



Progression of Computing Skills Document

National Curriculum Objectives

By the end of Key Stage 1, 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		EYFS	Year 1	Year 2
Computer Science	Understand what algorithms are	<ul style="list-style-type: none"> • Understand that instructions lead to a specific outcome. • Order steps of a known task. 	<ul style="list-style-type: none"> • Begin to understand that an algorithm is a set of instructions to achieve a specific purpose. 	<ul style="list-style-type: none"> • Describe a series of instructions as a sequence. • Explain that a sequence of commands has an outcome.
		<ul style="list-style-type: none"> • Know directional words forward, backward, left, right 	<ul style="list-style-type: none"> • Combine forwards and backwards commands and make a sequence. • Combine four direction commands to make sequences. 	<ul style="list-style-type: none"> • Combine four direction commands to make increasingly more complex sequences.
		<ul style="list-style-type: none"> • Understand that we control computers. 	<ul style="list-style-type: none"> • Understand that we control computers by giving them instructions. 	<ul style="list-style-type: none"> • Understand that computers have no intelligence and we have to program them to do things.

	Understand how algorithms are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions	<ul style="list-style-type: none"> Press buttons on a floor robot and talk about the movements. 	<ul style="list-style-type: none"> Choose a command for a given purpose. Show a series of commands can be joined together. 	<ul style="list-style-type: none"> Explain that a sequence of commands has a start.
				<ul style="list-style-type: none"> Explain what happens when we change the order of commands.
			<ul style="list-style-type: none"> Understand that the order of instructions in an algorithm is important. 	<ul style="list-style-type: none"> Understand that instructions in an algorithm need to be in order, clear and unambiguous.
	Create and debug simple programs.	<ul style="list-style-type: none"> Input a short sequence of instructions to control a device. 	<ul style="list-style-type: none"> Give a sequence of instructions to a floor robot. The length of programs increasing over the year. 	<ul style="list-style-type: none"> 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).
		<ul style="list-style-type: none"> Try alternative approaches to achieve a goal. 	<ul style="list-style-type: none"> Begin to debug instructions when a floor robot does not reach the intended destination. 	<ul style="list-style-type: none"> Use the word debug to correct mistakes in an algorithm.
	Use logical reasoning to predict the behaviour of simple programs.		<ul style="list-style-type: none"> Begin to predict what will happen for a short sequence of instructions in a program. 	<ul style="list-style-type: none"> Predict the outcome of a sequence.
			<ul style="list-style-type: none"> Understand that we control computers by giving them instructions. 	<ul style="list-style-type: none"> Compare prediction to the program outcome.

National Curriculum Objectives

By the end of Key Stage 2, 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
- 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

National Curriculum		Year 3	Year 4	Year 5	Year 6
Computer Science	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.	<ul style="list-style-type: none"> • Create a sequence of commands using a block language to produce a given outcome. • Debug errors to accomplish a specific goal. 	<ul style="list-style-type: none"> • Plan a program using a block language which includes appropriate loops to produce a given outcome. • Debug errors in increasingly complex programs to accomplish a specific goal. 	<ul style="list-style-type: none"> • Plan a program which includes selection to produce a given outcome. • Debug errors in increasingly complex programs to accomplish a specific goal. 	<ul style="list-style-type: none"> • Plan a program which includes variables to produce a given outcome. • Debug errors in increasingly complex programs to accomplish a specific goal.

	Solve problems by decomposing them into smaller parts.	<ul style="list-style-type: none"> • Work with others to decompose a problem into smaller steps in planning a project. 	<ul style="list-style-type: none"> • Independently decompose a problem into smaller steps in planning a project. 	<ul style="list-style-type: none"> • Plan a solution to a problem using decomposition. 	<ul style="list-style-type: none"> • Solve problems using decomposition tackling each part separately.
	Use sequence, selection and repetition in programs; work with variables and various forms of input and output.	<ul style="list-style-type: none"> • Explain how the order (sequence) of commands can affect the outcome (same commands, different order -> same or different outcome) • Identify that different sequences can achieve the same outcome. 	<ul style="list-style-type: none"> • Identify patterns (repetition) in a sequence. • Know that 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. 	<ul style="list-style-type: none"> • Define that conditional statements (selection) are used in computer programs. • Explain that a loop can stop when a condition is met (number of times or events) • 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. 	<ul style="list-style-type: none"> • Define a '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.

