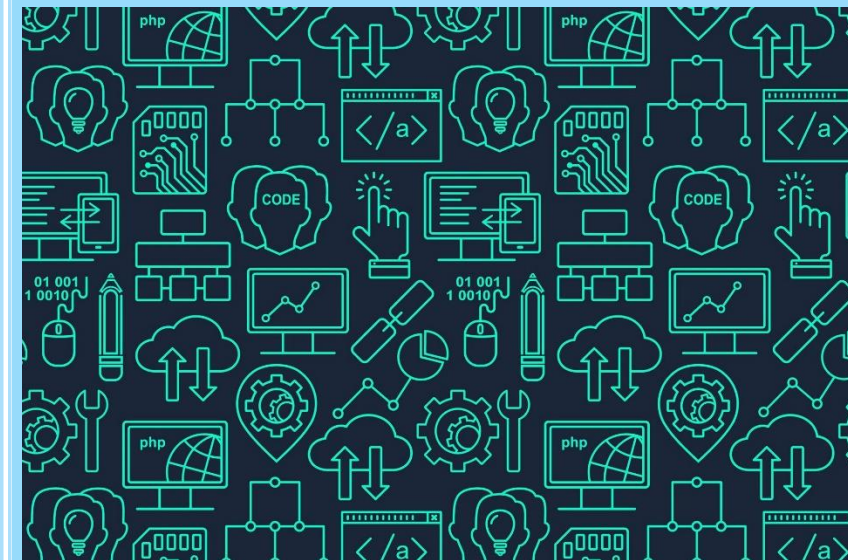


2019

# Curriculum Skills and Progression Map Computing



**Nebula**  
where stars are born



The Nebula Federation

Old Catton Junior School

COMPUTING: AGE RELATED STATUTORY COVERAGE	
KEY STAGE ONE LEARNING (for reference)	KEY STAGE TWO LEARNING
<ul style="list-style-type: none"> <li>• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions</li> <li>• Create and debug simple programs</li> <li>• Use logical reasoning to predict the behaviour of simple programs</li> <li>• Use technology purposefully to create, organise, store, manipulate and retrieve digital content</li> <li>• Recognise common uses of information technology beyond school</li> <li>• 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.</li> </ul> <p><b>Both Key Stages:</b></p> <ul style="list-style-type: none"> <li>• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>	<ul style="list-style-type: none"> <li>• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>• Use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>• Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> <li>• 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</li> <li>• Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>• Select, use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content to accomplish given goals</li> </ul>

<b>Skills Map – Computing</b>		
<b>Year 3 – Computing</b>		
<b>Programming</b>	<b>Communication</b>	<b>Problem Solving</b>
<ul style="list-style-type: none"> <li>• Can they write a program to create an animation?</li> <li>• Can they create their own sound and graphics?</li> <li>• Can they use variables in a program?</li> <li>• Can they work with various forms of input and output?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they describe the functions of different hardware that connects computers?</li> <li>• Can they describe how data is transmitted via the internet?</li> <li>• Can they realise that email and video conferencing work via the internet?</li> <li>• Can they use email to work together on a joint project?</li> <li>• Can they collect data via the internet?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they create an algorithm in an animation program?</li> <li>• Can they find errors and correct errors in programs?</li> </ul>
<b>Logical Thinking</b>	<b>Content Creation</b>	<b>E-Safety</b>
<ul style="list-style-type: none"> <li>• Can they think logically to detect and correct errors in their program?</li> <li>• Can they describe logically how a program works?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they use simple video equipment?</li> <li>• Can they import and export footage?</li> <li>• Can they present their footage?</li> <li>• Can they critically review their footage?</li> <li>• Can they critique survey forms and presentations?</li> <li>• Can they analyse data collected?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they consider some ways in which their safety or privacy may be compromised by using the internet?</li> <li>• Can they show consideration and respect in online communication?</li> <li>• Can they explain what they would do if they had any concerns about inappropriate behaviour online?</li> </ul>

Year 3 - Greater Depth
<ul style="list-style-type: none"> <li>• Can they recognise the impact of keyword choice on search engine results? (e.g. results ranked according to relevance or reliability of content and credibility of sources)</li> <li>• Can they use a range of block code to identify and evaluate the most efficient and appropriate use? (e.g. events, motion, sensing, sound, control)</li> <li>• Can they evaluate content (created/researched) against a given goal?</li> <li>• Can they discuss some of the protocols involved in transmitting data via the internet?</li> </ul>

Skills Map – Computing		
Year 4 – Computing		
Programming	Communication	Problem Solving
<ul style="list-style-type: none"> <li>• Can they design and develop a program for a given goal?</li> <li>• Can they work with variables in a game?</li> <li>• Can they integrate sound into their game?</li> <li>• Can they design and create a prototype of a toy with computer-controlled input and output?</li> <li>• Can they enter data?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they explain how digital technology contributes to distributing music?</li> <li>• Can they recognise that web pages are written and transmitted in HTML?</li> <li>• Can they understand the opportunities networks offer for communication and collaboration?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they design and develop an interactive game?</li> <li>• Can they debug programs to correct errors?</li> <li>• Can they evaluate an online article for its trustworthiness?</li> <li>• Can they identify the sources used in their research?</li> </ul>
Logical Thinking	Content Creation	E-Safety
<ul style="list-style-type: none"> <li>• Can they use logical reasoning to detect and correct errors in their program?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they create a simple composition using sequencing software?</li> <li>• Can they edit their composition?</li> <li>• Can they create a webpage by writing HTML?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they appreciate that copyright exists in original work and this should be respected?</li> </ul>

<ul style="list-style-type: none"> <li>• Can they make accurate predictions based on the data they already have?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they use weather measurement equipment safely?</li> <li>• Can they create charts to represent data?</li> <li>• Can they present their work to their peers?</li> <li>• Can they create use internet services to create content that presents information?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they recognise acceptable and unacceptable online behaviour?</li> </ul>
<b>Year 4 - Greater Depth</b>		
<ul style="list-style-type: none"> <li>• Can they design and create content on a computer in response to a given goal, paying attention to the needs of a known audience? (e.g. digital artwork linked to their topic, themes or core text)</li> <li>• Can they give reasons for errors in programs and explain how they have corrected these through decomposition and debugging?</li> <li>• Can they explain an algorithm using sequence, repetition and selection in their own words?</li> </ul>		

