

National Curriculum Objectives

By the end of KS1 pupils should be taught to:

- understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school
- 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

National Curriculum Objectives

By the end of KS2 pupil 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
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to 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
 - 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
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

NC Strand - Programming

NC Statement	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
KS1 Understand what algorithms are							
				KS2 Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems			

	Understand that instructions lead to specific outcome Order steps of a known task	Begin to understand an algorithm is a set of instructions to achieve a specific purpose	Describe a series of instructions as a sequence. Explain that a sequence of commands has an outcome	Create a sequence of commands using a block language to produce a given outcome Debug errors to accomplish specific goal	Plan a program using a block language which includes appropriate loops to produce a given outcome Debug errors in increasingly complex programs to accomplish specific goals	Plan a program which includes selection to produce a given outcome Debug errors in increasingly complex programs to accomplish specific goals	Plan a program which includes variables to produce a given outcome Debug errors in increasingly complex programs to accomplish specific goals
Understand how algorithms are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions				KS2 Solve problems by decomposing them into smaller parts			
	Press buttons on a floor robot and talk about the movements	Choose a command for a given purpose Show a series of commands can be joined together	Explain that a sequence of commands has a start Explain what happens when we change the order of commands	Work with others to decompose a problem into smaller steps in planning a project	Independently decompose a problem into smaller steps in planning a project	Plan a solution to a problem using decomposition	Solve problems using decomposition tackling each part separately
Create and debug simple programs				KS2 Use sequence, selection, and repetition in programs; work with variables and various forms of input and output			

	Input a short sequence of instructions to control a device	Give a sequence of instructions to a floor robot. The length of programs increasing over the course of the year.	Create a simple program on screen, correcting any errors, with a particular goal or purpose in mind (e.g. drawing a shape or moving a sprite from one place to another).	Explain the order (sequence) of commands can effect the outcome (same commands, different order - > same or different outcome) Identify different sequences can achieve the same outcome	Identify patterns (repetition) in a sequence Understand repetition in programming is also called looping Identify a loop in a program Understand, identify and justify when to use 'infinite' or 'count - controlled' loops Explain the importance in instruction order in a loop	Define that conditional statements (selection) are used in computer programs Explain a loop can stop when a condition is met (number of times event) Explain that a program flow can branch according to a condition Use a condition in an <i>if... then...</i> statement to produce a given outcome	Define 'variable' as something that is changeable Explain that a variable has a name and a value Identify a variable in an existing program Use a variable in a conditional statement to control the flow of a program
	Try alternative approaches to achieve a goal	Begin to debug instructions when floor robot does not reach the intended destination	Use the word debug to correct mistakes in an algorithm				
Use logical reasoning to predict the behaviour of simple programs				KS2 Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs			

		Begin to predict what will happen for a short sequence of instructions in a program	Predict the outcome of a sequence	Explain simple, sequence - based algorithm independently Use logical reasoning to detect errors in programs	Explain an algorithm using sequence and repetition independently Use logical reasoning to detect and correct errors in programs	Explain an algorithm using sequence, repetition and selection independently Use logical reasoning to detect errors in increasingly complex programs	Clearly and concisely explain algorithms using sequence, repetition, selection and variables independently Use logical reasoning to detect errors in increasingly complex programs
		Understand that we control computers by giving them instructions	Compare prediction to the program outcome				
	Know directional words forward, backward, left, right.	Combine forwards and backwards commands to make a sequence Combine four direction commands to make sequences	Combine four directions commands to make increasingly more complex sequences				
	Understand that we control computers	Understand that we control computers by giving them instructions	Understand that computers have no intelligence and we have to program them to do things				
NC Strand Information Technology							
Digital research				Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content			

				<p>Search for information in a single site</p> <p>Understand search engines select pages according to keywords found in digital content</p>	<p>Use a standard search engine to find information</p> <p>Understand that search engines rank pages according to relevance</p>	<p>Use filters to make more effective use of a standard search engine</p> <p>Understand that search engines use a cached copy of the crawled web to select and rank results</p>	<p>Use a range of search engines appropriate to finding information which is required</p> <p>Understand that search engines rank pages based on the number and quality of inbound links</p>
	Use technology purposefully to create, organise, store, manipulate and retrieve digital content			Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content			
Creating digital content		<p>Identify and find keys on a keyboard</p> <p>Add and remove text using basic typing skills (including use of space bar, backspace to delete and basic, age - appropriate punctuation) •</p> <p>Save work to the appropriate location (hard drive and Google Drive) •</p> <p>Begin to print, retrieve and edit work, with support</p>	<p>Identify and find keys on a keyboard with increased confidence and speed</p> <p>Type capital letters</p> <p>Change font, style (bold, italic and underline) and size of text</p> <p>Save, print, retrieve and edit work from appropriate location (hard drive and Google Drive) independently</p> <p>Upload images or movies to appropriate place (hard drive and</p>	<p>Search for information in a single site</p> <p>Understand that search engines select pages according to keywords found in the content</p>	<p>Use a standard search engine to find information</p> <p>Understand that search engines rank pages according to relevance.</p>	<p>Use filters to make more effective use of a standard search engine</p> <p>Understand that search engines use a cached copy of the crawled web to select and rank results</p>	<p>Use of a range of search engines appropriate to finding information that is required</p> <p>Understand that search engines rank pages based on the number and quality of inbound links</p>