	<p>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</p>	<ul style="list-style-type: none"> • Explain simple sequence-based algorithm independently. • Use logical reasoning to detect errors in programs. 	<ul style="list-style-type: none"> • Explain an algorithm using sequence and repetition independently. • Use logical reasoning to detect and correct errors in programs. 	<ul style="list-style-type: none"> • Explain an algorithm using sequence, repetition and selection independently. • Use logical reasoning to detect errors in increasingly complex programs. 	<ul style="list-style-type: none"> • Clearly and concisely explain algorithms using sequence, repetition, selection and variables independently. • Use logical reasoning to detect and correct errors in increasingly complex programs.
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National Curriculum			EYFS	Year 1	Year 2
Information Technology	Creating Digital Content	Text		<ul style="list-style-type: none"> Identify and find keys on a keyboard. Add and remove text using basic typing skills (including use of space bar, backspace to delete and basic, age-appropriate punctuation). Save work to the appropriate location. Begin to print, retrieve and edit work, with support. 	<ul style="list-style-type: none"> Identify and find keys on a keyboard with increased confidence and speed. Type capital letters Change font, style (bold, italic and underline) and size of text. Save, print, retrieve and edit work from appropriate location independently. Upload images of movies to appropriate place.
		Image		<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Add and resize images (including insert clip art/copy & paste an image) Capture/edit photograph using a range of tools.

Use technology purposefully to create, organise, store, manipulate and retrieve digital content.

- Identify and find keys on a keyboard.
- Add and remove text using basic typing skills (including use of space bar, backspace to delete and basic, age-appropriate punctuation).
- Save work to the appropriate location.
- Begin to print, retrieve and edit work, with support.

- Identify and find keys on a keyboard with increased confidence and speed.
- Type capital letters
- Change font, style (bold, italic and underline) and size of text.
- Save, print, retrieve and edit work from appropriate location independently.
- Upload images of movies to appropriate place.

- 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.

- Add and resize images (including insert clip art/copy & paste an image)
- Capture/edit photograph using a range of tools.

		Multimedia			<ul style="list-style-type: none"> • Use software to create and edit digital music for a purpose. • Explain and begin to justify why tools were chosen and used.
		Data Handling			<ul style="list-style-type: none"> • Label objects
				<ul style="list-style-type: none"> • Identify that objects can be counted. • Count objects with the same properties. • Compare groups of objects. 	<ul style="list-style-type: none"> • Recognise that objects can be counted and compared using tally charts.
				<ul style="list-style-type: none"> • Describe objects in different ways 	<ul style="list-style-type: none"> • Select objects by attribute and make comparisons.
					<ul style="list-style-type: none"> • Recognise objects can be represented as pictures.
					<ul style="list-style-type: none"> • Create a pictogram. • Explain that information can be presented using a computer.

National Curriculum			Year 3	Year 4	Year 5	Year 6	
Information Technology	Creating Digital Content	Text	<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.</p>	<ul style="list-style-type: none"> Combine text and images to share a message. Consider how different layouts can suit different purposes. Type with increased confidence and speed using age-appropriate punctuation. Use return to create paragraphs. Change orientation of text. Wrap text around an image. Recognise a document can be formatted with placeholders. 	<ul style="list-style-type: none"> Use cross-curricular opportunities to consolidate previous learning from Years 1-3. 	<ul style="list-style-type: none"> Use cross-curricular opportunities to consolidate previous learning from Years 1-4. 	<ul style="list-style-type: none"> Recognise components of a webpage layout. Create a webpage including text, images, hyperlinks and embedded content. Understand the need for a navigation path.

