



National Curriculum Requirements of Computing at KS2

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts (computer science);
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output (computer science);
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs (computer science).
- 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(digital literacy);
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content;
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
- 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 (Information Technology).

Our Intent

Computing at Stanley Park Junior School intends to develop **computational thinkers** of the future through an evolving, ambitious and relevant education in computing.

We want to equip pupils to use critical thinking and creativity to enable them to become active participants in the digital world.

Through the use of **computer science** such as analysing, evaluating, algorithms, pattern-finding, decomposition and abstraction, we aim to help pupils understand how to use rapidly-changing technology to express themselves and as tools for learning.

We want children, as users of **information technology**, to gain a wide range of knowledge of how to create digital artefacts using a range of applications that are useful in real-world situations, wherever possible built upon previous skills learned to gain a depth of understanding.

We want children to be **digitally literate** as responsible and confident users of technology. By making them aware of the positives and negatives of the online world and the measures that can be taken to keep themselves and others safe online, we aspire for every child to become a respectful digital citizen.

Our computing curriculum is designed to balance acquiring a broad and deep knowledge alongside opportunities to apply skills in various contexts. Beyond teaching computing discreetly, we aim to let pupils apply and develop what they have learnt and make connections across the wider curriculum.

	Year 3	Year 4	Year 5	Year 6
Areas of Study	E-Safety	E-Safety/email	E-Safety	E-safety
	Basic Skills			
	Programming - sequencing and events	Programming - sequencing and events Programming - repetition in games	Programming - selection in physical computing	Programming - variables in games Programming - sensing
	Connecting computers - networks	Computing systems and networks - The internet	Computing systems and networks - sharing information	Computing systems and networks - communication
Desktop publishing	Data logging Photo editing	Flat-file databases Video Editing Vector drawing	Spreadsheets 3D modelling	

E-safety	E-safety	E-safety	E-safety	E-safety
	<p>Initial quiz to establish knowledge.</p> <ul style="list-style-type: none"> ❖ To know what cyberbullying is and how to address it ❖ To understand how websites use advertisements to promote products ❖ To create strong passwords and understand privacy settings ❖ To explore different ways we can communicate online. ❖ To use knowledge of online safety to plan a party online. 	<p>Initial quiz to establish knowledge.</p> <ul style="list-style-type: none"> ❖ Identify how a message can hurt someone's feelings and respond to hurtful messages ❖ Use a search engine accurately ❖ Understand the term 'plagiarism' and how to avoid it ❖ Create a safe online profile ❖ Explain how to be a responsible digital citizen ❖ Create an online safety superhero character 	<p>Initial quiz to establish knowledge.</p> <ul style="list-style-type: none"> ❖ Identify spam emails and what to do with them ❖ Write citations for the websites I use ❖ Create strong passwords ❖ Recognise when, how and why online photos may be edited ❖ Apply online safety to real-life scenarios 	<p>Initial quiz to establish knowledge.</p> <ul style="list-style-type: none"> ❖ Find similarities and differences between bullying and cyberbullying and identify good strategies to deal with cyberbullying. ❖ I can identify secure websites by identifying privacy seals of approval ❖ Understand the benefits and pitfalls of online relationships. ❖ Identify information that I should never share ❖ Identify how the media play a powerful role in shaping ideas about girls and boys ❖ Apply online safety knowledge to my online activities.