<b>Skills Map – Computing</b>		
<b>Year 5 – Computing</b>		
<b>Programming</b>	<b>Communication</b>	<b>Problem Solving</b>
<ul style="list-style-type: none"> <li>• Can they use selection and repetition in their programs?</li> <li>• Can they use variables in their games? Can they use repetition in a program to create a geometric figure?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they send and receive messages using Morse code and semaphore?</li> <li>• Can they decrypt messages using a Caesar cipher with an unknown key?</li> <li>• Can they correct spelling, punctuation and grammar in another’s content?</li> <li>• Understand that the internet makes blogging possible?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they improve their game based on the feedback they receive?</li> <li>• Can they evaluate their computer-generated landscape- is it aesthetically pleasing?</li> <li>• Can they evaluate web sources for quality and bias?</li> </ul>
<b>Logical Thinking</b>	<b>Content Creation</b>	<b>E-Safety</b>

<ul style="list-style-type: none"> <li>• Can they identify and correct errors in their game?</li> <li>• Can they explain why an error has occurred?</li> <li>• Can they use tools to make web searches more efficient or effective?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they create images and sounds for use in their games?</li> <li>• Can they create a tessellating pattern using a program?</li> <li>• Can they add their own original image, audio or video to a blog post?</li> <li>• Write a blog post and respond to other posts?</li> <li>• Can they analyse and evaluate virtual places?</li> <li>• Can they create objects and apply finished using an architecture program?</li> <li>• Can they present their finished architecture?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they recognise the importance of using complex passwords?</li> <li>• Can they understand what constitutes a complex password?</li> <li>• Can they understand how to check if a website page is encrypted?</li> <li>• Can they create content to demonstrate knowledge of acceptable and unacceptable behaviour?</li> <li>• Understand how to use a blog safety?</li> </ul>
<p><b>Year 5 - Greater Depth</b></p>		
<ul style="list-style-type: none"> <li>• Can evaluate content according to its effectiveness and impact on a target audience?</li> <li>• Can they write programs that have sequences, repetitions and variables? (e.g. creating a scoring system as part of a Scratch game)</li> <li>• Do they consider audience when editing media and justify their choices?</li> <li>• Can they explain in simple terms how computers can generate photorealistic?</li> <li>• Can they create complex and compound, aesthetically pleasing shapes?</li> </ul>		

<b>Skills Map – Computing</b>		
<b>Year 6 – Computing</b>		
<b>Programming</b>	<b>Communication</b>	<b>Problem Solving</b>
<ul style="list-style-type: none"> <li>Can they describe the input and output capabilities of a smartphone?</li> <li>Can they design, write and debug programs that accomplish specific goals?</li> </ul>	<ul style="list-style-type: none"> <li>Can they appreciate how search engines select and rank results?</li> <li>Create a promotional video that communicates their app effectively?</li> </ul>	<ul style="list-style-type: none"> <li>Can they identify how a smartphone app might address problems they identify?</li> <li>Can they respond to questions posed?</li> <li>Can they solve problems by decomposing them into smaller parts?</li> <li>Can they develop an easy to navigate site for their app?</li> </ul>
<b>Logical Thinking</b>	<b>Content Creation</b>	<b>E-Safety</b>
<ul style="list-style-type: none"> <li>Can they understand how GPS can geolocate content such as photographs?</li> <li>Can they find ways to optimise the sequence of tasks?</li> <li>Can they explain how the different elements of their app will function?</li> <li>Use logical reasoning to detect errors in their code?</li> </ul>	<ul style="list-style-type: none"> <li>Create an effective presentation to pitch their idea?</li> <li>Can they discerningly source external content to use?</li> <li>Can they create an online survey and analyse the results?</li> <li>Can they use recorded media to analyse information collected?</li> <li>Sketch ideas for an intuitive and effective app design?</li> </ul>	<ul style="list-style-type: none"> <li>Can they use technology safely and respectfully?</li> <li>Can they understand and observe licence conditions associated with external content?</li> <li>Can they be aware of their responsibilities as creators of online content?</li> </ul>
<b>Year 6 - Greater Depth</b>		
<ul style="list-style-type: none"> <li>Can they understand some of the technology underlying GPS, and how this can be used?</li> <li>Can they understand legal and ethical framework around participant research?</li> <li>Can they make independent choices about software?</li> <li>Select and use appropriate hardware and software to create a video?</li> </ul>		

Skills Map - Computing	
E - Safety	
<p>E-Safety is taught discreetly in Computing lessons and is also embedded into our units of work. It is very important to us that we prepare pupils for the challenges and dangers of using technology as well as celebrating its many applications. Staff understand that computing is an ever-evolving subject and issues around e-safety also develop and change as technology evolves. Staff may choose to respond to new e-safety challenges as they arise in school or in society as a whole.</p>	
Knowledge and Understanding	Skills
<ul style="list-style-type: none"> <li>• Do they understand the need for rules to keep them safe when exchanging learning and ideas online?</li> <li>• Can they recognise that information on the internet may not be accurate or reliable and may be used for bias, manipulation or persuasion?</li> <li>• Do they understand that the internet contains fact, fiction and opinion and begin to distinguish between them?</li> <li>• Can they use strategies to verify information, e.g. cross-checking?</li> <li>• Do they understand the need for caution when using an internet search for images and what to do if they find an unsuitable image?</li> <li>• Do they understand that copyright exists on most digital images, video and recorded music?</li> <li>• Do they understand the need to keep personal information and passwords private?</li> <li>• Do they understand that if they make personal information available online it may be seen and used by others?</li> <li>• Do they know how to respond if asked for personal information or feel unsafe about content of a message?</li> <li>• Can they recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy?</li> </ul>	<ul style="list-style-type: none"> <li>• Do they follow the school's internet rules?</li> <li>• Do they recognise the difference between the work of others which has been copied (plagiarism) and re-structuring and re-presenting materials in ways which are unique and new?</li> <li>• Can they begin to identify when emails should not be opened and when an attachment may not be safe?</li> <li>• Can they explain how to use email safely?</li> <li>• Can they use different search engines?</li> </ul>



