

# Weaving Computing Knowledge, Skills and Understanding into the new National Curriculum

## Key Stage 1: Computing



## National Curriculum Requirements of Computing 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 a sequence of instructions
- write and test simple programs
- use logical reasoning to predict the behaviour of simple programs
- organise, store, manipulate and retrieve data in a range of digital formats
- communicate safely and respectfully online, keeping personal information private, and recognise common uses of information technology beyond school.

# Knowledge, Skills and Understanding breakdown for Computing

## Year 1

Algorithms and Programs	Data Retrieving and Organising	Communicating
<ul style="list-style-type: none"> <li>· Can they create a simple series of instructions - left and right?</li> <li>· Can they record their routes?</li> <li>· Do they understand forwards, backwards, up and down?</li> <li>· Can they put two instructions together to control a programmable toy?</li> <li>· Can they begin to plan and test a Bee-bot journey?</li> </ul>	<ul style="list-style-type: none"> <li>· Can they capture images with a camera?</li> <li>· Can they print out a photograph from a camera with help?</li> <li>· Can they record a sound and play it back?</li> <li>· Can they enter information into a template to make a graph?</li> <li>· Can they talk about the results shown on a graph?</li> </ul>	<ul style="list-style-type: none"> <li>· Do they recognise what an email address looks like?</li> <li>· Have they joined in sending a class email?</li> <li>· Can they use the @ key and type an email address?</li> <li>· Can they word process ideas using a keyboard?</li> <li>· Can they use the spacebar, back space, enter, shift and arrow keys?</li> <li>· Can they print out a page from the internet?</li> </ul>

## Year 1 (Challenging)

- Can they record pupils' voices as a voice over?
- Can they use a teacher prepared photo story to create a slideshow of photos?

# Knowledge, Skills and Understanding breakdown for Computing

## Year 2

Algorithms and Programs	Data Retrieving and Organising	Communicating
<ul style="list-style-type: none"> <li>Can they predict the outcomes of a set of instructions?</li> <li>Can they use right angle turns?</li> <li>Can they use the repeat commands?</li> <li>Can they test and amend a set of instructions?</li> <li>Can they write a simple program and test it?</li> <li>Can they predict what the outcome of a simple program will be?</li> </ul>	<ul style="list-style-type: none"> <li>Can they find information on a website?</li> <li>Can they click links in a website?</li> <li>Can they print a web page to use as a resource?</li> <li>Can they experiment with text, pictures and animation to make a simple slide show?</li> <li>Can they use the shape tools to draw?</li> </ul>	<ul style="list-style-type: none"> <li>Can they send and reply to messages sent by a safe email partner (within school)?</li> <li>Can they word process a piece of text?</li> <li>Can they insert/delete a word using the mouse and arrow keys?</li> <li>Can they highlight text to change its format (B, <u>u</u>, I)?</li> </ul>

## Year 2 (Challenging)

- Can they create a presentation in a small group and record the narration?
- Can they record sounds into software and playback?
- Can they insert prerecorded sounds into a presentation?
- Can they capture still and moving images?

## E-safety in Key Stage 1

Knowledge & understanding	Skills
<ul style="list-style-type: none"><li>· Understand the different methods of communication (e.g. email, online forums etc).</li><li>· Know you should only open email from a known source.</li><li>· Know the difference between email and communication systems such as blogs and wikis.</li><li>· Know that websites sometimes include pop-ups that take them away from the main site.</li><li>· Know that bookmarking is a way to find safe sites again quickly.</li><li>· Begin to evaluate websites and know that everything on the internet is not true.</li><li>· Know that it is not always possible to copy some text and pictures from the internet.</li><li>· Know that personal information should not be shared online.</li><li>· Know they must tell a trusted adult immediately if anyone tries to meet them via the internet.</li></ul>	<ul style="list-style-type: none"><li>• Follow the school's safer internet rules.</li><li>• Use the search engines agreed by the school.</li><li>• Act if they find something inappropriate online or something they are unsure of (including identifying people who can help; minimising screen; online reporting using school system etc).</li><li>• Use the internet for learning and communicating with others, making choices when navigating through sites.</li><li>• Send and receive email as a class.</li><li>• Recognise advertising on websites and learn to ignore it.</li><li>• Use a password to access the secure network.</li></ul>

Schools will need to review and amend their approaches to e-safety in order to take on board and address changes to technology.