	<p>Why: Safe choices help children become responsible digital citizens who can navigate the online world with greater resilience and more awareness of managed risk.</p> <p>Lesson Link: Y2 e-safety</p> <p>Year link: Y2 e-safety emails/footprint</p> <p>Connections: <u>PSCHE</u> - bullying and cyberbullying</p>	<p>Why: Safe choices help children become responsible digital citizens who can navigate the online world with greater resilience and more awareness of managed risk.</p> <p>Lesson Link: Previous e-safety lessons</p> <p>Year link:</p> <p>Connections: <u>Literacy</u> - plagiarism</p>	<p>Why: Safe choices help children become responsible digital citizens who can navigate the online world with greater resilience and more awareness of managed risk.</p> <p>Lesson Link: Previous e-safety lessons</p> <p>Year link:</p> <p>Connections: <u>Literacy</u> - persuasive language / photos</p>	<p>Why: Safe choices help children become responsible digital citizens who can navigate the online world with greater resilience and more awareness of managed risk.</p> <p>Lesson Link: Previous e-safety lessons</p> <p>Year link:</p> <p>Connections: <u>PSCHE</u> - healthy relationships</p>
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Programming	Sequencing and events	Sequencing and events	Selection in physical computing	Variables in games
	<p>End point: create a representation of a piano to show a sequence of sounds</p> <ul style="list-style-type: none"> ❖ To explore a new programming environment ❖ To identify that commands have an outcome ❖ To explain that a program has a start ❖ To recognise that a sequence of commands can have an order ❖ To change the appearance of my project ❖ To create a project from a task description 	<p>End point: design and code their own maze-tracing program</p> <ul style="list-style-type: none"> ❖ To explain how a sprite moves in an existing project ❖ To create a program to move a sprite in four directions ❖ To adapt a program to a new context ❖ To develop my program by adding features ❖ To design and create a maze-based challenge ❖ To identify and fix bugs in a program 	<p>End point: Design and make a working model using a Crumble controller</p> <ul style="list-style-type: none"> ❖ To control a simple circuit connected to a computer ❖ To write a program that includes count-controlled loops ❖ To explain that a loop can stop when a condition is met, e.g. number of times ❖ To conclude that a loop can be used to repeatedly check whether a condition has been met ❖ To design a physical project that includes selection (statements that is true when a condition is met) ❖ To create a controllable system that includes selection 	<p>End point: design a game in Scratch that uses variables</p> <ul style="list-style-type: none"> ❖ To define a 'variable' as something that is changeable ❖ To explain why a variable is used in a program ❖ To choose how to improve a game by using variables ❖ To design a project that builds on a given example ❖ To use my design to create a project ❖ To evaluate my project

	<p>Why: sequencing helps develop logical thinking with cause and effect. Useful for problem-solving when things go wrong. Basic understanding of computer programming.</p> <p>Lesson Link: Y2 - Purple Mash algorithms basic commands / sequencing</p> <p>Year link: Key stage 1 basic instructions in a floor robot and J2e.</p> <p>Connections: <u>Maths</u> - logical sequence to achieve a goal e.g. sequence of steps to do a written addition. <u>Literacy</u> - narrative 5-part story sequence <u>Games</u> - throwing/catching - hands ready to receive, watch ball, move to catch, catch</p>	<p>Why: sequencing helps develop logical thinking with cause and effect e.g. creating/following instructions, basic computer programs.</p> <p>Lesson Link: basic sequencing in an online piano program or instructional writing.</p> <p>Year link: Key stage 1 basic instructions in a floor robot and J2e.</p> <p>Connections: <u>Literacy</u> - debugging spelling errors. <u>Maths</u> - debugging computational errors. <u>History</u> - events happen due to a sequence of previous events.</p>	<p>Why: Applying coding to real-world hardware to get visible results. Most objects nowadays use computers in them, from games consoles to kettles.</p> <p>Lesson Link:</p> <p>Year link: Year 3 sequencing Year 4 repetition</p> <p>Connections: <u>Science</u> - using 'If' statements to suggest possible conclusions e.g. 'If we wrap this cup in wool then it might stay warmer.' <u>Literacy</u> - 'If' as a conditional conjunction</p>	<p>Why: Understanding variables occur in everyday life e.g. scoring, health (in video games), any kind of monitoring equipment etc.</p> <p>Lesson Link:</p> <p>Year link: Year 5 conditional loops commands</p> <p>Connections: <u>Science</u> – variable in experiment e.g. seed-eating evolution experiment. Variable will be the type of seed eaten. <u>Games</u> – scoring as a variable</p>
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Programming

Repetition in games

End point 1: Create a game using repetition

- ❖ To develop the use of **count-controlled loops** in a different programming environment
- ❖ To explain that in programming there are **infinite loops** and **count-controlled loops**
- ❖ To develop a design that includes two or more loops which run at the same time.
- ❖ To modify an **infinite loop** in a given program.
- ❖ To design a project that includes **repetition**.
- ❖ To create a project that includes repetition.