<ul style="list-style-type: none"> <li>• Do they know how to report an incident of cyber bullying?</li> <li>• Do they know the difference between online communication tools used in school and those used at home?</li> <li>• Do they understand the need to develop an alias for some public online use?</li> </ul>	
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Appendix				
Overview of Teaching Units				
Year 3				
Unit	Expectations	Suggested Computing Program of Study	Possible Software/APPs	Possible Hardware
3.1 We are programmers Programming an animation	Create an algorithm for an animated scene in the form of a storyboard.  Write a program in Scratch to create the animation.  Correct mistakes in their animation programs.	<ul style="list-style-type: none"> <li>• Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts.</li> <li>• Use sequence ... in programs; work with variables and various forms of input and output.</li> <li>• Use logical reasoning to detect and correct errors in algorithms and programs.</li> <li>• Select, use and combine a variety of software ... to design and create ... content that accomplish(es) given goals, including ... presenting ... information.</li> </ul>	Software: Scratch (recommended) or Microsoft [t PowerPoint Apps: Snap! in a web browser	Laptop or desktop computer(recommended) or tablet, cameras (optional), microphone (optional)
3.2 We are bug fixers Finding and correcting bugs in programs	Develop a number of strategies for finding errors in programs.  Build up resilience and strategies for problem solving.	<ul style="list-style-type: none"> <li>• Debug programs that accomplish specific goals.</li> <li>• Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> </ul>	Software: Scratch 2.0, Screencast-o-matic (if appropriate) Apps: Snap! in the web browser (Scratch requires	Laptop/desktop computers, microphone (if appropriate)

	<p>Increase their knowledge and understanding of Scratch.</p> <p>Recognise a number of common types of bug in software.</p>	<ul style="list-style-type: none"> <li>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> </ul>	<p>Adobe Flash@ Player, which is not available on iPad)</p>	
<p>3.3 We are presenters Videoing performance</p>	<ul style="list-style-type: none"> <li>Gain skills in shooting live video, such as framing shots, holding the camera steady, and reviewing.</li> <li>Edit video, including adding narration and editing clips by setting Wout points.</li> </ul> <p>Understand the qualities of effective video, such as the importance of narrative, consistency, perspective and scene length.</p>	<ul style="list-style-type: none"> <li>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.</li> <li>Work with various forms of input and output.</li> <li>Use technology safely, respectfully and responsibly.</li> </ul>	<p>Software: Microsoft Windows Movie Maker@ or iMovie</p> <p>Apps: iMovie</p>	<p>Digital cameras, flip cameras (or similar), tablet computers/iPod Touch or similar</p>
<p>3.4 We are network engineers Exploring computer networks, including the internet</p>	<p>Understand the physical hardware connections necessary for computer networks to work.</p> <p>Understand some features of internet protocols.</p> <p>Understand some diagnostic tools for investigating network connections.</p>	<p>Understand computer networks, including the internet; how they can provide multiple services.</p> <ul style="list-style-type: none"> <li>Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>	<p>Software: Simple diagnostic tools accessed via the command prompt: ping, ipconfig, nslookup, tracert/equivalent web-based tools</p> <p>Apps: Web-based equivalent tools via a web browser</p>	<p>Desktop or laptop computer/Raspberry Pi</p>

	Develop a basic understanding of how domain names are converted to IP addresses.			
3.5 <i>We are communicators</i> Communicating safely on the internet	Develop a basic understanding of how email works. Gain skills in using email. Be aware of broader issues surrounding email, including 'netiquette' and e-safety. Work collaboratively with a remote partner. Experience video conferencing.	<ul style="list-style-type: none"> <li>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.</li> <li>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. <ul style="list-style-type: none"> <li>Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul> </li> </ul>	Software: Email system (your school's own system, Gmail or another system), video conferencing software (Skype, Google Hangouts or Janet video conferencing), presentation software  Apps: Skype, FaceTime	Webcam and speakers
3.6 <i>We are opinion pollsters</i> Collecting and analysing data	Understand some elements of survey design. Understand some ethical and legal aspects of online data collection. Use the web to facilitate data collection. Gain skills in using charts to analyse data. Gain skills in interpreting results.	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. <ul style="list-style-type: none"> <li>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.</li> </ul>	Software: Web browser, Google Forms, Google Sheets and Google Slides/InspireData@/Microsoft Excel@ and Microsoft Word@ Apps: Google Drive/web browser	Laptop or desktop computer with internet connection

Year 4				
Unit	Expectations	Suggested Computing Program of Study	Possible Software/APPs	Possible Hardware
4.1 We are software developers Developing a simple educational game	Develop an educational computer game using selection and repetition.  Understand and use variables.  Start to debug computer programs.  Recognise the importance of user interface design, including consideration of input and output.	<ul style="list-style-type: none"> <li>Design, write and debug programs that accomplish specific goals.</li> <li>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> <li>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> </ul>	Software: Scratch/Snap! Apps: Snap! in the web browser (Scratch requires Flash, which is not available on iPad)	Laptop/desktop computer, microphones (not essential)
4.2 We are toy designers Prototyping an interactive toy	Design and make an on-screen prototype of a computer-controlled toy.  Understand different forms of input and output (such as sensors, switches, motors, lights and speakers).  Design, write and debug the control and monitoring program for their toy.	<ul style="list-style-type: none"> <li>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.</li> <li>Use sequence, selection, and repetition in programs; work with various forms of input and output.</li> <li>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> </ul>	Software: Scratch Apps: Web browser and Snap!	Laptops/computers, microphones and speakers
4.3 We are musicians Producing digital music	Use one or more programs to edit music.  Create and develop a musical composition, refining their ideas through reflection and discussion.	<ul style="list-style-type: none"> <li>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> <li>Understand computer networks including the internet; . and the opportunities they offer for communication and collaboration.</li> </ul>	Software: Isle of Tune, Audacity <sup>e</sup> , CMMS/ GarageBand, MuseScore (optional) Apps: Isle of Tune, GarageBand	Computers or tablets, microphones, midi instruments, if available

