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| **Substantive knowledge Computing Curriculum**Kensington Junior Academy |

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| **Autumn** |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Coding**  | **Coding** | **Coding** | **Coding** |
| * Knows what a flowchart is and how flowcharts are used in computer programming.
* Knows how to use a flowchart to create a computer program.
* Knows that there are different types of timers used in coding environments such as 2Code.
* Knows which timer should be used for a given purpose.
* Know what a repeat command is and how to use the repeat command.
* Know how to create a range of programs using coding knowledge.
* Know how to run, test and debug their own programs.
* Know what nesting is and that this should be considered when debugging.
* Know how to change attributes/properties of any objects in a program they have made.
 | * 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.
 | * 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 how to implement a game which includes timers and a score.
* Know what the launch command is.
* Build on knowledge of functions.
* Know how to use multiple functions in own program.
* Know how to arrange code in multiple tabs.
* Know how to develop creativity when coding to generate novel effects.
* Know the different options of generating user input in 2Code.
* Know how to attribute variables to user input.
* Know the need to code for all possibilities when using user inputs. Know how 2Code can be used to make a text-based adventure game.
* Know with improving understanding of how they can alter existing programs to reflect their own ideas.
* Building on existing knowledge of debugging, children know how to debug more effectively.
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| **Online Safety**  | **Online Safety** | **Online Safety** | **Online Safety** |
| * Knows what makes a safe password and how to keep it safe.
* Knows the main outcomes of not keeping passwords safe.
* Knows all the common ways the Internet enables people to effectively communicate.
* Know that a blog can be used to help communicate with a wider audience. Know how to contribute to a blog with clear and appropriate messages.
* Know that some information held on websites may not be accurate or true.
* Beginning to know how to search the Internet and how to think critically about the results returned.
* Know why there are age restrictions on digital media and devices.
* Know where to turn to for help if they see inappropriate content or have inappropriate contact from others.
 | * 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 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 the benefits and risks of mobile devices broadcasting the location of the user/device, e.g., apps accessing location.
* Know what secure sites are.
* Know that secure sites will have industry standard seals of approval. Build on knowledge of Digital Footprints. For example, know how and why people use their information.
* Build on knowledge of appropriate online behaviours and how this can protect themselves and others from possible online dangers. For example, the dangers of promoting inappropriate content online.
* Have greater knowledge of how to make more informed choices of how free time is used.
* Know the effects on individual health when having too much screen time.
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| **Spread sheets**  | **Spreadsheets** | **Spreadsheets** | **Spreadsheets** |
| * Know how to create tables of data within a spreadsheet.
* Know how to use a spreadsheet program to automatically create charts and graphs from data.
* Know how to use various features within a spreadsheet to support solutions to calculations. For example, ‘more than’, ‘less than’, and ‘equals’. Know how to describe a cell location in a spreadsheet.
* Know how to find specified locations in a spreadsheet.
 | * 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 reallife situation e.g. budget planner.
* Know how to add a formula to a cell in order to create automatic calculations.
 | * 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 create a spreadsheet to help answer a mathematical question relating to probability.
* Know how to take ‘copy’ and ‘paste’ shortcuts.
* Know how to problem solve during mathematical investigations when using spreadsheets by using tools such as the ‘Count tool’.
* Know how to create a spreadsheet to produce computational models. For example, creating a spreadsheet that works out discounts and final price sales.
* Children will know how to use advanced formula to assist with this.
* Know how to use a spreadsheet to help plan actions. For example, create a
* spreadsheet to plan how to spend pocket money and the effect of saving.
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| **Spring** |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Touch typing**  | **Writing for Different Audiences** | **Databases** | **Blogging** |
| * Know typing terminology including names of fingers.
* Know the home, top and bottom row sections on a keyboard.
* Knows the keys typed with left hand. Knows the keys typed with right hand. Knows the correct way to sit at a keyboard.
 | * 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.
 | * 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.
 | * Know the purpose of writing a blog. Know the features of successful blog writing.
