Computing Progression of Knowledge and Skills – Years 3-6

Year Group	Computer Science	
	Control and Programming	**Modelling, simulating and data logging**
1	**CS1.2** Be able to program a bot by giving single commands with an immediate outcome. **CS1.3** Be able to use the appropriate keys or commands to make a virtual or floor robot go forward, backward, left and right. **CS1.4** Be able to use basic symbols to record directional instruction. **CS1.5** Be able to use a developing range of language and styles of control e.g. tilt and turn/instructional to direct a robot.	**CS1.1** Be able to change variables in simulations that represent real or fantasy situations and scenarios to create different outcomes and effects. **CS1.6** Be able to recognise the correspondence between a simulation and the real-world counterpart.
2	**CS2.4** Be able to give control devices instructions that contain numerical data. (e.g. move 2 steps etc.). **CS2.5** Be able to predict a sequence of instructions, record it by sequencing cards or using an agreed set of symbols, and test the sequence, amending if necessary. **CS2.6** Be able to program a bot to using repeats and simple conditional commands.	**CS2.1** Be able to enter data into a computer simulation/game. **CS2.2** Be able to change the variables in a simulation and use them to make and test predictions e.g. increase the size of a ball in a game and observe what happens). **CS2.3** Be able to make a simple online game that reflects aspects of the real world.
3	**CS3.1** To know that robots and on-screen characters share a common language. **CS3.2** To use the repeat command and begin to use procedures to program more efficiently. **CS3.3** To amend programs to produce similar outputs e.g. a smaller square. **CS3.4** To use conditional statements to enable the character to interact with other characters or sensors (if and when commands). **CS3.5** To understand the importance of time within a program (e.g. using wait). **CS3.6** To sequence a list of commands/blocks e.g. to produce a pre-drawn shape or make a robot follow a defined route with repeats and conditional statements.	**CS3.7** Enter data into a computer simulation, change data and observe changes in results. **CS3.8** As part of a class investigation, experience the use of a data logger.
4	**CS4.1** Be able to use the 'repeat' and 'repeat until' command/block to program a bot more efficiently. **CS4.2** Use a greater range of conditionals including whilst, if else , repeat until **CS4.3** Use and change a pre-written procedure. **CS4.4** Know that procedures can call on other procedures. **CS4.5** Begin to predict, program, test and amend longer sequences of linked instructions to achieve an intended objective. **CS4.6** Understand that many real-world devices (such as traffic lights, washing machines) are controlled using computer programs. **CS4.7** Be able to make use of external sensors or inputs as part of a linear program e.g. on mouse click, when key pressed, when sound level is greater than etc.	**CS4.8** Understanding sensing devices can be used to monitor changes in environmental conditions and are present in a variety of real-life situations **CS4.9** Understand how to take snapshot data with a sensor **CS4.10** Use a data logger in an investigation and share the results **CS4.11** Explore the effect of changing the variables in simulations and games and observe the results.