	<p>Develop collaboration skills.</p> <p>Develop an awareness of how their composition can enhance work in other media.</p>	<ul style="list-style-type: none"> <li>• Be discerning in evaluating digital content.</li> <li>• 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.</li> <li>• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour.</li> </ul>		
<p>4.4</p> <p><b>We are HTML editors</b></p> <p>Editing and writing HTML</p>	<p>Understand some technical aspects of how the internet makes the web possible.</p> <p>Use HTML tags for elementary mark up.</p> <p>Use hyperlinks to connect ideas and sources. Code up a simple web page with useful content.</p> <p>Understand some of the risks in using the web.</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Use technology safely, respectfully and responsibly; know a range of ways to report concerns and unacceptable behaviour.</li> <li>• Use and combine a variety of software (including internet services) to accomplish given goals, including presenting information.</li> </ul>	<p>Software: Firefox, Brackets</p> <p>Apps: Safari, Koder</p>	<p>Laptop/desktop computers</p>
<p>4.5</p> <p><b>We are co-authors</b></p> <p>Producing a wiki</p>	<p>Understand the conventions for collaborative online work, particularly in wikis.</p> <p>Be aware of their responsibilities when editing other people's work.</p> <p>Become familiar with Wikipedia, including potential problems</p>	<ul style="list-style-type: none"> <li>• Solve problems by decomposing them into smaller parts.</li> <li>• 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.</li> <li>• Use search technologies effectively.</li> <li>• Use ... a variety of software (including internet services) ... to . create ... content . . including ... presenting information.</li> </ul>	<p>Software: Learning platform wiki tools/ MediaWiki/Google Sites/ other hosted wiki</p> <p>Apps: Web browser (e.g. Safari), Wikipedia app</p>	<p>Computers and internet connection, web server (If hosting MediaWiki)</p>

	<p>associated with its use. Practise research skills. Write for a target audience using a wiki tool. Develop collaboration skills. Develop proofreading skills.</p>	<ul style="list-style-type: none"> <li>Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>		
<p>4.6 <b>We are meteorologists</b> Presenting the weather</p>	<p>Understand different measurement techniques for weather, both analogue and digital. Use computer-based data logging to automate the recording of some weather data. Use spreadsheets to create charts Analyse data, explore inconsistencies in data and make predictions Practise using presentation software and, optionally, video.</p>	<ul style="list-style-type: none"> <li>Work with variables and various forms of input and output.</li> <li>Use logical reasoning to explain how some simple algorithms work.</li> <li>Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</li> <li>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.</li> </ul>	<p>Software: Microsoft Excel, Google Sheets, web browser, Microsoft PowerPoint@/IWB software</p> <p>Apps: Weather Station by Netatmo, Weather Station.UK, Numbers</p>	<p>Equipment for measuring weather</p>
<b>Year 5</b>				
<b>Unit</b>	<b>Expectations</b>	<b>Suggested Computing Program of Study</b>	<b>Possible Software/APPs</b>	<b>Possible Hardware</b>
<p>5.1 <b>We are game developers</b> Developing an interactive game</p>	<p>Create original artwork and sound for a game. Design and create a computer program for a computer game, which uses sequence, selection, repetition and variables.</p>	<ul style="list-style-type: none"> <li>Design, write and debug programs that accomplish specific goals, including controlling systems; solve problems by decomposing them into smaller parts.</li> <li>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> </ul>	<p>Software: Scratch</p> <p>Apps: Snap!</p>	<p>Laptop or desktop computers, microphones</p>

	<p>Detect and correct errors in their computer game. Use iterative development techniques (making and testing a series of small changes) to improve their game.</p>	<ul style="list-style-type: none"> <li>● Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> <li>● 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...</li> </ul>		
<p>5.2 We are cryptographers Cracking codes</p>	<p>Be familiar with semaphore and Morse code. Understand the need for private information to be encrypted. Encrypt and decrypt messages in simple ciphers. Appreciate the need to use complex passwords and to keep them secure. Have some understanding of how encryption works on the web.</p>	<ul style="list-style-type: none"> <li>● Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> <li>● 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.                             <ul style="list-style-type: none"> <li>● Use technology safely, respectfully and responsibly, recognise acceptable/unacceptable behaviour, identify a range of ways to report concerns about content and contact.</li> </ul> </li> </ul>	<p>Software: Scratch 20. The Black Chamber Website Apps: Snap!, The Black Chamber in web browser (Safari)</p>	<p>Laptop or desktop computers</p>
<p>5.3 We are artists Fusing geometry and art</p>	<p>Develop an appreciation of the links between geometry and art. Become familiar with the tools and techniques of a vector graphics package. Develop an understanding of turtle graphics. Experiment with the tools available, refining and developing their work as they apply their own criteria to evaluate it and</p>	<ul style="list-style-type: none"> <li>● Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> <li>● Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.                             <ul style="list-style-type: none"> <li>● 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,</li> </ul> </li> </ul>	<p>Software: Inkscape/ Adobe Illustrator/ Scratch, Terragen Classic, Logo Apps: Adobe Ideas/neu. draw, Snap!</p>	<p>Laptop or desktop computers</p>

