

Computing Progression Map

2021 – 2022

Wallace Fields Junior School Intent

In line with the 2014 National Curriculum for KS2 Computing, our aim is to provide children with the necessary skills and knowledge to embark on all areas of society when faced with technology. The curriculum focuses on providing children with the skills required to use and apply computational thinking and creativity to understand and have an impact in our rapidly-changing, modern world.

By the time the children leave Wallace Fields Junior School, we hope the children will have gained key knowledge and skills across the three main areas of the computing curriculum: computer science (programming, coding and understanding how digital systems work in practice), information technology (using computer systems to store, retrieve and send information; focus on presenting, designing and creating using a range of multimedia) and digital literacy (evaluating digital content for its reliability, using technology safely and respectfully, understanding the positive influence we can have on our digital footprint). The three strands are covered across all year groups in KS2 and ensure a solid grounding for future learning beyond for all children.

Computational Thinking/ Computer Science

Computer Science will introduce children to the understanding of how computers and networks work. It will also give all children the opportunity to learn about computer programming.

National Curriculum Requirements:

Children should know how to design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.

They should solve problems by decomposing them into smaller parts. Children should be able to use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

They should use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

Children should understand computer networks, including the internet.

Information Technology

Information Technology is about the use of computers for functional purposes, such as collecting and presenting information, or using search technology.

Children should know how computers can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.

National Curriculum Requirements:

They should use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.

Children should 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.

Digital Literacy/ E-Safety

Digital Literacy is about the safe and responsible use of technology, including recognising its' advantages for collaboration and communication.

National Curriculum Requirements:

Children should be taught to use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

<p>KS1 Cultural Capital</p>	<p>To understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.</p> <p>To create and debug simple programs.</p> <p>To use logical reasoning to predict the behaviour of simple programs</p> <p>To use technology purposefully to create, organise, store, manipulate and retrieve digital content</p> <p>To recognise common uses of information technology beyond school</p> <p>To 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.</p>																												
<p>National Curriculum/ End point for KS2</p>	<p>To design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</p> <p>To use sequence, selection, and repetition in programs; work with variables and various forms of input and output</p> <p>To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</p> <p>To 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</p> <p>To use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</p> <p>To 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>To use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</p>																												
<p>Key Vocabulary</p>	<table border="0"> <tr> <td>Abstraction</td> <td>Logic</td> </tr> <tr> <td>Algorithm</td> <td>Network</td> </tr> <tr> <td>Binary</td> <td>Output</td> </tr> <tr> <td>Coding</td> <td>Procedure/function</td> </tr> <tr> <td>Communication technology</td> <td>Program</td> </tr> <tr> <td>Compile</td> <td>Programming language</td> </tr> <tr> <td>Computation logic/thinking</td> <td>Repetition</td> </tr> <tr> <td>Data</td> <td>Selection</td> </tr> <tr> <td>Debug</td> <td>Sequence</td> </tr> <tr> <td>Decomposition</td> <td>Software</td> </tr> <tr> <td>Hardware</td> <td>System</td> </tr> <tr> <td>Information technology</td> <td>Variable</td> </tr> <tr> <td>Input</td> <td>World Wide Web</td> </tr> <tr> <td>Internet</td> <td></td> </tr> </table>	Abstraction	Logic	Algorithm	Network	Binary	Output	Coding	Procedure/function	Communication technology	Program	Compile	Programming language	Computation logic/thinking	Repetition	Data	Selection	Debug	Sequence	Decomposition	Software	Hardware	System	Information technology	Variable	Input	World Wide Web	Internet	
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Application of Skill and Knowledge

