

Computing Key Stage 2 Knowledge and Skills Progression

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.

National Curriculum		Year 3	Year 4	Year 5	Year 6
Programming	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems	• 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 goal	• Plan a program which includes selection to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal	• Plan a program which includes variables to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal

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Programming	Solve problems by decomposing them into smaller parts	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
	Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	- Explain the order (sequence) of commands can affect 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	- Know that conditional statements (selection) are used in computer programs - Explain a loop can stop when a condition is met (number of times overevent) - Explain a that 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
	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	- Explain a 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

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Information Technology	Digital Research	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content	- Search for information in a single site - Understand that search engines select pages according to keywords found in the content	- Use a standard search engine to find information - Understand that search engines rank pages according to relevance.	- 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	- Use of 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
	Creating Digital Content	Text 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	- 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	Use cross-curricular opportunities to consolidate previous learning from Year 1 – Year 3	Use cross-curricular opportunities to consolidate previous learning from Year 1 – Year 3	- Recognise components of a webpage layout - Create a webpage including text, images, hyperlinks and embedded content - Understand the need for a navigation path

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Information Technology	Creating Digital Content	Image		Change orientation of images	- 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	- Recognise an image is comprised of separate objects - Add, remove, modify and combine objects to create graphical drawing on a computer - Recognise objects are layered - Recognise that objects can be modified in groups - Consider the impact of choices made	- 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		- 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 media to an animation	- 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	- 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	Use cross-curricular opportunities to consolidate previous learning from Year 1 – Year 5

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Information Technology	Data Handling	Collecting, analysing, evaluating and presenting data and information	• 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	• Collect data using a digital device • Recognise that a sensor can be used as an input device for data collection • Use a larger dataset to find information • Use a computer program to sort data by one attribute • Export information and present data in a table and a graph	• 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	• 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 in comparison to the question asked • Choose suitable ways to present data
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Digital Literacy	Online Safety	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	See related document: Online Safety Skills Progression (Education for a Connected World)			
	Computing Systems and Networks	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	• 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 WideWeb • 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 • Evaluate different ways of working together online	Continue to develop online searching skills to enhance online communication and collaboration