

# Computing Curriculum

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## Intent

At St John's we want every child to understand and apply the fundamental principles and concepts of computer science, including logic, algorithms and data representation. We encourage our learners to confidently analyse problems in computational terms and provide deliberate practice and practical experience of writing computer programs in order to solve problems. Children are provided with opportunities to evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems. Over time our pupils at St John's become responsible, competent, confident, safe and creative users of information and communication technology.

## Implementation

Our device ratio is high so that children have the opportunity in every computing lesson to either use a device independently or work collaboratively within a pair. Every child at St John's is challenged to engage in deliberate practice that promotes computational thinking that will equip them with the knowledge and understanding required to be successful in a technologically rich world. Through the use of Kapow, pupils engage with and experience a range of software that enables them to master knowledge and skills related to computer science, information technology and digital literacy. The curriculum is planned in a way so that pupils experiences progressively increase in complexity, enabling each child to build on their knowledge and understanding in depth each academic year. The use of readily available apps throughout the curriculum encourages children to continue their skills outside of the classroom including: Google, Scratch, Python, Times Table Rockstars and Microsoft.

Online safety workshops and briefing in our newsletters, raise the importance of staying online, helping parents to protect their children and support them to make appropriate choices to safe online, protect their privacy and be critical when reading online materials. Our school website provides an online presence that enables children and their families to use information technology to stay update with news and events within school. We teach E-safety throughout the academic year, and begin each unit with a lesson dedicated to the importance of being safe online. We also include E-safety throughout our PSHE units and the whole school participate in Safer Internet day.

## Impact

Children take part in weekly computing lessons and progress is tracked during units of work. Assessment is provided by Kapow where children are tracked throughout their time within St John's.

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## Breadth of study

### Key Stage 1

- Understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following a sequence of instructions.
- Write and test simple programs.
- Use logical reasoning to predict the behaviour of simple programs.
- Organise, store, manipulate and retrieve data in a range of digital formats.
- Communicate safely and respectfully online, keeping personal information private and recognise common uses of information technology beyond school.

### Key Stage 2

- Design and write programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.
- Use sequence, selections and repetition in programs; work with variables and various forms of input and output; generate appropriate inputs and predicted outputs to test programs.
- Use logical reasoning to explain how a simple algorithm works, detect and correct errors in algorithms and programs.
- 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.
- Describe how internet search engines find and store data; use search engines effectively; be discerning in evaluating digital content; respect individuals and intellectual property; use technology responsibly, securely and safely.
- Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

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		How is it different, how is it the same?		How and why does that happen?		What did they leave behind?	What would happen if?
EYFS		Use ICT to support learning	Use ICT to support learning				
Milestone 1	Cycle A	Improving mouse skills	Algorithms unplugged	Rocket to the moon	What is a computer?	Algorithms and debugging	Word processing
	Cycle B	Beebots	Digital imagery	Introduction to data	Scratch junior	Stop motion	International space station
Milestone 2	Cycle A	Emailing	Programming Scratch	Video trailers	Website design	Further coding with Scratch	Computational thinking
	Cycle B	Networks & the internet	Comparison cards	Journey inside a computer	Collaborative learning	Investigating weather	HTML
Milestone 3	Cycle A	Micro:bit	Mars Rover 1	Mars Rover 2	Bletchley Park	The history of computers	Investigating a product
	Cycle B	Programming; Music	Stop, motion, animation	Search engines	Big Data 1	Big data 2	Intro to Python

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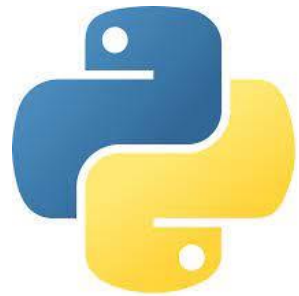
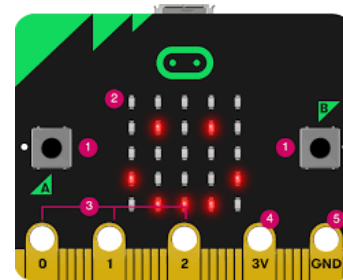
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# Computing Skills Progression

Computing progression across all milestones

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	Concept	Milestone 1	Milestone 2	Milestone 3
<b>Code</b> This concept involves developing an understanding of instructions, logic and sequences.	Motion	<ul style="list-style-type: none"> <li>Control motion by specifying the number of steps to travel, direction and turn.</li> </ul>	<ul style="list-style-type: none"> <li>Use specified screen coordinates to control movement.</li> </ul>	<ul style="list-style-type: none"> <li>Set IF conditions for movements. Specify types of rotation giving the number of degrees.</li> </ul>
	Looks	<ul style="list-style-type: none"> <li>Add text strings, show and hide objects and change the features of an object.</li> </ul>	<ul style="list-style-type: none"> <li>Set the appearance of objects and create sequences of changes.</li> </ul>	<ul style="list-style-type: none"> <li>Change the position of objects between screen layers (send to back, bring to front).</li> </ul>
	Sound	<ul style="list-style-type: none"> <li>Select sounds and control when they are heard, their duration and volume.</li> </ul>	<ul style="list-style-type: none"> <li>Create and edit sounds. Control when they are heard, their volume, duration and rests.</li> </ul>	<ul style="list-style-type: none"> <li>Upload sounds from a file and edit them. Add effects such as fade in and out and control their implementation.</li> </ul>
	Draw	<ul style="list-style-type: none"> <li>Control when drawings appear and set the pen colour, size and shape.</li> </ul>	<ul style="list-style-type: none"> <li>Control the shade of pens.</li> </ul>	<ul style="list-style-type: none"> <li>Combine the use of pens with movement to create interesting effects.</li> </ul>