* Know how to plan a blog.
* Know how to write a blog.
* Know how to write a blog post.
* Know that the way information is presented within a blog has an impact upon the audience.
* Know how to contribute to others’ blogs.
* Know the importance of having an approval process when creating blog content or modifying it.
* Know from Online Safety knowledge that content within blogs applies. For example, children know the issues surrounding inappropriate posts and cyberbullying.
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| **Email** | **Logo (coding)** | **Game Creator** | **Text Adventures** |
| * Know the different methods of communication and know the strengths and weaknesses of his form. Know how to open and responding to email.
* Know how to use an address book to write an email.
 | * 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 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 a text based adventure is.
* Know how to convert a simple story with 2 or 3 levels of decision making into a logical design.
* Know how to use the functionality of 2Create a Story Adventure mode to create, test and debug using plans.
* Know the difference between a map-based game and a sequential story-based game.
* Know how to use written plans to code a map-based adventure using 2Code.
* Know how to recall existing knowledge to support coding a map-based adventure game. For example, using functions, two-way selection (IF/ELSE statements) and repetition.
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| **Branching Databases** | **Animation** | **Modelling** | **Networks** |
| * Know how to sort objects using just YES/NO.
* Know how YES/NO questions are structured and answered.
* Know how to complete a branching database.
* Know how to edit and adapt a branching database.
* Know how to create a branching database including debugging it.
 | * 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 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 difference between the World Wide Web and the Internet.
* Know what a WAN and LAN is and the key differences between them.
* Know how a school network accesses the Internet. Know the history of the Internet.
* Know some of the major changes in technology which have taken place in their lifetime.
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| **Summer** |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Simulations**  | **Effective searching** | **Concept Maps** | **Quizzing** |
| * Know that a computer simulation can represent real and imaginary situations. Know advantages and problems of using simulations.
* Know how to use a simple simulation to try out different options and test predictions.
* Begin to know how to evaluate simulations by comparing them with real simulations and considering their usefulness.
 | * 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 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 how to use createactivities for younger childrenusing software such as 2DIY.• Know about different questiontypes within quizzingsoftware tools such as 2Quiz.• Know how to give andrespond to feedback based onquizzes made.• Know how to create their owngrammar games.• Know how to use multiplepieces of software to enhancea quiz. For example, creating aquiz that requires children tolook up information on adatabase |
| **Graphing**  | **Hardware Investigators** | **Word Processing** | **Binary** |
| * Know how to set up a graph

with a given number of fields using graphing software (2Graph).* Know how to enter data for a graph.
* Know how to select the most appropriate chart type for their data and explain reasoning.
* Know how to sort data in graphing software to enable easier analysis.
 | * Know there are key parts that make up a computer.
* Know what each of the key parts is called and the function of them.
 | • Know what a word processingtool is for.• Know how to create a wordprocessing document.• Know how to alter the look oftext and navigate around adocument.• Know how to alter page layoutincluding heading andcolumns.• Know how to add and editimages.• Know how to add features toenhance look and usability within a document. For example: textboxes, hyperlinks, contents pages.• Know how to use tables topresent information. | Know that all data in acomputer is saved in thecomputer memory in a binaryformat.• Know that binary uses onlythe integers 0 and 1.• Know that we can relate 0 asan ‘off’ switch and 1 to an ‘on’switch.• Know how to count up from 0in binary using visual aids ifrequired.• Know that bits are related tocomputer storage.• Know how to convertnumbers to binary using thedivision by two method.• Know how to use a convertertool to check binaryconversions. |
| **Presenting 3.9** | **Music Programming**  |  |  |
| * Know what presentation is and how it can be used.
* Know how to add pages/slides, text and shapes to pages, and also format them.
* Know how to add media such as images, audio and videos.
* Know how to use effects and
* features such as animations and slide transitions.
* Know how timings can help when presenting and know how to include them in presentations.
* Know how to effectively present to an audience using presentation software
 | * 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.
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