	<p>receive feedback from their peers. Develop some awareness of computer-generated art, in particular fractal-based landscapes.</p>	<p>including collecting, analysing, evaluating and presenting data and information.</p>		
<p>5.4 <b>We are web developers</b> Creating a website about cyber safety</p>	<p>Develop their research skills to decide what information is appropriate. Understand some elements of how search engines select and rank results. Question the plausibility and quality of information. Develop and refine their ideas and text collaboratively. Develop their understanding of e-safety and responsible use of technology.</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</li> <li>• 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.             <ul style="list-style-type: none"> <li>• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul> </li> </ul>	<p>Software: Google, Bing, Google Sites/wiki tool in the school's learning platform/WordPress Apps: Google Search app, Google Sites via browser</p>	<p>Desktop or laptop computers/tablets</p>
<p>5.5 <b>We are bloggers</b> Sharing experiences and opinions</p>	<p>Become familiar with blogs as a medium and a genre of writing. Create a sequence of blog posts on a theme. Incorporate additional media. Comment on the posts of others.</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Select, use and combine a variety of software (Including internet services) on a range of digital devices to design and</li> </ul>	<p>Software: WordPress/Blogger/learning platform blogging tool or similar, GIMP, Audacity@, Microsoft Windows Movie Maker<sup>s</sup> Apps: WordPress, Camera, Snapseed</p>	<p>Computers, digital cameras, audio recorders/tablets</p>



	Develop a critical, reflective view of a range of media, including text.	<p>create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.</p> <ul style="list-style-type: none"> <li>• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</li> <li>• be discerning in evaluating digital content.</li> </ul>		
5.6 <i>We are architects</i> Creating a virtual space	Understand the work of architects, designers and engineers working in 3D. Develop familiarity with a simple CAD (computer aided design) tool. Develop spatial awareness by exploring and experimenting with a 3D virtual environment. Develop greater aesthetic awareness.	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.	Software: Trimble SketchUp (used for 3D modelling), Screencasto-matic (for final screencast) Apps: Home Design 3D/3dVAS	Laptops/ computers
<b>Year 6</b>				
<b>Unit</b>	<b>Expectations</b>	<b>Suggested Computing Program of Study</b>	<b>Possible Software/APPs</b>	<b>Possible Hardware</b>
6.1 <i>We are app planners</i> Planning the creation of a mobile app	Develop an awareness of the capabilities of smartphones and tablets. Understand geolocation, including GPS. Identify interesting, solvable problems. Evaluate competing products.	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</li> </ul>	Software: App Inventor/ TouchDevelop, Picasa Web, Google Drive Presentation/ Prezi or similar Apps: Codea, TouchDevelop	Computers and tablets or smartphones (can be done with a phone emulator)

	Pitch a proposal for a smartphone or tablet app.	<ul style="list-style-type: none"> <li>● 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.</li> </ul>		
6.2 <b>We are project managers</b> Developing project management skills	<p>Scope a project to identify different components that must be successfully combined.</p> <p>Identify their existing talents and plan how they can develop further knowledge and skills.</p> <p>Identify the component tasks of a project and develop a timeline to track progress.</p> <p>Identify the resources they'll need to accomplish a project.</p> <p>Use web-based research skills to source tools, content and other resources.</p> <p>Consider strategies to ensure the quality of a collaborative project.</p>	<ul style="list-style-type: none"> <li>● Solve problems by decomposing them into smaller parts.</li> <li>● 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.</li> <li>● Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour, identify a range of ways to report concerns about content and contact.</li> <li>● Be discerning in evaluating digital content.</li> <li>● Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> </ul>	<p>Software: Google Apps for Education/Basecamp</p> <p>Apps: Web browser (Safari)</p>	Laptop or desktop computers, internet access
6.3 <b>We are market researchers</b> Researching the app market	<p>Create a set of good survey questions.</p> <p>Analyse the data obtained from a survey.</p> <ul style="list-style-type: none"> <li>● Work collaboratively to plan questions.</li> </ul>	<ul style="list-style-type: none"> <li>● 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.</li> </ul>	<p>Software: Google Drive applications/ Microsoft Office, Microsoft Windows Movie Maker<sup>e</sup></p> <p>Apps: Web browser, Keynote, iMovie</p>	Laptop/desktop computers, internet access

	<ul style="list-style-type: none"> <li>Conduct an interview or focus group. Analyse and interpret the information obtained from interviews or a focus group. Present their research findings.</li> </ul>	<ul style="list-style-type: none"> <li>Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>		
<p>6.4</p> <p><b>We are interface designers</b></p> <p>Designing an interface for an app</p>	<p>Work collaboratively to design the app's interface. Use wireframing tools to create a design prototype of their app.</p> <p>Develop or source the individual interface components (media assets) they will use. Address accessibility and inclusion issues. Document their design decisions and the process they've followed.</p>	<ul style="list-style-type: none"> <li>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</li> <li>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> <li>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> <li>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.</li> <li>Be discerning in evaluating digital content.</li> <li>Recognise acceptable/unacceptable behaviour.</li> </ul>	<p>Software: Justinmind Prototyper/Pencil Project/Microsoft PowerPoint@</p> <p>Apps: SketchyPad or iMockups (pay-for apps)</p>	Laptop/desktop/ tablets
<p>6.5</p> <p><b>We are app developers</b></p> <p>Developing a simple mobile phone app</p>	<p>Become familiar with another programming toolkit or development platform.</p>	<ul style="list-style-type: none"> <li>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</li> </ul>	<p>Software: App Inventor/ TouchDevelop</p> <p>Apps: TouchDevelop/ Codea</p>	Computers and tablets/ smartphones/ phone emulator

	<p>Import existing media assets to their project.</p> <p>Write down the algorithms for their app.</p> <p>Program, debug and refine the code for their app.</p> <p>Thoroughly test and evaluate their app.</p>	<ul style="list-style-type: none"> <li>• Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> <li>• Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> <li>• 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.</li> </ul>		
<p>6.6</p> <p><b>We are marketeers</b></p> <p>Creating video and web copy for a mobile phone app</p>	<p>Consider key marketing messages, including identifying a unique selling point.</p> <p>Develop a printed flyer or brochure incorporating text and images.</p> <p>Further develop knowledge, skills and understanding in relation to creating a website.</p> <p>Further develop skills relating to shooting and editing video.</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</li> <li>• Select, use and combine a variety of software (including internet services) . to design and create content that accomplishes given goals, including collecting, analysing, evaluating and presenting ... information.</li> <li>• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>	<p>Software: Microsoft Publisher™</p> <p>WordPress/Google Sites, Movie Maker<sup>D</sup> and other programs chosen by the pupils</p> <p>Apps: Pages, WordPress, iMovie and other apps chosen by the pupils</p>	<p>Laptops/ desktop computers, cameras</p>

