



Computing - Progression of Skills and Knowledge in KS2

National Curriculum Objectives	Year 3	Year 4	Year 5	Year 6
<p>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.</p>	<p>We are Programmers</p> <p>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.</p> <p>We are Bug Fixers</p> <p>Correct 'off-by-one' errors in loops. Improve the performance of the circle drawing program. Get the dialogue in the joke program to work in sequence. Correct the 'Pong'-style game so the bounce is more realistic.</p> <p><i>Progression: in Year 2 students have knowledge of what algorithms are and how they are used in computing. In Year 3 the focus shifts towards looking at how algorithms are used by programs to accomplish specific goals, with a greater focus on creating their own computing algorithms. Debugging more complex programs on Scratch in Year 3 compared to more simple programs in Scratch Jr in Year 2.</i></p>	<p>We are Software Developers</p> <p>Design an interactive educational game. Develop an interactive educational game. Correct mistakes in their game.</p> <p><i>Progression from Year 3: element of interaction and interface increases complexity from animation. Increased complexity leads to opportunity for more complex debugging.</i></p>	<p>We are Game Developers</p> <p>Create an algorithm for a game. Create images and sounds for use in their game. Improve their game on the basis of the feedback they receive.</p> <p><i>Progression from Year 4: Creating images and sound for use in more complex game, using peer assessment and acting on feedback to refine their game.</i></p>	<p>We are Interface Designers</p> <p>We are App Developers</p> <p>Develop clear written algorithms for their App. Implement their algorithms as code. Use trial and improvement approaches to debug their code. Make changes to their code on the basis of feedback received.</p> <p><i>Progression from Year 5: Focus on improving clarity of algorithms, moving from pictures or storyboards to written algorithms. Using trial and improvement to debug codes with more feedback cycles. Changes to code itself, rather than to game in general, in response to feedback received.</i></p>
<p>Solve problems by decomposing them into smaller parts.</p>	<p>We are Programmers</p> <p>Break the scene down into small sections of action and dialogue.</p>	<p>We are Co-Authors</p> <p>Work with others to plan a project.</p>	<p>We are Game Developers</p> <p>Create an algorithm for a game. Create images and sounds for use in their game.</p>	<p>We are Interface Designers</p> <p>Make changes to their code on the basis of feedback received.</p>



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	<p><i>Progression from recognising the importance of precise and unambiguous instructions in Year 2; building on this to solve problems by breaking them down into smaller parts in Year 3.</i></p>	<p><i>Progression from Year 3: working with others to decompose problems into smaller parts.</i></p>	<p>Improve their game on the basis of the feedback they receive.</p> <p><i>Progression from Year 4: Creating images and sound for use in more complex game, using peer assessment and acting on feedback to refine their game.</i></p>	<p>We are App Developers</p> <p><i>Progression from Year 5: Changes to code itself, rather than to game in general, in response to feedback received.</i></p>
<p><i>Pupils should use sequence, selection and repetition in programs.</i></p>	<p>We are Programmers</p> <p>Put the blocks of their Scratch script into order.</p> <p><i>Progression from Year 2: new skill introduced, ordering blocks on Scratch.</i></p>	<p>We are Software Developers</p> <p>Put Scratch blocks into the right order for their game. Use the <i>if/then/else</i> block correctly. Use repetition in programs. Keep track of random numbers and the score.</p> <p><i>Progression from Year 3: moving blocks from the right order to using the if/then/else block, using repetition, and keeping track of scores.</i></p>	<p>We are Game Developers</p> <p>Use sequences of instructions. Use selection and repetition in their game.</p> <p><i>Progression from Year 4: Using sequences and selection in their games, further consolidating use of repetition.</i></p>	<p>We are Interface Designers</p> <p>We are App Developers</p> <p>Use trial and improvement approaches to debug their code.</p> <p><i>Progression from Year 5: Using trial and improvement to debug codes with more feedback cycles. Changes to code itself, rather than to game in general, in response to feedback received.</i></p>
<p><i>Pupils should work with variables and various forms of input and output.</i></p>	<p>We are Programmers</p> <p>Create their own sound and graphics for the sprites and the backdrop.</p> <p>We are Bug Fixers</p> <p>Experiment with the speed variable and other factors in the racing car simulator. Describe how the times-table program works. Describe how the racing car simulator works. Use text and video for communication.</p>	<p>We are Software Developers</p> <p>Use the keyboard for input and the screen for output. Integrate sound into their game.</p> <p>We are Co-authors. Edit their own content.</p> <p><i>Progression from Year 3: moving from creating sound to integrating the sounds into their game. Moving from experimentation with content towards editing their own content.</i></p>	<p>We are Game Developers</p> <p>Use Scratch and different forms of variables in Scratch – input, keyboards, microphone, output game, interaction.</p> <p>We are bloggers – exposure to new forms of input and output in the form of blogs.</p> <p><i>Progression from Year 4: consolidation of work with keyboards, and understanding of more kinds of output.</i></p>	<p>We are App Planners</p> <p>Describe the input and output capabilities of a smartphone.</p> <p>We are Interface Designers</p> <p><i>Progression from Year 5: describing the input and output capabilities of a smartphone, exposure to more varieties of input and output.</i></p>



