

# Computing Knowledge & Skills Progression

## Statutory Framework for the Early Years Foundation Stage

Understanding the world involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. Children will foster their understanding of our culturally, socially, technologically and ecologically diverse world through stories, play and discussion. Children will therefore have an awareness of technology and its basic role.



## The National Curriculum for Computing

### Purpose of study

A high- quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge into programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and range of content. Computing also ensures that pupils become digitally literate –able to use, and express themselves and develop their ideas through, information and communication technology – at a suitable for the future workplace and as active participants in a digital world.

### Aims

The national curriculum for computing aims to ensure that all pupils:

- Can understand and apply the fundamental principles and concepts of computer science, including abstractions, logic, algorithms and data representation.
- Can analyse problems in computational terms, and have repeated practical experience of writing computer programmes in order to solve such problems.
- Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.
- Are responsible, competent, confident and creative users of information and communication technology.

## Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

### Subject content at 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 instruction
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple program
- 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.

	<b>Content</b>
<b>EYFS</b>	Technology in role play areas, use of interactive whiteboard, remote control toys and other technology around us
<b>Year 1</b>	Technology around us, digital painting, digital writing, grouping data, moving a robot, introduction to animation.
<b>Year 2</b>	IT around us, digital photography, making music, pictograms, robot algorithms, introduction to quizzes.

## Subject content at 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 out
- 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

	<b>Content</b>
<b>Year 3</b>	Connecting computers, animation, desktop publishing, branching databases, sequence in music, events and action.
<b>Year 4</b>	The internet, audio editing, photo editing, data logging, repetition in shapes, repetition in games.
<b>Year 5</b>	Sharing information, vector drawing, video editing, flat-file databases, selection in physical computing, selection in quizzes.
<b>Year 6</b>	Communication, 3D modelling, web page creation, spreadsheets, variables in games, sensing.

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## EYFS to Milestone 1



Prior Learning	Skill	Milestone 1: Year 1 and Year 2	Key Vocabulary
<ul style="list-style-type: none"> <li>Seeks to acquire basic skills in turning on and operating some ICT equipment.</li> <li>Knows how to operate simple equipment, e.g. turns on CD player and uses remote control. Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones. Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images.</li> <li>Uses ICT hardware to interact with age-appropriate computer software.</li> <li>Is aware of some technological devices and can identify where they may be found in the outside world</li> </ul>	<b>To code</b>	<ul style="list-style-type: none"> <li>Motion: Control motion by specifying the number of steps to travel, direction and turn.</li> <li>Looks: Add text strings, show and hide objects and change the features of an object.</li> <li>Sound: Select sounds and control when they are heard, their duration and volume.</li> <li>Draw: control when drawings appear and set the pen colour, size and shape.</li> <li>Events: specify user inputs (such as clicks) to control events.</li> <li>Control: specify the nature of events (such as a single event or loop)</li> <li>Sensing: create conditions for actions by waiting for a user input.</li> </ul>	Choices, Internet, Website, Rules, Online, Private information, Email, Appropriate/inappropriate sites, Cyber-bullying, Digital footprint, Keyword searching, Equipment, Buttons, Movement, Instructions, Buttons, Robots, Patterns, Program, Forward, Backward, Right-angle turn, Algorithm, Sequence, Debug Screen, Mouse, Images, Keyboard, Paint, Videos, Camera stills, Sounds, Image bank, Word bank, Space bar, Paint effects, Templates, Animation, Documents, Index finger typing, Enter/return, Caps lock, Backspace, Communicate, Photographs, Video, Sound, Data Pictogram, Digitally, Capturing moments, Magnified images, Questions, Data collection, Graphs, Charts, Save, Retrieve
	<b>To connect</b>	<ul style="list-style-type: none"> <li>Participate in class social media accounts.</li> <li>Understand online risks and the age rules for sites.</li> </ul>	
	<b>To communicate</b>	<ul style="list-style-type: none"> <li>Use a range of applications and devices in order to communicate ideas, work and messages.</li> </ul>	
	<b>To collect</b>	<ul style="list-style-type: none"> <li>Use simple databases to record information in areas across the curriculum.</li> </ul>	