**Appendix I****Key Subject Specific Vocabulary by Year Group****Year 3**

- Algorithm: An unambiguous set of rules or a precise step-by-step guide to solve a problem or achieve a particular objective.
- Arithmetic bugs: Errors in a program caused by problems with mathematical calculations, such as dividing by zero, working with numbers that are too large to store, or loss of precision owing to rounding.
- Computer networks: Computers and their connections, allowing data to be transferred — typically at very high speed — between one computer and another.
- Debug: To fix the errors in a program.
- Input: Data supplied to a computer, typically via the keyboard or mouse.
- Internet: Global network connecting computers and local networks using automated switches, routers and fibreoptic, copper wire and radio connections.
- Internet Protocol (IP) addresses: Numeric addresses uniquely specifying computers directly connected to the internet, also used on private networks to uniquely identify computers on that network.
- ISPs: Internet service providers.
- Mail client: Software running on a computer (including tablets and smartphones) that allows emails to be sent and received, e.g. Microsoft Outlook.
- Mail server. A service that sends email messages out to the internet or receives email messages from the internet.
- Malware: Software designed with malicious intent, such as viruses, trojan horses, rootkits and keyloggers.
- Network switch: Dedicated computer hardware that routes data packets to connections according to their IP address header.
- Output: Information produced by computer processing systems, typically on the screen or through speakers.
- Packets of data: A small set of numbers that get transmitted together via the internet, typically enough for 1000 or 1500 characters.
- Programs: A stored set of instructions encoded in a language understood by the computer that does some form of computation, processing input and/or stored data to generate output.

- Repetition: A programming construct in which one or more Instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.
- Screencast: A way of recording the action on a computer screen; often accompanied by a voice-over.
- Sequence: To place programming instructions in order, with each executed one after the other.
- Spam: Unwanted, unsolicited advertising, typically by email.
- Spoofed links: Links that look as though they point to one website but actually point to another.
- Sprite: A computer graphics object that can be controlled (programmed) independently of other objects or the background.
- Variables: A way in which computer programs can store, retrieve or change simple data, such as a score, the time left, or the user's name.
- Web server: A service running on a computer (or sometimes the computer itself) that returns HTML data for a web page when it receives a request via the local network or the internet.
- World wide web: A service provided by computers connected to the internet (web servers), in which pages of hypertext (web pages) are transmitted to users; the pages typically include links to other web pages and may be generated by programs automatically.

**Year 4**

- Algorithm: An unambiguous set of rules or a precise step-by-step guide to solve a problem or achieve an objective.
- Debug: To fix the errors in a program —the term 'bug' was used by the computing pioneer Grace Hopper in relation to a moth that had to be removed from an automatic switch In an early computer in order for the program to run.
- Decomposing: The process through which problems or systems are broken down into its component parts, each of which may then be considered separately.
- Digital technology: Technology in which information is represented in digital form, including modern computers but also MP3 players, DVD players, digital televisions, digital cameras, etc.
- Hyperlinks: Text or images that, when clicked, opens another page or moves to another part of the document.
- Interface: The link between one system and another, typically between the user of a program and the computer on which it runs.

- **Mix:** The process through which multiple sources (e.g. audio tracks) are combined into one or more channels, such as two-channel stereo.
- **Pressure pad:** A sensor in which a signal is generated, or a circuit completed by pressing down on the pad, e.g. a sensor hidden under a carpet as part of a burglar alarm.
- **Protocol:** A set of agreed rules and procedures for communication.
- **Prototype:** An early sample of a product or program built to test the concept.
- **Proximity sensor:** A hardware sensor that gives a measure of the distance to an object, usually by timing the reflection of an ultrasound or infrared pulse.
- **Pseudocode:** An informal but detailed written description of an algorithm, allowing it to be coded in a range of programming languages.
- **Repeat block:** A Scratch program block used for repetition.
- **Repetition:** A programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.
- **Screencast:** A way of recording the action on a computer screen; often accompanied by a voice-over.
- **Simulation:** Using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical and social systems; an integral part of most computer games.
- **Smartphone:** A mobile phone on which user-selected apps (programs) can be installed, typically with a touchscreen interface and internet connectivity.

#### **Year 5**

- **Algorithm:** An unambiguous set of rules or a precise step-by-step guide to solve a problem or achieve a particular objective.
- **Blog:** An online journal or website made of a series of individual posts, usually displayed in reverse chronological order.
- **Buggy code:** Computer programs with mistakes.
- **Caesar cipher:** A simple cryptographic system in which the plain text is encrypted by shifting each letter along the alphabet a certain, agreed number of places.
- **Computer-Aided Design (CAD):** using computer software to help design real-world artefacts, from engineering components to buildings.
- **Computer networks:** Computers and their connections, allowing data to be transferred — typically at very high speed between one computer and another.
- **Cryptanalysis:** The process of decrypting an encrypted message without prior access to the encryption key.

- **Cryptography:** The science of keeping communication and information secret.
- **Cyberbullying:** To use online systems with the deliberate intention of hurting or upsetting another person.
- **Debug:** To fix the errors in a program — the term 'bug' was used by the computing pioneer Grace Hopper in relation to a moth that had to be removed from an automatic switch in an early computer in order for the program to run.
- **Decrypt:** To convert an encrypted message into plain text so that it can be read and understood.
- **Encrypt:** To convert a plain, readable message into an encrypted form so that it cannot be read by those without a secret key.
- **Firewall:** A service protecting a local network from external access or preventing access to some internet services from a local network.
- **Hyperlinks:** Text or images that, when clicked, opens another page or moves to another part of the document.
- **Morse code:** A simple code for converting letters and numbers into patterns of short and long electrical pulses.
- **Page Rank:** Google's main search algorithm in which search results are ranked according to the number and quality of inbound links.
- **Photorealistic:** An image indistinguishable (or nearly indistinguishable) from a digital photograph.
- **Semaphore:** A simple code for converting letters and numbers into different positions of two flags, one held in each hand.
- **Tessellation:** A regular pattern of one shape that fills a space without overlapping or leaving spaces between.
- **Vector graphics:** A way of representing an image by specifying the lines, arcs and regions from which it is made.
- **Web server:** A service running on a computer (or sometimes the computer itself) that returns HTML data for a web page when it receives a request via the local network or the internet.
- **WordPress:** A popular open source blogging platform; also used as a general content management system.