		Image		<ul style="list-style-type: none"> • Change orientation of images. 	<ul style="list-style-type: none"> • Use a computer to (further) manipulate images. • Recognise images can be changed for different purposes. • Use the most appropriate tool for a particular purpose. • Consider the impact of changes made on the quality of the image. 	<ul style="list-style-type: none"> • Recognise an image is comprised of separate objects. • Add, remove, modify and combine objects to create a graphical (vector) drawing on a computer. • Recognise objects are layered. • Recognise that objects can be modified in groups. • Consider the impact of choices made. 	<ul style="list-style-type: none"> • Create 3D graphical objects on a computer. • Alter the view of a 3D space. • Modify 3D objects. • Combine 3D objects to create desired effect. • Apply blank 3D objects as placeholders to create holes.
		Multimedia		<ul style="list-style-type: none"> • Understand animation is a sequence of drawings or photographs. • Relate animated movement with a sequence of images. • Plan an animation. • Review and improve an animation. • Evaluate the impact of adding other 	<ul style="list-style-type: none"> • Press/tap buttons to start and stop recordings. • Recognise recorded audio is stored as a file. • Edit and alter recorded audio. • Layer sounds. • Save/export an audio file. • Consider the results of editing choices made. 	<ul style="list-style-type: none"> • Identify the features of a good video. • Plan a video production using a story board. • Use a computer to make a video. • Recognise a video can be improved through editing. • Consider the impact of changes made on the quality of the video. 	<p>Use cross-curricular opportunities to consolidate previous learning from Years 1-5.</p>

				media to an animation.			
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	Data Handling	<p>Collecting, analysing, evaluating and presenting data and information.</p>	<ul style="list-style-type: none"> • Identify object attributes needed to collect relevant data. • Create a branching database. • Identify objects using a branching database. • Compare information shown in a pictogram with a branching database. • Explain that data can be used to answer questions. 	<ul style="list-style-type: none"> • Collect data using a digital device. • Recognise that a sensor can be used as an input device for data collection. • Use a larger data set to find information. • Use a computer program to sort data by one attribute. • Export information and present data in a table and a graph. 	<ul style="list-style-type: none"> • Use a form to collect information. • Navigate a flat-file database. • Apply knowledge of a database to ask and answer real-world questions. • Design a structure for a flat-file database. • Choose tools to select and analyse data to answer questions. • Select an appropriate graph to visually compare data. • Choose suitable ways to present information. 	<ul style="list-style-type: none"> • Identify questions that can be answered using data. • Create a spreadsheet for a purpose. • Apply a formula that can be used to produce calculated data. • Recognise data can be calculated using different operations. • Evaluate results comparison to the question asked. • Choose suitable ways to present data.
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	<p style="text-align: center;">Digital Research</p>	<p>Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</p>	<ul style="list-style-type: none">• Search for information in a single site.• Understand that search engines select pages according to keywords found in content.	<ul style="list-style-type: none">• Use a standard search engine to find information.• Understand that search engines rank pages according to relevance.	<ul style="list-style-type: none">• Use filters to make more effective use of a standard search engine.• Understand that search engines use a cached copy of the crawled web to select and rank results.	<ul style="list-style-type: none">• Use a range of search engines appropriate to finding information that is required.• Understand that search engines rank pages based on the number and quality of in-bound links.
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National Curriculum		EYFS	Year 1	Year 2
Digital Literacy Computing Systems and Networks	Recognise common uses of information technology beyond school.	<ul style="list-style-type: none"> Help adults operate equipment around the school, independently operating simple equipment. 	<ul style="list-style-type: none"> Identify technology. 	<ul style="list-style-type: none"> Identify information technology in the home. Identify information technology beyond school. Explain how information technology benefits us.
			<ul style="list-style-type: none"> Identify a computer and its main parts. 	<ul style="list-style-type: none"> Recognise the uses and features of information technology.
			<ul style="list-style-type: none"> Use a mouse in different ways. 	<ul style="list-style-type: none"> Continue to practise mouse skills independently.

National Curriculum	Year 3	Year 4	Year 5	Year 6
<p style="text-align: center;">Digital Literacy Computing Systems and Networks</p> <p>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>	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. • Evaluate different ways of working together online. 	<ul style="list-style-type: none"> • Continue to develop online searching skills to enhance online communication and collaboration.