Sensing

End point: create a step-counter based on the BBC microbit

- ❖ To create a program to run on a controllable device
- ❖ To explain that **selection** can control the flow of a program
- ❖ To update a **variable** with a user input
- ❖ To use a **conditional** statement to compare a **variable** to a value
- ❖ To design a project that uses **inputs** and **outputs** on a controllable device
- ❖ To **develop** a program to use **inputs** and **outputs** on a controllable device

		<p>Why: humans find repetition dull. Computers do the dull tasks accurately every time and allow us to invent. Automation e.g. traffic lights / medical scanners/manufacturing/music etc.</p> <p>Lesson Link:</p> <p>Year link: Year 3 sequencing</p> <p>Connections: <u>Maths</u> - multiplication and division are repeated addition and subtraction. <u>Art</u> - repeatedly stirring to mix paint. <u>Games</u> - count-controlled loop in games - game stops when a set score is obtained. Infinite loop in games - playing 'it'.</p>		<p>Why: Small microchip-powered devices are everywhere e.g. the small Raspberry Pi has been used to power a personalised, timed pill dispenser.</p> <p>Lesson Link: Previous lessons on variables and other year lessons.</p> <p>Year link: Year 5 lessons on selection and conditions.</p> <p>Connections:</p>
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Connecting computers	Networks	The internet	Sharing information	Communication
	<p>End point: improved understanding of digital devices and basic knowledge of computer networks, including devices that make up a network's infrastructure</p> <ul style="list-style-type: none"> ❖ To explain how digital devices function ❖ To identify input and output devices ❖ To recognise how digital devices can change the way we work ❖ To explain how a computer network can be used to share information ❖ To explore how digital devices can be connected ❖ To recognise the physical components of a network 	<p>End point: to understand what the internet is, how content is created and by whom and begin to evaluate content for reliability</p> <ul style="list-style-type: none"> ❖ To describe how networks physically connect to other networks ❖ To recognise how networked devices make up the internet ❖ To outline how websites can be shared via the World Wide Web ❖ To describe how content can be added and accessed on the World Wide Web ❖ To recognise how the content of the WWW is created by people ❖ To evaluate the consequences of unreliable content 	<p>End point: to understand how information is transferred between systems and devices</p> <ul style="list-style-type: none"> ❖ To explain that computers can be connected together to form systems ❖ To recognise the role of computer systems in our lives ❖ To recognise how information is transferred over the internet ❖ To explain how sharing information online lets people in different places work together ❖ To contribute to a shared project online ❖ To evaluate different ways of working together online 	<p>End point: learn how search engines work and which methods of communication suit particular purposes</p> <ul style="list-style-type: none"> ❖ To identify how to use a search engine ❖ To describe how search engines select results ❖ To explain how search results are ranked ❖ To recognise why the order of results is important, and to whom ❖ To recognise how we communicate using technology ❖ To evaluate different methods of online communication

	<p>Why: People should know how their data, including personal data, is stored. We all use a computer network, in school and when browsing the web/playing games at home. Increasingly, we only have a client computer that is just a connection to a group of servers doing all the work.</p> <p>Lesson Link: not yet taught</p> <p>Year link: not yet taught</p> <p>Connections: Every time they use a computer in school they are using the network.</p>	<p>Why: The internet is used everyday from gaming to data-crunching, from file-sharing to cybercrime.</p> <p>Lesson Link: Y3 network lessons</p> <p>Year link: Y3</p> <p>Connections: Any learning across the curriculum that uses internet searching</p>	<p>Why: Working collaboratively with other students, sharing work around the world e.g. medical research.</p> <p>Lesson Link: Y4 network lessons</p> <p>Year link: Y4 databases and network lessons</p> <p>Connections: J2e sharing documents online and collaborative documents.</p> <p>Google classroom jamboard and other content.</p> <p>Any collaborative work across the curriculum.</p>	<p>Why: Ranked search results affect what information we see - the top-listed search results, often paid-for, will be the most-clicked. Lower-ranked results may not be viewed - wealth gap?</p> <p>Lesson Link: Y5 network lessons</p> <p>Year link: Y5 sharing information</p> <p>Connections: <u>E-safety</u> - communicating safely online</p>
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Email

Email:

End point: use email to communicate safely and securely over time including sending documents.