#### Year 6

- **Algorithm:** An unambiguous set of rules or a precise step-by-step guide to solve a problem or achieve a particular objective.
- **App:** Short for application a program for a smartphone or tablet computer designed to achieve a specific goal.
- **Debug:** To fix the errors in a program — the term 'bug' was used by the computing pioneer Grace Hopper in relation to a moth that had to be removed from an automatic switch in an early computer in order for the program to run.
- **Digital signage system:** The use of large computer screens as displays of visual information, sometimes including video.
- **Geotagging:** The process of tagging media, such as photographs, with geographical identification information (using latitude and longitude coordinates).
- **Global Position System (GPS):** This system allows a user to determine their exact location using a network of military satellites.



- Hypertext mark-up language (HTML): HTML is the predominant language for web pages.
- Interface: The link between one system and another, typically between the user of a program and the computer on which it runs.
- iOS: Apple's operating system for iPhone, iPad and iPod Touch.
- Page Rank: Google's main search algorithm in which search results are ranked according to the number and quality of inbound links.
- Prototype: An early sample of a product or program built to test the concept.
- Pseudocode: An informal but detailed written description of an algorithm, allowing it to be coded in a range of programming languages.
- QR code: A two-dimensional binary (black/white) pattern encoding text, typically URLs, for easy access from smartphones or tablets.
- Tablet: A handheld or portable computer with a pen or touch-based interface.
- Widget: A widget is an element of the graphical user interface that displays information or allows the user to control some aspect of the app,

## Appendix II

### Examples of Big Questions by Year Group

Teachers will use higher order questioning during and at the end of units to assess the depth of pupil understanding. Below are some examples of the type of 'Big Questions' that teacher may use but these may be changed depending of the interests and level of understanding of the class.

#### **Year 3**

##### **Communication and E-Safety**

Why do you need to tell an adult if you feel uncomfortable with something online?

How is a face to face conversation different to a text conversation?

Describe acceptable and unacceptable online behaviour? Why?

##### **Programming**

What happens if you make a mistake when you are coding?

What might happen if the mars rover has an error in its programming?

##### **Arts and Music**

Why is it entertaining to watch people play a game?

Why is playing a game a good way of learning?

Which games are educational?

Can games ever be a waste of time?

#### **Year 4**

##### **Communication and E-Safety**

How might you keep your identity safe online?

Why might someone try to get hold of your details?

How might technology make our lives easier in the future?

##### **Programming**

How might you realise that you've made an error in programming?

What's better, pre-programming or controlling in real time?

##### **Arts and Music**

Should people have to tell people if they have edited an image of themselves?

Is live music better than recorded?  
Who owns music?  
What is lost in recorded music?

**Year 5**

**Communication and E-Safety**

Will we need teachers in the future?  
Is it okay to take and post pictures of people without them know? Why?  
How would you explain e-safety to a younger child?  
Why is it important to understand what is happening to our data?  
What is the internet?

**Programming**

How can you make this programme more efficient?  
How might an over reliance on robots be a problem?  
Would it be okay to make robot clones of yourself to do the things you don't want to do?  
Could you be tricked into believing a robot is a person?

**Arts and Music**

Can nature be equalled by a programme?  
Who owns art?  
Can an art be produced by a computer?  
Is architecture art?  
Can you live in an online world?

**Year 6**

**Communication and E-Safety**

How might technology change our lives for the worse?  
Is it okay to use other people's images? Why?  
Should everything online be permanent or disappear?  
How might filters be useful?

**Programming**

Are robots alive?  
 If you replace the parts of a person with robotic parts will they still be human?  
 How does autonomous programming effect our lives?  
**Arts and Music**  
 Is there artistry in game play?  
 Why do we advertise?  
 What are the advantages and disadvantages of making APPs free to all?  
 What are the ethics around tracking others using GPS?

Unit Title	Suggested Possible Subject Links
Below are ideas for cross- curriculum links to other subjects. Teacher know their classes the best and will choose when these links are meaningful and timely. Possible writing opportunities are highlighted in blue.	
Year 3	
3.1 We are Programmers	Art and design: The children could design characters and backgrounds using art and design techniques such as drawing, painting or sculpture. o English: This unit links to the study of character, dialogue and narrative.  Languages: The children could write or record dialogue for their character in a foreign language.  Music: The children could compose and record backing music for their cartoons. Scratch is a flexible programming language with applications right across the curriculum
3.2 We are Bug Fixers	Maths: This unit develops skills in logical reasoning and problem solving that can be applied right across the programme of study.  Science: This unit links to the requirement for working scientifically; in particular, making systematic and careful observations, and using results to draw simple conclusions and suggest improvements.
3.3 We are Presenters	English: This project develops skills in spoken language, particularly participating in presentations and performances.  Maths: Evaluating performance in sports whose results are compared by time or distance links to work in measurement. Evaluating performance in sports whose results are compared by scores links to work in number.

