgrounds and effects **Unit 4.9 Making music** • Electronically compose a themed piece of music on Busy Beats **<u>Future Learning Year 6</u>** **Unit 6.5 Text adventures** • Plan and create a story-based adventure in 2Create a Story • Full functionality including animation, backgrounds, sound effects	**<u>Key Learning</u>** • To be introduced to 2Design and Make and the skills of computer aided design. • To explore the effect of moving points when designing. • To design a 3D Model to fit certain criteria. • To refine and print a model. **<u>Key Questions</u>** **What are the different view of an object available in 2Design and Make?** Net, Points and 3D. **How can the objects designed in 2Design and Make be turned into 3D objects?** You can print the net and then cut and fold this into shape or you can convert the file into a format recognised by 3D printers. **How is CAD software used in industry?** Give some examples. It is used to design 3D objects in a 2D environment. Some examples are; Architectural plans for buildings; designing layouts for interiors; designing objects such as packaging and designing mechanical components; designing shoes and clothing. **<u>Prior Learning Year 4</u>** **Unit 4.6 animation** • Create a stop motion animation using 2Animate • Use of art tools to create backgrounds and effects	**<u>Key Learning</u>** • To understand the need for visual representation when generating and discussing complex ideas. • To understand the uses of a 'concept map'. • To understand and use the correct vocabulary when creating a concept map. • To create a concept map. • To understand how a concept map can be used to retell stories and information. • To create a collaborative concept map and present this to an audience **<u>Key Questions</u>** **What is a concept map?** A concept map is a pictorial way of showing relationships between concepts and ideas. A concept map allows you to show information, pictures and links to support an idea or concept. **How is information arranged on a concept map?** On a concept map ideas or concepts are organised into nodes which are linked together with lines to show how the concepts and ideas link together. **How does a concept map help share ideas?** A concept map in 2Connect allows many users to contribute to the map which means that ideas or concepts can be quickly amended or additional information provided. **<u>Prior Learning Year 4</u>** **Unit 4.4 Writing for different audiences** • Understanding importance of text formatting and organisation • Transferring information from a concept map into a written report **<u>Future Learning Year 6</u>** **Unit 6.4 Blogging** • Creation of blog post, considering impact of presentation • Collaborative planning **Unit 6.5 Text adventures** • Consideration of audience when planning • Use of a variety of tools to create a final piece of work	**<u>Key Learning</u>** • To know what a word processing tool is for. • To add and edit images to a word document. • To know how to use word wrap with images and text. • To change the look of text within a document. • To add features to a document to enhance its look and usability. • To use tables within MS Word to present information. • To introduce children to templates. • To consider page layout including heading and columns. **<u>Key Questions</u>** **What is a word processing tool used for?** A word processing tool is used to create, edit and print off a document. This can contain text, images, tables or charts. Documents are a type of file that portray information. **What features can you use to make a document more readable?** You can change the font format to give the document a theme and make it more readable. By changing the paragraph formatting, you can ensure the words are spaced evenly. You can add images and use text wrapping to ensure they are positioned well on the page. **How do you successfully add an image to a document?** If you have an image saved onto your computer, you click on insert – pictures – insert image from this device. You can resize and move the image and ensure it fits well on the page by changing the text wrap setting. **<u>Prior Learning Year 4</u>** **Unit 4.4 writing for different audiences** • Discussion of effectiveness of different written material. • Opportunities to type in a variety of styles **<u>Unit 4.7 Effective searching</u>** • Efficient structure of search queries • Answering written questions **<u>Future Learning Year 6</u>** **Unit 6.4 Blogging** • Develop of text and typing skills through the creation of a blog • Considering the impact of different communication styles Unit 6.5 Text adventures • Children extend their text and typing stamina through the planning and creation of a text-based adventure game
Key Assessment Opportunity	**Task: Design and make a playable game.** • Children can design the setting for their game so that it fits with the selected theme.	**Task: To design and make a 3D packaging for pet food.** • Children know what the 2Design and Make tool is for. • Children can explore the different viewpoints in 2Design and Make whilst designing a building.	**Task: To create a collaborative concept map and present this to an audience.** • Children have used 2Connect collaboratively to create a concept map.	**Task : To present information linked to Literacy unit on MS Word** • Children know how to add images to a word document. • Children can edit images to reduce their file size.

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	• Children can upload images or use the drawing tools to create the walls, floor, and roof • Children can design characters for their game. • Children can decide upon, and change, the animations and sounds that the characters make. • Children can make their game more unique by selecting the appropriate options to maximise the playability. • Children can write informative instructions for their game so that other people can play it. • Children can evaluate my their own and peers' games to help improve their design for the future.	• Children can adapt one of the vehicle models by moving the points to alter the shape of the vehicle while still maintaining its form. • Children can explore how to edit the polygon 3D models to design a 3D model for a purpose. • Children can refine one of their designs to prepare it for printing. • Children can print their design as a 2D net and then created a 3D model. • Children can explore the possibilities of 3D printing.	• Children have used Presentation Mode to present their concept maps to an audience.	• Children know the correct way to search for images that they are permitted to reuse. • Children know how to attribute the original artist of an image. • Children can edit their images within Word to best present them alongside text. • Children understand wrapping of images and text. • Children can add appropriate text to their document, formatting in a suitable way. • Children can use a style set in Word. • Children can use bullet points and numbering • Children can add text boxes and shapes. • Children can consider paragraph formatting such as line spacing, drop capitals. • Children can add hyperlinks to an external website. • Children can add an automated contents page. • Children can add tables to present information. • Children can edit properties of tables including borders, colours, merging cells, adding and removing rows and columns. • Children can use a Word template and edit it appropriately.
Key Skills	• I can test and debug my programs as I work. • I can use the most appropriate form of online communication according to the digital content. For example, use 2Email, 2Blog and Display Boards. • I can make appropriate improvements to digital work I have created.	• I can make appropriate improvements to digital work I have created. • I can comment on how successful a digital solution is that I have created. For example, a program built in 2Code that sorts decimals numbers. • I can work collaboratively with others creating solutions to problems using appropriate software such as 2Code	• I can work collaboratively with others creating solutions to problems using appropriate software such as 2Code. • I can use collaborative modes such as within 2Connect to work with others and share it.	• I can make appropriate improvements to digital work I have created. • I can comment on how successful a digital solution is that I have created. • I can work collaboratively with others creating solutions to problems using appropriate software