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5	**CS5/6.1** Understand what variables and procedures are in real life and be able to create them within a computer program to store and retrieve data. **CS5/6.2** Think logically that when x happens y is the result and show this using code, flowcharts, diagrams or explanations. **CS5/6.3** Use "say" commands to give information. **CS5/6.4** Test and debug regularly. **CS5/6.5** Program and explain what happens when more than one variable changes. **CS5/6.6** Use "and" "or" and "not" blocks to change responses and understand what they do. **CS5/6.7** Be able to program responses to inputs from external sensors such as Makey Makey or Picoboards **CS5/6.8** Know when to use "repeat", "repeat until" and "forever if" loops to make programs shorter and more efficient and be able to use them (understanding the differences between them). **CS5/6.9** Understand what 'events' are such as mouse clicks and broadcasts and use them efficiently within programs to start and stop scripts.	**CS5/6.10** To use modelling and simulation software to create realistic or fantasy representations of the real world **CS5/6.11** Choose and use appropriate data loggers to log continuous date for a given purpose. Export and analyse the data
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Information Technology		
	Spreadsheets, Databases and Graphs	**Research: Internet**
1	**DL1.9** Be able to use a suitable on-screen program to represent information with pictures. **DL1.10** Be able to use a graph presented on screen to answer questions.	**DL1.1** Be able to control a resource to access the information they require e.g. DVD player, web site, tablet. **DL1.2** Access information on the internet through QR codes or links on a device.
2	**DL2.1** Be able to use different types of graphs to represent data collected. **DL2.2** Be able to enter data into graphing software and choose the type of graph that is most appropriate to present data. **DL2.3** Be able to enter data accurately to provide the answers to questions. **DL2.4** With help be able to search a pre-prepared database as part of a group, constructing questions and suggesting plausible answers. **DL2.5** Be able to perform sorting and grouping activities to find answers to questions.	**DL2.6** Be able to navigate a website using links. **DL2.7** Be able to find a website by following links set up by the teacher, by using Favourites or by typing into the address bar. **DL2.8** Be able to use a search engine to search for given information to answer questions, sorting by text, pictures, sound and video.
3	**DL3.12** Use information from a given source or from a data logger to generate bar charts to answer questions. **DL3.13** To choose, print and annotate appropriate graphs, to answer simple questions e.g. bar charts, or pie charts and interpret data. **DL3.14** Answer questions by searching and sorting a database or spreadsheet. **DL3.15** To understand that 'yes/no' questions can be used to divide a set of objects into subsets and that a sequence of 'yes/no' questions can identify an object. **DL3.16** Create record cards, (analogue or digital) to store collected information. **DL3.17** Transfer records to a pre-prepared digital branching database, online database or spreadsheet. **DL3.18** Enter data into a pre-prepared spreadsheet, change data and observe changes in results.	**DL3.1** Develop key questions to search for specific information to answer a problem. **DL3.2** Identify keywords to narrow searches. **DL3.3** Begin to understand how a search engine locates information and that information is not always suitable. **DL3.4** Use a range of techniques to navigate a given site. **DL3.5** Use given information to answer specific questions, and evaluate how appropriate a site is. **DL3.6** Access suitable sites selected by the teacher by following links; share suitable sites with others in the class.
4	**DL4.1** Be able to collect data from internet research, digital surveys and digital devices including data loggers and tablet devices **DL4.2** Be able to read and interpret bar and line graphs created through data logging, to draw conclusions to experiments	**DL4.6** Understand that content on the internet can be located efficiently but is not always relevant **DL4.7** Use keywords for effective Internet searches

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	DL4.3 Understand that computing can create graphs for different purposes; some are more appropriate and easier to read than others **DL4.4** Be able to enter data into a graphing package and use it to create a range of graphs, and to interpret data **DL4.5** Know some real-life examples of branching databases, such as a cinema telephone booking system. **DL4.15** Understand that spreadsheets perform calculations **DL4.16** Explore the effect of changing the cell values in spreadsheets and use them to make and test predictions.	**DL4.8** Select relevant information (pictures, text, sound and video) to use in other software
5	**DL5/6.1** To organise data by designing fields and records in a database **DL5/6.2** To be able to Interpret results, using a range of searches and graphs, draw conclusions and analyse the effectiveness of the technology **DL5/6.3** To justify reasons for their choices and explain why other methods were not appropriate **DL5/6.4** To be able to design questions using keywords, to search a large pre-prepared database **DL5/6.5** To be able to search using 'greater and less than', 'equal to' and 'contains' **DL5/6.6** To be able to use graphs to provide supporting evidence for their conclusions **DL5/6.7** To be able to check for accuracy by checking data and looking at graphs **DL5/6.23** Add formula to spreadsheets , enter data and use filters to sort information **DL5/6.24** Add data validation e.g drop down lists and conditional formatting to spreadsheets	**DL5/6.8** To be able to search the internet for specific information using tools such as Google Advanced Search (Boolean searches) **DL5/6.9** To be able to skim read and sift information found online **DL5/6.10** To be able to check information for accuracy **DL5/6.11** To be able to identify irrelevant, biased, implausible and inappropriate information **DL5/6.12** Use hyperlinks to trail an idea **DL5/6.13** To be able to present findings to a specific audience **DL5/6.14** To be able to use a range of search engines and select the most appropriate based on the tools they provide (e.g Google or Bing) **DL5/6.15** Use information from internet to make notes and present in a form of their choosing, without using copied/ pasted text
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Digital Literacy		
	Word Processing/DTP/ Multimedia	**Paint/Draw/ Photo Editing/ Animation/Video**
1	**IT1.1** Use a mouse/trackpad/touchscreen to move and place items accurately on a screen. **IT1.2** Produce text on screen and make changes to make it clear.	**IT1.3** Use a range of tools purposefully to create and alter the appearance of an image. **IT1.4** Use a digital camera or recording device, with support. **IT1.5** Use simple software to record a puppet-style and stop frame animation, with support.
2	**IT2.1** Add and edit text, considering style, colour and layout of font. **IT2.2** Make use of basic editing skills e.g.shift key and caps lock for uppercase, question marks and spaces after punctuation.	**IT2.3** Use different effects such as symmetry and filters to manipulate images or make changes. **IT2.4** Select appropriate paint tools within a paint package to create pictures that communicate their ideas. **IT2.5** Transfer images between devices or apps with help. **IT2.6** Use still and video cameras independently to capture still images and video footage. **IT2.7** Sequence and arrange pictures or video clips for a purpose. **IT2.8** Create simple animations with support using suitable software.