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Code This concept involves developing an understanding of instructions, logic and sequences.	Concept	Milestone 1	Milestone 2	Milestone 3
	Events	<ul style="list-style-type: none"> <li>Specify user inputs (such as clicks) to control events.</li> </ul>	<ul style="list-style-type: none"> <li>Specify conditions to trigger events.</li> </ul>	<ul style="list-style-type: none"> <li>Set events to control other events by 'broadcasting' information as a trigger.</li> </ul>
	Control	<ul style="list-style-type: none"> <li>Specify the nature of events (such as a single event or a loop).</li> </ul>	<ul style="list-style-type: none"> <li>Use IF THEN conditions to control events or objects.</li> </ul>	<ul style="list-style-type: none"> <li>Use IF THEN ELSE conditions to control events or objects.</li> </ul>
	Sensing	<ul style="list-style-type: none"> <li>Create conditions for actions by waiting for a user input (such as responses to questions like: What is your name?).</li> </ul>	<ul style="list-style-type: none"> <li>Create conditions for actions by sensing proximity or by waiting for a user input (such as proximity to a specified colour or a line or responses to questions).</li> </ul>	<ul style="list-style-type: none"> <li>Use a range of sensing tools (including proximity, user inputs, loudness and mouse position) to control events or actions.</li> </ul>
	Variables and lists	<ul style="list-style-type: none"> <li>From Year 3 onwards.</li> </ul>	<ul style="list-style-type: none"> <li>Use variables to store a value.</li> <li>Use the functions define, set, change, show and hide to control the variables.</li> </ul>	<ul style="list-style-type: none"> <li>Use lists to create a set of variables</li> </ul>

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	Concept	Milestone 1	Milestone 2	Milestone 3
<b>Code</b> This concept involves developing an understanding of instructions, logic and sequences.	Operators	<ul style="list-style-type: none"><li>From Year 3 onwards.</li></ul>	<ul style="list-style-type: none"><li>Use the Reporter operators ( ) + ( ) ( ) - ( ) ( ) * ( ) ( ) / ( ) to perform calculations.</li></ul>	<ul style="list-style-type: none"><li>Use the Boolean operators ( ) &lt; ( ) ( ) = ( ) ( ) &gt; ( ) ( )and() ( )or() Not() to define conditions.</li><li>Use the Reporter operators ( ) + ( ) ( ) - ( ) ( ) * ( ) ( ) / ( ) to perform calculations. Pick Random ( ) to ( ) Join ( ) ( ) Letter ( ) of ( ) Length of ( ) ( ) Mod ( ) This reports the remainder after a division calculation Round ( ) ( ) of ( ).</li></ul>



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Computing progression across all milestones

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Concept	Milestone 1	Milestone 2	Milestone 3
<b>Connect</b> This concept involves developing an understanding of how to safely connect with others.	<ul style="list-style-type: none"><li>• Participate in class social media accounts.</li><li>• Understand online risks and the age rules for sites.</li></ul>	<ul style="list-style-type: none"><li>• Contribute to blogs that are moderated by teachers.</li><li>• Give examples of the risks posed by online communications.</li><li>• Understand the term 'copyright'.</li><li>• Understand that comments made online that are hurtful or offensive are the same as bullying.</li><li>• Understand how online services work.</li></ul>	<ul style="list-style-type: none"><li>• Collaborate with others online on sites approved and moderated by teachers.</li><li>• Give examples of the risks of online communities and demonstrate knowledge of how to minimise risk and report problems.</li><li>• Understand and demonstrate knowledge that it is illegal to download copyrighted material, including music or games, without express written permission, from the copyright holder.</li><li>• Understand the effect of online comments and show responsibility and sensitivity when online.</li><li>• Understand how simple networks are set up and used.</li></ul>

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Concept	Milestone 1	Milestone 2	Milestone 3
<b>Communicate</b> This concept involves using apps to communicate one's ideas.	<ul style="list-style-type: none"><li>Use a range of applications and devices in order to communicate ideas, work and messages.</li></ul>	<ul style="list-style-type: none"><li>Use some of the advanced features of applications and devices in order to communicate ideas, work or messages professionally.</li></ul>	<ul style="list-style-type: none"><li>Choose the most suitable applications and devices for the purposes of communication.</li><li>Use many of the advanced features in order to create high quality, professional or efficient communications.</li></ul>
<b>Collect</b> This concept involves developing an understanding of databases and their uses.	<ul style="list-style-type: none"><li>Use simple databases to record information in areas across the curriculum.</li></ul>	<ul style="list-style-type: none"><li>Devise and construct databases using applications designed for this purpose in areas across the curriculum.</li></ul>	<ul style="list-style-type: none"><li>Select appropriate applications to devise, construct and manipulate data and present it in an effective and professional manner.</li></ul>

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### Understanding the World

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children’s vocabulary will support later reading comprehension.

Autumn 1		Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
How is it different, how is it the same?			How and why does that happen?		What did they leave behind?	What would happen if?