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	<p><i>Progression from Year 2: new skill introduced working with variables and forms of input and output.</i></p>			
<p>Pupils should use logical reasoning to explain how algorithms work and to detect and correct errors in algorithms and programs.</p>	<p>We are Programmers</p> <p>Explain the connection between their storyboard and the scene they're animating.</p> <p>We are Bug Fixers</p> <p>Experiment with the speed variable and other factors in the racing car simulator. Describe how the circle-drawing program works. Describe how the two joke scripts work together.</p> <p><i>Progression: in Year 2 students have knowledge of what algorithms are and how they are used in computing; in Year 3 students start to think about the logic of their own algorithms.</i></p>	<p>We are Software Developers</p> <p>Design an interactive educational game. Develop an interactive educational game. Correct mistakes in their game.</p> <p><i>Progression from Year 3: moving from understanding, as shown through description of how the algorithms work, towards using logical reasoning to detect errors in their games.</i></p>	<p>We are Game Developers</p> <p>Detect errors in their game. Correct errors in their game.</p> <p><i>Progression from Year 4: consolidation of work detecting and correcting errors in their game.</i></p>	<p>We are Interface Designers</p> <p>Explain how the different elements of their app will function.</p> <p>We are App Developers</p> <p>Use logical reasoning to detect errors in their algorithms and code.</p> <p><i>Progression from Year 5: understanding not simply how their algorithm will work as a whole, but how each part of their algorithm should work to create a functioning app. Further consolidating ability to detect and correct errors through articulating functions for their app.</i></p>
<p>Understand computer networks including the internet.</p>	<p>We are Communicators</p> <p>Understanding of the concept of the internet and computer network.</p> <p><i>Progression: new knowledge introduced – concept of networks. Building on use of internet in KS1.</i></p>		<p>We are Web Developers</p> <p>Appreciate how Google selects web pages in search results Show awareness of other search engines.</p> <p><i>Progression: movement from what a network is and basic understanding of how it works, to knowledge of Google and other search engines and their use of the internet.</i></p>	<p>We are App Planners</p> <p><i>Progression from Year 5: use of the internet and search engine optimisation to research competition for their own app, use of the app store and geolocation networks.</i></p>