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3	**IT3.1** Independently select and import graphics and sounds from digital cameras and tablet devices, graphics packages, shared areas and the Internet and combine with text. **IT3.2** Organise and present information for a specific audience. **IT3.3** Recognise the difference and the advantages and disadvantages between electronic media and printed media. **IT3.4** Use font sizes and effects appropriately and text boxes, columns, borders, WordArt; cut, copy and paste between applications and use delete, insert and replace: Use spell checker; begin to use more than two fingers to enter text.	**IT3.5** Use editing tools in a paint package for a specific purpose. **IT3.6** Build up images by selecting, copying and pasting within the image. **IT3.7** Sequence still images and video and use simple editing techniques to create a presentation.
4	**IT4 .1** Be able to evaluate a range of electronic multimedia, appropriate to task e.g website, photostory, leaflet, and recognise key features of layout, design and presentation **IT4.2** With support, plan the structure and layout of document/ presentation **IT4.3** When typing, begin to hold two hands over different halves of the keyboard and use more than two fingers to enter text	**IT4.4** Be able to import a photograph, explore the effects which can be created and use a range of visual effects such as filters, hues and painting over photographs to give different effects **IT4.5** Sequence and edit video footage and still images once transferred from a digital camera to computer **IT4.6** To add text, sound effects and other graphic effects to video. **IT4.7** Be able to create a stop-frame animation using a camera with built-in stop motion software or an on-screen stop animation package. **IT4.8** Evaluate and improve digital work with a view to audience and purpose
5	**IT5/6.1** Format text to indicate relative importance. Justify text where appropriate. Cut and paste between applications. Delete/insert and replace text to improve clarity and mood. Make corrections using a range of tools (eg spell check, find and replace) Develop confidence using both hands when typing **IT5/6.2** Select appropriate software for the task/audience **IT5/6.3** Independently, plan structure and layout of multimedia presentation **IT5/6.4** To be able to evaluate and select suitable information and media from a range of electronic resources **IT5/6.5** To be able to use a multimedia authoring program to organise, refine and present information for a specific audience **IT5/6.6** To be able to create a range of hyperlinks to produce a non-linear presentation **IT5/6.7** Through peer assessment and self evaluation, make suitable improvements	**IT5/6.8** To be able to select, copy and paste within and between photographs **IT5/6.9** To be able to explore "airbrush" techniques to improve photographs, such as used in magazines with celebrities **IT5/6.10** To be able to use different filming techniques and camera angles e.g. zoom, panning, wide shot etc to create different mood/perspective **IT5/6.11** To be able to plan a video or animation by drawing a storyboard **IT5/6.12** Film, create, edit and refine media to ensure quality; present to an audience e.g cutting and trimming, adjusting volume,pan and zoom effects.

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