	<p>Year 3</p> <ul style="list-style-type: none"> - Introduction to Computing - Multimedia and word processing - Graphics - Kodu - Network engineers - Algorithms and coding – Scratch/Kodu 	<p>Year 4</p> <ul style="list-style-type: none"> - Multimedia and word processing - Research following straight lines of enquiry - Microsoft excel (Autumn – weather topic) - Algorithms and coding (Scratch & Turtle Academy) - Animations 	<p>Year 5</p> <ul style="list-style-type: none"> - Prezi - We are Cryptographers – history of computing and coding - Code.org - Algorithms and coding - Photo editing/artistic editing - Audio editing - We are bloggers 	<p>Year 6</p> <ul style="list-style-type: none"> - Microsoft excel - Powerpoint - Movie Maker - Google Sites
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<p>Computer Science</p> <ul style="list-style-type: none"> - Explain what programming is - How an algorithm works - Control an object to move along a route - Commands to animate pictures - Conditional events in a program - Variable in a program - Program a complex game - Detect and correct errors in a program (debug) - Design and create a program - Identify computer components - Understand how a computer stores data - Uses of technology - Simulations - Impact of technology - How the internet works - Intranet – what is the difference - Binary numbers - History of computing 	<p>Key vocabulary</p> <p>Abstraction Algorithm Binary Coding Debug Decomposition Prodecure/ function Program Programming language Sequence Variable</p>	Skill	<ul style="list-style-type: none"> • To create a new land in Kodu • To program a character/sprite to follow a path • To create a simple game • To create a game where characters interact with each other • To begin animate a Sprite using Scratch • To know how simple algorithms work 	<ul style="list-style-type: none"> • To test an algorithm and debug if necessary • To use the repeat function to write an algorithm to draw a regular polygon • To create code to repeat sections of my program • To design and create their own algorithms and assess their own learning – adding each lesson • To develop the interface of the game. • To explain how simple alorithms work 	<ul style="list-style-type: none"> • To transmit information in semaphore • To use ciphers to create and crack codes • To use coding to complete a guided task • To create, find and edit the assets needed for a game • To create a prototype of a game • To be able to de-bug a program • To be able to test and evaluate a game. • To detect and correct errors in algorithms and programs 	<ul style="list-style-type: none"> • To find a problem to solve with an app • To solve a problem using excel • To explore websites using the x-ray tool • To find out what happens behind the interface of a website page. • To design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
			Knowledge	<ul style="list-style-type: none"> • To know what Kodu is • To know how to program a character to follow a path • To know how games are formulated • To know what a network is. • To understand how the internet works. • To understand computer networks including the internet. 	<ul style="list-style-type: none"> • To know what codes to write in for relevant directions. • To understand computer networks including the internet. 	<ul style="list-style-type: none"> • To know why and when semaphores were and are used – how this links to the input on a computer system • To know why and when Morse code was used and how this is similar to the binary system for a computer to input and output data/information • The use of codes and why they were/are used • To understand how the internet works.