- ❖ Learn how to use a basic email account;
- ❖ **Send and receive** emails (reminder of e-safety);
- ❖ Open and add **attachments** (see above);

Why: Email is a basic form of daily communication, from chats to important government information.

Lesson Link: E-safety on password security

Year link: Y2 - Purple Mash basic email sending and receiving

Connections: History - communication through the ages.

Internet searching

End point: children can say what happens when they use a search engine and can independently and sensibly search for information

- ❖ Identify how word order affects search results
- ❖ Explain how searches return results
- ❖ Explain how to stay safe when communicating
- ❖ Understand that not all websites have useful information

Why: Web searches are used by everybody. Sensible, safe and effective web searching is a part of everyday life and will be needed throughout school and work.

Lesson Link: Computer systems and networks - the Internet

Year link: Previous lessons on networks. Y2 - basic searching.

Connections: Any subject across the curriculum that uses internet searching. Compare with a traditional encyclopaedia.

<p>Information technology</p>	<p>Desktop publishing</p> <p>End point: create a World War 2 propaganda poster</p> <ul style="list-style-type: none"> ❖ To recognise how text and images convey information ❖ To recognise that text and layout can be edited ❖ To choose appropriate page settings ❖ To add content to a desktop publishing publication ❖ To consider how different layouts can suit different purposes ❖ To consider the benefits of desktop publishing 	<p>Data logging</p> <p>End point: understand why and how data can be collected and collect data over a time period to answer questions</p> <ul style="list-style-type: none"> ❖ To explain that data gathered over time can be used to answer questions ❖ To use a digital device to collect data automatically ❖ To explain that a data logger collects 'data points' from sensors over time ❖ To use data collected over a long duration to find information ❖ To identify the data needed to answer questions 	<p>Flat-file databases</p> <p>End point: use a real-life database to answers questions and present to others</p> <ul style="list-style-type: none"> ❖ To use a form to record information ❖ To compare paper and computer-based databases ❖ To outline how grouping and then sorting data allows us to answer questions ❖ To explain that tools can be used to select specific data ❖ To explain that computer programs can be used to compare data visually ❖ To apply my knowledge of a database to ask and answer real-world questions 	<p>Spreadsheets</p> <p>End point: plan a party event to a budget and create graphs to represent the data</p> <ul style="list-style-type: none"> ❖ To identify questions which can be answered using data ❖ To explain that objects can be described using data ❖ To explain that formulae can be used to produce calculated data ❖ To apply formulas to data, including duplicating ❖ To create a spreadsheet to plan an event ❖ To choose suitable ways to present data
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	<p>Why: Understand that published materials are designed that way for a reason, not randomly. Advertising uses the same skills, especially on the internet.</p>	<p>Why: Understand how data helps build a picture of the world. Medical equipment, weather stations and even people-counts are used to work out how to make machines or organisations more efficient, to predict outcomes or to persuade governments to change e.g. climate data.</p>	<p>Why: Understand how most data in the world is stored e.g. doctor's records of patients, police files on cases and criminals, populations of different animals etc.. Most digital information is stored in some kind of database e.g. medical records, search history for advertisers to target you with adverts, retailers' stock lists, population of people/animals etc. It is a very quick way to find a piece of information.</p>	<p>Why: Know how data is handled in a quick, efficient manner. A lot of organisation is done using spreadsheets e.g. class/lunch lists, surveys, functions etc. A lot of the data also ends up in databases.</p>
	<p>Lesson Link:</p>	<p>Lesson Link: Possible link to science data logging.</p>	<p>Lesson Link: Y4 data collection</p>	<p>Lesson Link: Y4 games using repetition (for repeated use of formulae to save time).</p>
	<p>Year link: Y2 - 2connect story writing presentation</p>	<p>Year link: Y3 branching databases - data is being stored so you can view it again.</p>	<p>Year link: Y2 - Purple Mash simple pictogram database Y4 - data logging - another type of digitised data.</p>	<p>Year link: Y2 - Purple Mash basic spreadsheet Y4 databases</p>
	<p>Connections: <u>Literacy</u> - editing our own writing and considering audience</p>	<p>Connections: <u>Science</u> - collecting data for experiments <u>Maths</u> - data interpretation in graphs</p>	<p>Connections: <u>Science</u> - classification is a type of data sorting. <u>History</u> - grouping monarchs throughout the ages by certain attributes.</p>	<p>Connections: <u>Maths</u> - using four operations and also mean average.</p>