# Computing Knowledge & Skills Progression

## Milestone 2



Prior Learning	Skill	Milestone 2: Year 3 and Year 4	Key Vocabulary
<ul style="list-style-type: none"> <li>● Control motion by specifying the number of steps to travel, direction and turn.</li> <li>● Looks: Add text strings, show and hide objects and change the features of an object.</li> <li>● Sound: Select sounds and control when they are heard, their duration and volume.</li> <li>● Draw: control when drawings appear and set the pen colour, size and shape.</li> <li>● Events: specify user inputs (such as clicks) to control events.</li> <li>● Control: specify the nature of events (such as a single event or loop)</li> <li>● Sensing: create conditions for actions by waiting for a user input.</li> </ul>	<p><b>To code</b></p>	<ul style="list-style-type: none"> <li>● Motion: use specified screen coordinates to control movement.</li> <li>● Looks: set appearance of objects and create sequences of changes.</li> <li>● Sound: create and edit sounds. Control when they are heard, their volume, duration and rests.</li> <li>● Draw: control the shade of pens.</li> <li>● Events: specify conditions to trigger events.</li> <li>● Control: use IF THEN conditions to control events or objects.</li> <li>● Sensing: create conditions for actions by sensing proximity or by waiting for a user input (such as proximity to a specified colour or line or responses to questions).</li> <li>● Operators: use the reporter operators () + () () - () ()*() () / () to perform calculations.</li> </ul>	<p>Sequence instructions, debugging, Test + improve, Logo commands, Sequence programming, Type + edit logo commands. Sensors, Open-ended problems, Bugs in programs, Complex programming</p>

<ul style="list-style-type: none"> <li>● Participate in class social media accounts.</li> <li>● Understand online risks and the age rules for sites.</li> </ul>	<b>To connect</b>	<ul style="list-style-type: none"> <li>● Contributes to blogs that are moderated by teachers.</li> <li>● Give examples of the risks posed by online communications.</li> <li>● Understand the term 'copyright'.</li> <li>● Understand that comments made online that are hurtful or offensive are the same as bullying.</li> <li>● Understand how online services work.</li> </ul>	Copyright, Blogs, School network, Devices, Computer parts, Collaborate, Appropriate online communication, Search tools, Appropriate websites, Owner, Moderator, Information collection, Reliability, Owners, E Safety rules, Secure passwords, Repot Abuse Button.
	<b>To communicate</b>	<ul style="list-style-type: none"> <li>● Use some of the advanced features of applications and devices in order to communicate ideas, work or messages professionally.</li> </ul>	Multimedia, Presentations, Alignment, Brush Size, Repeats, Reflections, Create, Modify, Specific Purpose, Keyboard Shortcuts, Bullet Points
<ul style="list-style-type: none"> <li>● Use simple databases to record information in areas across the curriculum.</li> </ul>	<b>To collect</b>	<ul style="list-style-type: none"> <li>● Devise and construct databases using applications designed for this purpose in areas across the curriculum.</li> </ul>	Questioning, Database, Construct, Contribute, Recording data, Data logger, Present data, Database creation, Database searches, Inaccurate data