<p>Information Technology</p> <ul style="list-style-type: none"> - Type quickly and correctly - Type and design a printable document - Text using 'fancy' effects - Word collage - Photo collage - Mind map - Paint a picture - Picture using drawing tools - Create music - Audio recording - Edit a digital photo - Animations - Multimedia video producing - Multimedia e-book - Interactive activity - On-screen presentation - Create a website - Handling data - Creating a spreadsheet 	<p>Key vocabulary</p> <p>Communication technology Computation logic/ thinking Hardware Information technology Input Internet Logic Network Output Sequence Software System World Wide Web</p>	Skill	<ul style="list-style-type: none"> • Touch typing to increase speed of input • Looking at internet pages for research and navigating your way through these. • To use a search engine. • To create music using technology (Music link). • Creating a poster in word – <i>Internet safety – how to report concerns to someone in school</i> • To use technology purposefully to create, organise, store, manipulate and retrieve digital content. 	<ul style="list-style-type: none"> • Touch typing to increase speed of input • To be able to cut and paste information, text, pictures or diagrams from one place to another • To record data using a spread sheet – collect and present data and information. • To create a graph in Excel to represent data. • To create music using technology (Music link). • Using PowerPoint. • Being able to research, use and find appropriate information and photographs online. 	<ul style="list-style-type: none"> • Touch typing to increase speed of input • Presenting information in a clear and cohesive manner which is appropriate to an audience (Prezi) • Evaluate and improve/reflect upon presentations in order to improve our own • To investigate photo editing effects (Maya topic link). • Use Google Classroom to write a blog post (Link to IOW trip) - select, use and combine a variety of software. • Post suitable blog comments • Add images to a blog post • Use audacity (software) to warp existing sound effects (Link to IOW trip). • Record my own sound effects to make my own radio advert • Warp and edit these effects appropriately and effectively 	<ul style="list-style-type: none"> • Using the functions of a spreadsheet to display information/data • Using formulas on spreadsheet to present data • Integrate words, images and sounds imaginatively for different audiences and purposes • Select from a variety of ICT applications to present text images and sounds effectively and communicate specific information and ideas for a specific audience • Understand the importance of evaluation and adaptation of individual features to enhance the overall presentation • Generate, amend and combine digital images from different sources for a specific audience or task • Create a presentation to pitch the app idea • Create an animation of all the different ways that children are protected and kept safe online – using knowledge and understanding from all year groups.
			Knowledge	<ul style="list-style-type: none"> • Know what wikis are and understand what they can be used for • Know how to complete a safe internet search • How music is created using technology (Music) 	<ul style="list-style-type: none"> • Know what wikis are and understand what they can be used for • features of good page design and multimedia presentations • When we would need to 'cut' something • When we would need to 'paste' something • What it means to format a picture • How to use spreadsheet and why it may be chosen as a program for recording data • How music is created using technology (Music) 	<ul style="list-style-type: none"> • Know when touch typing is important and to understand why we learn it – built upon practice throughout the school (1 lesson) • what makes a good blog (Link to IOW trip) • Listen to a range of adverts and identify features (Link to IOW trip) • Know how to use audacity to edit sounds • Know how to warp sounds and sound effects on audacity

<p>Digital Literacy/ E-Safety</p> <ul style="list-style-type: none"> - using QR codes - reading URLs - how to search effectively - exploring a virtual map - communicating online - staying safe online 		Skill	<ul style="list-style-type: none"> • DIGITAL LITERACY DAY. • Being able to navigate through Google Classroom. 	<ul style="list-style-type: none"> • DIGITAL LITERACY DAY. • To be competent on Google Classroom. 	<ul style="list-style-type: none"> • DIGITAL LITERACY DAY. • Create/generate a strong password • Being able to use Google Earth (link to Prezi/Maya) • Create a blog. • To be competent on Google Classroom. 	<ul style="list-style-type: none"> • DIGITAL LITERACY DAY. • Research points of view about a historical event • Use the internet to compare points of view and discuss bias • Working safely on line • Creating an acceptable use policy to promote children's use online recognise acceptable/unacceptable behaviour.
		Knowledge	<ul style="list-style-type: none"> • The importance of password <p><i>To use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</i></p>	<ul style="list-style-type: none"> • How to stay safe on the internet • How to communicate safely on the internet. • To know what is right and wrong on the internet. • How search results are effectively ranked appreciate how results are selected and ranked. <p><i>To use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact.</i></p>	<ul style="list-style-type: none"> • Why do we have strong passwords (out in the 'real world') • How to take a screen shot and input into a ppt • Edit photos, create art work and pixilate images (Maya topic link) <p><i>To use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact.</i></p>	<ul style="list-style-type: none"> • Know how to search effectively using key words • Know what a URL is • Understand how a search is driven by algorithms • School use on internet policy • Appropriateness of sharing personal information • Action if inappropriate material is found • Not sharing passwords <p><i>To use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact.</i></p>