<p>3.4 We are Network Engineers</p>	<p>D&amp;T: Complex systems such as the internet and computer networks illustrate engineering ideas.</p> <p>Geography: The children can follow the geographical route taken by data packets.</p>
<p>3.5 We are communicators</p>	<p>English: This unit provides opportunities for the children to write for a range of real purposes and audiences as part of their work across the curriculum.</p> <p>History: You could link this unit to a history topic, such as communication through the ages</p> <p>Languages: If you link with a partner school abroad, this unit could provide opportunities for the children to understand and respond to spoken and written language from a variety of authentic sources.</p> <p>Sport, music, art and drama would also provide contexts for communication, making it particularly relevant to share rich media.</p>
<p>3.6 We are opinion pollsters</p>	<p>English: The children can apply their knowledge of sentence structures by creating well-structured and unambiguous questions. Reporting on the results of the survey provides an opportunity to participate in presentations.</p> <p>Maths: This unit allows the children to apply work in statistics on interpreting and presenting data.</p> <p>PSHE: The topics the children choose to investigate may be concerned with the broader aspects of school life, such as enjoyment of lessons, school food, play time or homework.</p>
<p><b>Year 4</b></p>	
<p>4.1 We are software developers</p>	<p>Maths: Games can be used for reinforcing many areas of mathematics. Possible applications include practising recall of multiplication and/or division facts, rounding decimals with one with one decimal place to the nearest whole number or converting between measurements.</p> <p>Languages: Games can be used to practise vocabulary in foreign languages.</p>
<p>4.2 We are toy designers</p>	<p>D&amp;: Pupils could construct the toys they have designed, and use the computer to control them.</p>

	<p>Music: The toy could be a simple musical instrument, using inputs to control sounds played by the computer.</p> <p>English: The pitch presentation will allow pupils to develop skills in spoken language.</p>
4.3 We are musicians	Music: Pupils develop their understanding of musical notation (extensions).
4.4 We are HTML editors	<p>English: As with any text-based coding, spelling, punctuation and grammar are important.</p> <p>History: Written communication over time, with the web as the successor to printing, could form the subject of 'a study of an aspect or theme in British history that extends pupils' chronological knowledge beyond 1066'.</p>
4.5 We are co-authors	<b>English: The unit helps develop the pupils' sense of writing for an audience and for a purpose. The proofreading and copy-editing skills the pupils use will reinforce spelling and grammar work.</b>
4.6 We are meteorologists	<p>English: This unit provides opportunities for the pupils to develop their mastery of spoken language; in particular, giving well-structured descriptions, speaking audibly and fluently, participating in presentations, and selecting and using appropriate registers for communication.</p> <p>Geography: There are opportunities for the pupils to consolidate their knowledge of the geographical regions of the UK and the eight points of the compass.</p> <p>Science: This unit covers almost all the statutory requirements for 'Working scientifically' in the programme of study for lower Key Stage 2.</p> <p>Maths: Pupils practise interpreting and presenting discrete and continuous data using appropriate graphical methods, including bar charts.</p>
<b>Year 5</b>	
5.1 We are games developers	<p>Art and Design: Pupils can improve their art and design skills by creating artwork for their games.</p> <p>Music: Pupils can record sound or compose music for their games.</p> <p>The games may require an understanding of aspects of maths and science to ensure the computer model on which the game is based is realistic.</p>
5.2 We are cryptographers	<p>Maths: Encryption and decryption use mathematical functions. Frequency tables play a role in cracking substitution ciphers.</p> <p>History: There are interesting stories involving the use of cryptography throughout history. PSHE: Privacy, safety and identity can link to topics in the school PSHE curriculum.</p> <p>D&amp;T and science: The pupils could make simple electrical telegraph circuits.</p>
5.3 We are artists	Art and design: The children learn about some famous artists.

	<p>Maths: This unit draws on pupils' knowledge of angles, 2D shapes, translations and that angles at a point total <math>360^{\circ}</math>.</p> <p>RE: There are opportunities to explore Islamic art. PE: The pupils can explore turtle graphics instructions within a PE or dance context.</p>
5.4 We are web developers	<p>English: There is scope for pupils to apply their skills in summarising text, as well as their knowledge of spelling, grammar and punctuation.</p> <p>History: Children could make use of skills in conducting an enquiry and in considering the authority and potential bias of source documents.</p>
5.5 We are bloggers	<p>English: There are ample writing opportunities in this unit where children plan, draft and evaluate their own (and others' writing)</p> <p>History: The blog activity could replace a diary journal activity, e.g. the blog of an ancient Greek.</p>
5.6 We are architects	<p>Art and design: Pupils could take scans or photos of their original drawings, paintings or sculptures before uploading them to their virtual galleries.</p> <p>Maths: Pupils apply skills from maths work in the domains of measurement and geometry.</p> <p>Science: There are opportunities to link this unit to work on properties and changes of materials, e.g. by exploring the properties of building materials, such as their hardness and transparency.</p>
<b>Year 6</b>	
6.1 We are app planners	<p>Geography: Pupils can make use of the GPS sensor to use location-specific information.</p> <p>English: Text- or media-based apps could link well with work in this curriculum area.</p> <p>Art and design: The camera or video functions of smartphones could be used.</p> <p>Music: Pupils could use the sound features of the phone.</p> <p>Pupils could link their app to any aspect of the school curriculum.</p>
6.2 We are project managers	<p>English: Pupils can develop verbal and written communication skills. They could develop a flash card-based vocabulary revision game.</p> <p>Maths: Pupils could create a 'drill and practice' revision app.</p>
6.3 We are market researchers	<p>Geography: Pupils can make use of the GPS sensor to use location-specific information.</p> <p>English: Text- or media-based apps could link well with work in this curriculum area.</p> <p>Art and design: The camera or video functions of smartphones could be used.</p> <p>Music: Pupils could use the sound features of the phone.</p>

	Pupils could link their app to any aspect of the school curriculum.
6.4 We are interface designers	<p>Geography: Pupils can make use of the GPS sensor to use location-specific information.</p> <p>Art and design: The camera or video functions of smartphones could be used.</p> <p>Music: Pupils could use the sound features of the phone.</p> <p>Pupils could link their app to any aspect of the school curriculum.</p>
6.5 We are app developers	<p>D&amp;T: The project has strong parallels with 'design and make' projects.</p> <p>English: Algorithms and programming have connections with instructional writing.</p> <p>Maths: Programming requires logical thinking and decomposition in tackling complex problems.</p> <p>Apps could be linked to any area of the curriculum.</p>
6.6 We are marketers	<p>D&amp;T: A similar set of marketing tasks would link well to 'design and make' projects.</p> <p>English: The pupils practise skills in persuasive writing, using correct spelling, punctuation and grammar, and writing for a specific audience.</p> <p>Art and design: The pupils apply the principles of effective design in a range of media.</p>