<p>Information technology</p>		<p>Photo editing</p> <p>End point: understand how digital images can be changed and consider impact of editing choices</p> <ul style="list-style-type: none"> ❖ To explain that digital images can be changed ❖ To change the composition of an image ❖ To describe how images can be changed for different uses ❖ To make good choices when selecting different tools ❖ To recognise that not all images are real ❖ To evaluate how changes can improve an image 	<p>Video Editing</p> <p>End point: create a short video and edit it using a variety of tools</p> <ul style="list-style-type: none"> ❖ To recognise video as moving pictures, which can include audio ❖ To identify digital devices that can record video ❖ To capture video using a digital device ❖ To recognise the features of an effective video ❖ To identify that video can be improved through ❖ reshooting and editing ❖ To consider the impact of the choices made when making and sharing a video 	<p>3D modelling</p> <p>End point: create accurate 3D models of real-life objects</p> <ul style="list-style-type: none"> ❖ To use a computer to create and manipulate three-dimensional (3D) digital objects ❖ To compare working digitally with 2D and 3D graphics ❖ To construct a digital 3D model of a physical object ❖ To identify that physical objects can be broken down into a collection of 3D shapes ❖ To design a digital model by combining 3D objects ❖ To develop and improve a digital 3D model
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		<p>Why: Know that images they see are not always truthful. Adverts for everything from shampoo to horror movies have altered images. Even social media has them in abundance.</p> <p>Lesson Link:</p> <p>Year link:</p> <p>Connections: <u>Literacy</u> - editing for improvements or intentions e.g. word choice.</p>	<p>Why: Know why videos are altered. Just like still digital images, moving digital images are frequently manipulated to alter the message being given, either for good (making a movie look a certain way, making certain details clearer e.g. in medical footage) or for bad (erasing 'unwanted' people from a film, making someone look bad etc.).</p> <p>Lesson Link: E-safety - false photography</p> <p>Year link: Y4 digital image manipulation.</p> <p>Connections: <u>Literacy</u> - editing for improvements or intentions e.g. word choice.</p> <p><u>History</u> - consideration of word choice leading to historical bias.</p>	<p>Why: Know that most designs are now done in 3D modelling software. Cars, buildings, computer components, lego etc. are all designed on 3D modelling software. You can even now design and print 3D objects at home!</p> <p>Lesson Link:</p> <p>Year link:</p> <p>Connections: <u>Geography</u> - 3D drawings of natural disasters / volcanoes.</p> <p><u>DT</u> - basic sketch model of fairground ride</p>
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Information technology

Vector drawing

End point: create a complex drawing using layers, shapes and groupings

- ❖ To identify that drawing tools can be used to produce different outcomes
- ❖ To create a **vector** drawing by combining shapes
- ❖ To use **tools** to achieve a desired effect
- ❖ To recognise that vector drawings consist of layers
- ❖ To **group** objects to make them easier to work with
- ❖ To evaluate my vector drawing

Why: Most images that are not hand-made are drawn on a computer. They are in adverts, movies (as backdrops) and on countless websites.

Lesson Link:

Year link: Y2 - 2paint
impressionist
Y4 photo editing

Connections: Science -
grouping animals to sort
themselves
Desktop publishing -
considering audience and
impact.