			Google Drive), with support				
Text				<p>Combine text and images to share a message</p> <p>Consider how different layouts can suit different purposes</p> <p>Type with increased confidence and speed using age appropriate punctuation</p> <p>Use return to create paragraphs</p> <p>Change orientation of text</p> <p>Wrap text around an image</p> <p>Recognise a document can be formatted with placeholders</p>	<p>Use cross-curricular opportunities to consolidate previous learning from Year 1 – Year 3 such as changing font style, size and underlining, saving work to a folder or specified place and formatting text.</p>	<p>Use cross-curricular opportunities to consolidate previous learning from Year 1 – Year 3 such as changing font style, size and underlining, saving work to a folder or specified place and formatting text to wrap around an image and be sent in front of or behind images.</p>	<p>Recognise components of a webpage layout</p> <p>Create a webpage including text, images, hyperlinks and embedded content</p> <p>Understand the need for a navigation path</p>

Images			<p>Create/edit a drawing using a range of 'tools' such as brushes, pens, eraser, stamps and shapes, and set the size, colour and shape; Explain why tools were chosen and used</p>	<p>Add and resize images (including insert clip art/copy & paste an image)</p> <p>Capture/edit photograph using a range of 'tools'</p>	<p>Change orientation of images</p>	<p>Use a computer to (further) manipulate images</p> <p>Recognise images can be changed for different purposes</p> <p>Use the most appropriate tool for a particular purpose</p> <p>Consider the impact of changes made on the quality of the image</p>	<p>Recognise an image is comprised of separate objects</p> <p>Add, remove, modify and combine objects to create graphical drawing on a computer</p> <p>Recognise objects are layered</p> <p>Recognise that objects can be modified in groups</p> <p>Consider the impact of choices made</p>	<p>Create 3D graphical objects on a computer</p> <p>Alter the view of a 3D space</p> <p>Modify 3D objects</p> <p>Combine 3D objects to create desired effect</p> <p>Apply blank 3D objects as placeholders to create holes</p>
Multimedia				<p>Use software to create and edit digital music for a purpose</p> <p>Explain and begin to justify why tools were chosen and used</p>	<p>Understand animation is a sequence of drawings or photographs</p> <p>Relate animated movement with a sequence of images</p> <p>Plan an animation</p>	<p>Press/tap buttons to start and stop recordings</p> <p>Recognise recorded audio is stored as a file</p> <p>Edit and alter recorded audio</p> <p>Layer sounds</p>	<p>Identify the features of a good video</p> <p>Plan a video production using a story board</p> <p>Use a computer to make a video</p> <p>Recognise a video can be</p>	<p>Use cross-curricular opportunities to consolidate previous learning from Year 1 – Year 5</p>

					Review and improve an animation	Save/export an audio file	improved through editing	
					Evaluate the impact of adding other media to an animation	Consider the results of editing choices made	Consider the impact of changes made on the quality of the video	
Collecting, analysing, evaluating and presenting data and information			<p>Label objects</p> <p>Identify that objects can be counted</p> <p>Count objects with same properties</p> <p>Compare groups of objects</p> <p>Describe objects in different ways</p>	<p>Recognise that objects can be counted and compared using tally charts</p> <p>Select objects by attribute and make comparisons</p> <p>Recognise objects can be represented as pictures</p> <p>Create a pictogram</p> <p>Explain that information can be presented using a compute</p>	<p>Identify object attributes needed to collect relevant data</p> <p>Create a branching database</p> <p>Identify objects using a branching database</p> <p>Compare information shown in a pictogram with a branching database</p> <p>Explain that data can be used to answer questions</p>	<p>Collect data using a digital device</p> <p>Recognise that a sensor can be used as an input device for data collection</p> <p>Use a larger data set to find information</p> <p>Use a computer program to sort data by one attribute</p> <p>Export information and present data in a table and a graph</p>	<p>Use a form to collect information</p> <p>Navigate a flat -file database</p> <p>Apply knowledge of a database to ask and answer real -world questions</p> <p>Design a structure for a flat -file database</p> <p>Choose tools to select and analyse data to answer questions</p> <p>Select an appropriate graph to visually compare data</p> <p>Choose suitable ways to present information</p>	<p>Identify questions that can be answered using data</p> <p>Create a spreadsheet for a purpose</p> <p>Apply a formula that can be used to produce calculated data</p> <p>Recognise data can be calculated using different operations</p> <p>Evaluate results in comparison to the question asked</p> <p>Choose suitable ways to presents data</p>

NC Strand Digital Literacy

Online Safety		Use technology safely and respectfully Keep personal information private Identify where to go for help and support when they have concerns about the content or contact on the internet or other online technologies			Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact			
Computing systems and networks		Recognise common uses of information technology beyond school			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			
		Help adults operate equipment around the school, independently operating simple equipment	Identify technology Identify a computer and its main parts Use a mouse in different ways	Identify information technology in the home Identify information technology beyond school Explain how information technology benefits us Recognise the uses and features of information technology Continue to practise mouse skills independently	Explain how a computer network can be used to share information Explore how digital devices can be connected Recognise the physical components of a network Explain how digital devices function Identify input and output devices	Describe how networks physically connect to other networks Recognise how networked devices make up the internet Describe how content can be added and accessed on the World Wide Web Recognise how the content of the WWW is created and shared by people Describe the current limitations of World Wide Web media	Explain that computers can be connected together to form systems Recognise the role of computer systems in our lives Recognise how information is transferred over the internet Explain how sharing information online lets people in different places work together Contribute to a shared project online	Continue to develop online searching skills to enhance online communication and collaboration

							Evaluate different ways of working together online	
--	--	--	--	--	--	--	---	--