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<p>Understand how networks can provide multiple services, such as the world wide web.</p>	<p>We are Communicators</p> <p>Realise that email and video conferencing work via the internet. Realise that the internet is different from the web.</p> <p><i>Progression: new knowledge introduced – introduction to email and video conferencing. Building on use of internet in KS1.</i></p>	<p>We are Co-Authors</p> <p>Create content for a wiki.</p> <p><i>Progression from Year 3: Moving from understanding how networks work towards utilising the services provided by these networks, such as the internet and Wikipedia.</i></p>	<p>We are Bloggers</p> <p>Understand that blog posts are stored as HTML.</p> <p>We are Web Developers</p> <p><i>Progression: from knowledge of email and video conferencing, internet and Wikipedia, to exposure to new services - blog posts and HTML.</i></p>	<p>We are App Planners</p> <p><i>Progression from year 5: use of the internet and search engine optimisation to research competition for their own app, use of the app store and geolocation networks.</i></p>
<p>Understand the opportunities networks offer for communication and collaboration.</p>	<p>We are Communicators</p> <p>Use email and video conferencing to communicate. Use email to work together on a joint project.</p> <p><i>Progression: new knowledge introduced – communication with networks.</i></p>	<p>We are Co-Authors</p> <p>Edit others' content. Edit content on Wikipedia.</p> <p><i>Progression from Year 3: Moving from communication via email to collaboration on content.</i></p>	<p>We are Web Developers</p> <p>Correct spelling, punctuation and grammar errors in another's content.</p> <p>We are Bloggers</p> <p>Understand how the internet makes blogging possible. Comment on a blog post.</p> <p><i>Progression: increasing ways of collaboration, from editing content itself to correcting SPAG and leaving comments.</i></p>	<p>We are App Planners</p> <p><i>Progression from Year 5: use of the internet and search engine optimisation to research competition for their own app, use of the app store and geolocation networks. Possibilities for communication and collaboration in the form both of cooperation between classmates, but also in online forums such as Scratch and code sharing platforms.</i></p>
<p>Use search technologies effectively, appreciate how results are selected and ranked, be discerning in evaluating digital content.</p>	<p>We are Communicators</p> <p><i>(This cell is empty in the original image)</i></p>	<p>We are Co-Authors</p> <p>Find and read an article on Wikipedia. Edit the HTML for a web page. Identify the sources used in their research. Evaluate an article for trustworthiness.</p> <p><i>Progression: new knowledge introduced – using search technologies and discerning digital content.</i></p>	<p>We are Web Developers</p> <p>Review others' content. Appreciate how Google selects web pages in search results Show awareness of other search engines. Evaluate web sources for quality and bias. Use tools to make web searches more efficient or effective. Identify the criteria for an effective blog post.</p>	<p>We are App Planners</p> <p>Search for apps addressing the problems they have identified. Evaluate the quality of a range of competing products. Understand how search engines (including dedicated search engines) select and rank results.</p> <p>We are Interface designers</p> <p>Think through elements of interaction design for their app.</p>



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<p>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.</p>	<p>We are Programmers Creation of animation.</p> <p>We are Communicators Sending of emails</p> <p><i>Progression: exposure to new software including Scratch (building on knowledge of Scratch Jr) and sending emails.</i></p>	<p>We are Co-Authors Create content for a wiki.</p> <p><i>Progression from Year 3: Exposure to new software- Wikipedia and HTML.</i></p>	<p>We are Game Developers Create music for use in their game. Add instructions to their game.</p> <p>We are Web Developers Correctly attribute third-party content on a shared site.</p> <p>We are Bloggers Write a blog post. Add an image, audio or video to a blog post. Add their own original image, audio or video to a blog post.</p> <p><i>Progression: greater exposure to a variety of software to achieve a wider variety of goals, from web development, blogs and increasingly complex educational games.</i></p>	<p>We are App Planners Understand that a smartphone is a programmable computer. View geotagged photos on a map. Identify interesting problems. Create an effective presentation to pitch their idea. Use GPS to geolocate photographs or other media. Identify how a smartphone app might address problems they identify. Respond effectively to questions posed.</p> <p>We are Interface Designers Sketch ideas for the design of their app. Use a prototyping tool to develop a set of screen layouts for their app. Sketch ideas for an intuitive and effective app design. Take into account accessibility in the design of their app. Develop original media assets for their app.</p>