Key Vocabulary

Algorithm	An unambiguous set of rules or a precise step-by-step guide to solve a problem or achieve a particular objective.
Block	A graphical representation of computer code in languages such as Scratch; also used to describe a part of a computer program.
Block language	A programming language in which blocks are used to program the computer.
Cache	To make a copy of information for faster retrieval or processing.
Command	An instruction, written in a particular programming language, for the computer to execute.
Content management system	A database-driven system for managing web-based content, in which pages are generated automatically from stored content. Examples include WordPress and Moodle.
Data	A structured set of numbers, possibly representing digitised text, images, sound or video, which can be processed or transmitted by a computer; also used for numerical (quantitative) information.
Debug	To fix the errors in a program.
Digital devices	Electronic hardware that processes information represented as numbers, using a microprocessor to control its operation, including laptop computers, tablets and smartphones.
Domain Name System (DNS)	The distributed automatic system that converts domain names into the IP addresses that are used for routing packets via the internet.
Encryption	Securely encoding information so that it can only be read by those knowing both the system used and a secret, private key.
E-safety	Used to describe behaviours and policies intended to minimise the risks to a user of using digital technology, particularly the internet.
Hardware	The physical systems and components of digital devices; see also software .
Hypertext mark-up language (HTML)	HTML is the language in which web pages are composed.

Hypertext transfer protocol (HTTP)	HTTP is the standard protocol for the request and transmission of HTML web pages between browser and web server.
Hypertext transfer protocol – secure (HTTPS)	An encrypted version of HTTP in which page content cannot be read by the internet routers and gateways through which it passes.
Input	Data provided to a computer system, e.g. via a keyboard, mouse, microphone, camera or physical sensors.
Interface	The boundary between one system and another – often used to describe how a person interacts with a computer.
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.
Iteration	A form of repetition in which a variable keeps track of how many times the loop has been executed.
Loop	A block of code repeated automatically under the program's control.
Network	The computers and the connecting hardware (Wi-Fi access points, cables, fibres, switches and routers) that make it possible to transfer data using an agreed method ('protocol').
Operating system	The programs on a computer that deal with internal management of memory, input/output, security and so on, such as Windows 10 or iOS.
Output	The information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly through the control of motors in physical systems.
Packets of data	A small set of numbers that get transmitted together via the internet, typically enough for 1000 or 1500 characters.
Platform	Used to describe computer systems in which particular content, programs or systems can be developed.
Program	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.
Pulse code modulation (PCM)	The standard format for audio files, in which the amplitude of the sound is represented at one of, say, 65,536 levels, sampled, say, 44,100 times a second.

Repetition	Executing a section of computer code a number of times as part of the program.
Reverse engineer	The process of extracting knowledge or design information from an artefact, such as a computer program, often by experimenting with it to see how different inputs produce different outputs.
Safe search mode	A search engine functionality in which inappropriate results are hidden.
Script	A computer program typically executed one line at a time through an interpreter, such as the instructions for a Scratch character.
Selection	A programming construct in which one section of code or another is executed depending on whether a particular condition is met.
Sequence	To place program instructions in order, with each executed one after the other.

Server	A computer connected to the internet or to a local area network providing services – such as file storage, printing, authentication, web pages or email – automatically to other computers on the internet or local network.
Simulation	Using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical or social systems; an integral part of most computer games.
Software	The programs that control or are run on a computer, written in one or other programming language, including the operating system, interpreters, compilers and application programs (apps).
Sprite	A computer graphics object that can be controlled (programmed) independently of other objects or the background.
Unicode	A system for representing typographic symbols and text in many different writing systems digitally.
Uniform Resource Locator (URL)	A standard for specifying the location on the internet of certain data files, such as http://info.cern.ch/hypertext/WWW/TheProject.html . In this case (and typically), the URL includes the protocol used to transmit the data, the computer on which it is stored, the file path and the file name of the data.
Variables	A way in which computer programs can store, retrieve or change data, such as a score, the time left or the user's name.
Web (World Wide Web or WWW)	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.