# Computing Knowledge & Skills Progression

## Milestone 3



Prior Learning	Skill	Milestone 3: Year 5 and Year 6	Key Vocabulary
<ul style="list-style-type: none"> <li>● Motion: use specified screen coordinates to control movement.</li> <li>● Looks: set appearance of objects and create sequences of changes.</li> <li>● Sound: create and edit sounds. Control when they are heard, their volume, duration and rests.</li> <li>● Draw: control the shade of pens.</li> <li>● Events: specify conditions to trigger events.</li> <li>● Control: use IF THEN conditions to control events or objects.</li> <li>● Sensing: create conditions for actions by sensing proximity or by waiting for a user input (such as proximity to a specified colour or line or responses to questions).</li> </ul>	<p><b>To code</b></p>	<ul style="list-style-type: none"> <li>● Motion: Set IF conditions for movements. Specify types of rotation giving the number of degrees.</li> <li>● Looks: Change the position of objects between screen layers (send to back, bring to front).</li> <li>● Sound: Upload sounds from a file and edit them. Add effects such as fade in and out and control their implementation.</li> <li>● Draw: combine the use of pens with movement to create interesting effects.</li> <li>● Events: Set event to control other events by 'broadcasting' information as a trigger.</li> <li>● Control: Use IF THEN ELSE conditions to control events or objects.</li> <li>● Sensing: Use a range of sensing tools including proximity, user inputs, loudness</li> </ul>	<p>Predicting outputs, Plan, program, test &amp; review a program, Program writing, Control mimics + devices, Sensors, Measure input, Create variables, Link errors, Explore procedures, Refine procedures, Variable, Hardware + software, Change inputs, Different outputs, Articulate solutions, Commands</p>

<ul style="list-style-type: none"> <li>Operators: use the reporter operators  <math>() + ()</math>  <math>() - ()</math> <math>() * ()</math> <math>() / ()</math> to perform calculations.</li> </ul>		<p>and mouse position) to control events or actions.</p> <ul style="list-style-type: none"> <li>Variables and lists: Use lists to create a set of variables.</li> <li>Operators: Use the Boolean operators <math>() + ()</math> <math>() - ()</math> <math>() * ()</math> <math>() / ()</math> to perform calculations.  Pick random <math>()</math> to <math>(0</math>  Join <math>() ()</math>  Letter <math>()</math> of <math>()</math>  Lengths of <math>()</math>  <math>() \text{ Mod } ()</math> This reports the remainder after a division calculation.  Round <math>()</math>  <math>()</math> of <math>()</math>.</li> </ul>	
<ul style="list-style-type: none"> <li>Contributes to blogs that are moderated by teachers.</li> <li>Give examples of the risks posed by online communications.</li> <li>Understand the term 'copyright'.</li> <li>Understand that comments made online that are hurtful or offensive are the same as bullying.</li> </ul> <p>Understand how online services work.</p>	<p><b>To connect</b></p>	<ul style="list-style-type: none"> <li>Collaborate with others online on sites approved and moderated by teachers.</li> <li>Give examples of the risks of online communities and demonstrate knowledge of how to minimise risk and report problems.</li> <li>Understand and demonstrate knowledge that it is illegal to download copyrighted material, including music or games, without express written permission, from the copyright holder.</li> <li>Understand the effect of online comments and show responsibility and sensitivity when online.</li> <li>Understand how simple networks are set up and used.</li> </ul>	<p>Computing devices, Internet parts, Collaboration, Responsibility, Searching strategies, Webpages, Responsible online, communication, Informed choices, Virus threats, Blogs, Messaging Information movement, Connecting devices, Different audiences, Research strategies, Search result rankings, Acknowledge resources.</p>

Prior Learning	Skill	Milestone 3: Year 5 and Year 6	Key Vocabulary
<ul style="list-style-type: none"> <li>Use some of the advanced features of applications and devices in order to communicate ideas, work or messages professionally.</li> </ul>	<b>To communicate</b>	<ul style="list-style-type: none"> <li>Choose the most suitable applications and devices for the purposes of communication.</li> <li>Use many of the advanced features in order to create high quality, professional or efficient communications.</li> </ul>	Online sharing, Multimedia effects, modification, Transitions, Hyperlinks, Editing tools, Refining, Online sharing
<ul style="list-style-type: none"> <li>Devise and construct databases using applications designed for this purpose in areas across the curriculum.</li> </ul>	<b>To collect</b>	<ul style="list-style-type: none"> <li>Select appropriate applications to devise, construct and manipulate data and present it in an effective and professional manner.</li> </ul>	Spreadsheets, Complex searches (and/or: </>), Problem solving, Present answers, Analyse information, Question data, Interpret, Generate, Process, Interpret, Store, Present information, Plausibility, Appropriate data tool, Interrogate Investigations