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				<p>We are Marketeers</p> <p>Create a marketing flyer that incorporates images and text. Develop a website containing text and other media for their app. Shoot and source video and other media for a promotional video. Create an effective and well-designed marketing flyer. Develop a well-designed and easy-to navigate site for their app. Edit original and third-party content to create a promotional video.</p> <p><i>Progression from Year 5: exposure to a greater variety of software and digital devices such as geotagging, GPS, smart phones, publisher and website creators. Exposure to presentation, evaluation and collection of information across more platforms and softwares.</i></p>
<p>Use technology safely, respectfully and responsibly.</p>	<p>We are Communicators</p> <p>Ensure their use of email and video conferencing complies with the school's AUP. Show consideration and respect for their partners throughout.</p> <p><i>Progression: building on KS1 need to keep information private, show students how this might be applied in their use of email and video conferencing.</i></p>	<p><i>Progression: building on KS1 need to keep information private, and how to search safely online. Continuing to stress from KS1 that concerns must be reported to a trusted adult such as a teacher or parent.</i></p>	<p>We are Bloggers</p> <p>Understand how to use blogs safely and responsibly. Understand how to comment respectfully.</p> <p>We are Web Developers</p> <p>Create or curate content to demonstrate knowledge of safe, respectful and responsible use of technology.</p> <p><i>Progression: understanding of how to use technology safely, respectfully</i></p>	<p>We are Marketeers</p> <p>Be aware of their responsibilities as creators of online content.</p> <p><i>Progression from Year 5: adding to their knowledge of online safety to online rights over content creation, plagiarism, need to credit intellectual property.</i></p>



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			<i>and responsibly in a wider variety of contexts, including blogging.</i>	
Recognise acceptable/unacceptable behaviour.	<p>We are Communicators</p> <p>Explain how they would report any concerns or inappropriate use of email.</p> <p><i>Progression: building on KS1, need to keep information private, show students how this might be applied in their use of email and video conferencing.</i></p>	<p><i>Progression: building on KS1, need to keep information private, and how to search safely online. Continuing to stress from KS1 that concerns must be reported to a trusted adult such as a teacher or parent.</i></p>	<p>We are Web Developers</p> <p>Create or curate content to demonstrate knowledge of acceptable/unacceptable behaviour.</p> <p>Appreciate what constitutes acceptable and unacceptable behaviour when commenting.</p> <p><i>Progression: recognition of acceptable/unacceptable wider variety of contexts, including blogging.</i></p>	<p>We are Interface Designers</p> <p>We are Marketeers</p> <p>Be aware of their responsibilities as creators of online content.</p> <p><i>Progression from Year 5: adding to their knowledge of online safety to online rights over content creation, plagiarism, need to credit intellectual property.</i></p>
Identify a range of ways to report concerns about content and contact.	<p>We are Communicators</p> <p>Explain how they would report any concerns or inappropriate use of email.</p> <p><i>Progression: continuing to stress from KS1 that concerns must be reported to a trusted adult such as a teacher or parent.</i></p>	<p><i>Progression: building on KS1 need to keep information private, and how to search safely online. Continuing to stress from KS1 that concerns must be reported to a trusted adult such as a teacher or parent.</i></p>	<p>We are Web Developers</p> <p>Create or curate content to demonstrate knowledge of how to report concerns.</p> <p>We are Bloggers</p> <p>Report concerns about posts or comments on blogs.</p> <p><i>Progression: building on KS1, need to keep information private, how to search safely online, and what is and is not acceptable on an online forum. Continuing to stress from KS1 that concerns must be reported to a trusted adult such as a teacher or parent.</i></p>	<p>We are Marketeers</p> <p>Be aware of their responsibilities as creators of online content.</p> <p><i>Progression: building on KS1, need to keep information private, how to search safely online, and what is and is not acceptable on an online forum. Continuing to stress from KS1 that concerns must be reported to a trusted adult such as a teacher or parent, but with additional avenues of reporting content to website operators or third parties if appropriate, after consultation with a trusted adult.</i></p>