# Weaving Computing Knowledge, Skills and Understanding into the new National Curriculum

## **Key Stage 2: Computing**



## National Curriculum Requirements of Computing at Key Stage 2

Pupils should be taught to:

- design and write 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; generate appropriate inputs and predicted outputs to test programs
- use logical reasoning to explain how a simple algorithm works 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
- describe how internet search engines find and store data; use search engines effectively; be discerning in evaluating digital content; respect individuals and intellectual property; use technology responsibly, securely and safely
- select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

# Knowledge, Skills and Understanding breakdown for Computing: Year 3

Algorithms and Programs	Data Retrieving and Organising	Communicating
<ul style="list-style-type: none"> <li>· Can they experiment with variables to control models?</li> <li>· Can they use 90 degree and 45 degree turns?</li> <li>· Can they give an on-screen robot directional instructions?</li> <li>• Can they draw a square, rectangle and other regular shapes on screen, using commands?</li> <li>• Can they write more complex programs?</li> </ul>	<ul style="list-style-type: none"> <li>· Can they review images on a camera and delete unwanted images?</li> <li>· Have they experienced downloading images from a camera into files on the computer?</li> <li>· Can they use photo editing software to crop photos and add effects?</li> <li>· Can they manipulate sound when using simple recording story boarding?</li> </ul>	<ul style="list-style-type: none"> <li>· Can they use the email address book?</li> <li>· Can they open and send an attachment?</li> </ul>
Using the Internet	Databases	Presentation
<ul style="list-style-type: none"> <li>· Can they find relevant information by browsing a menu.</li> <li>· Can they search for an image, copy and paste it into a document?</li> <li>· Can they use 'Save picture as' to save an image to the computer?</li> <li>· Can they copy and paste text into a document?</li> <li>· Do they begin to use note making skills to decide what text to copy?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they input data into a prepared database?</li> <li>• Can they sort and search a database to answer simple questions?</li> <li>• Can they use a branching database?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they create a presentation that moves from slide to slide and is aimed at a specific audience?</li> <li>• Can they combine text, images and sounds and show awareness of audience?</li> <li>• Do they know how to manipulate text, underline text, centre text, change font and size and save text to a folder?</li> </ul>

## Year 3 (Challenging)

- Can they search by keyword using a child friendly search engine?
- Can they bookmark a page into your favourites?
- Can they contribute to a class blog?
- Can they use repeat command in logo to create a pattern?



# Knowledge, Skills and Understanding breakdown for Computing: Year 4

Algorithms and Programs	Data Retrieving and Organising	Communicating
<ul style="list-style-type: none"> <li>• Can they use repeat instructions to draw regular shapes on screen, using commands?</li> <li>• Can they experiment with variables to control models?</li> <li>• Can they make turns specifying the degrees?</li> <li>• Can they give an on-screen robot specific directional instructions that takes them from x to y?</li> <li>• Can they make accurate predictions about the outcome of a program they have written?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they capture images using webcams, screen capture, scanning, visualiser and internet?</li> <li>• Can they choose images and download into a file?</li> <li>• Can they download images from the camera into files on the computer?</li> <li>• Can they copy graphics from a range of sources and paste into a desktop publishing program?</li> </ul>	<ul style="list-style-type: none"> <li>• Do they appreciate the benefits of ICT to send messages and to communicate?</li> <li>• Can they use the automatic spell checker to edit spellings?</li> </ul>
Using the Internet	Databases	Presentation
<ul style="list-style-type: none"> <li>• Can they use a search engine to find a specific website?</li> <li>• Can they use note-taking skills to decide which text to copy and paste into a document?</li> <li>• Can they use tabbed browsing to open two or more web pages at the same time?</li> <li>• Can they open a link to a new window?</li> <li>• Can they open a document (pdf) and view it?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they input data into a prepared database?</li> <li>• Can they sort and search a database to answer simple questions?</li> <li>• Do they recognise what a spread sheet is?</li> <li>• Can they use the terms cells, rows and columns?</li> <li>• Can they enter data, highlight it and make bar charts?</li> </ul>	<ul style="list-style-type: none"> <li>• Can they create a lengthy presentation that moves from slide to slide and is aimed at a specific audience?</li> <li>• Can they insert sound recordings into a multi media presentation?</li> <li>• Do they know how to manipulate text, underline text, centre text, change font and size and save text to a folder?</li> </ul>

## Year 4 (Challenging)

- Can they use photo editing software to crop photographs and add effects?
- Can they copy and paste the graph/bar chart and use it in a WP document?
- Can they use animation in their presentation?

## E-safety in Years 3 and 4

Knowledge & understanding	Skills
<ul style="list-style-type: none"><li>· Understand the need for rules to keep them safe when exchanging learning and ideas online.</li><li>· Recognise that information on the internet may not be accurate or reliable and may be used for boas, manipulation or persuasion.</li><li>· Understand that the internet contains fact, fiction and opinion and begin to distinguish between them.</li><li>· Use strategies to verify information, e.g. cross-checking.</li><li>· Understand the need for caution when using an internet search for images and what to do if they find an unsuitable image.</li><li>· Understand that copyright exists on most digital images, video and recorded music.</li><li>· Understand the need to keep personal information and passwords private.</li><li>· Understand that if they make personal information available online it may be seen and used by others.</li><li>· Know how to respond if asked for personal information or feel unsafe about content of a message.</li><li>· Recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy.</li><li>· Know how to report an incident of cyber bullying.</li><li>• Know difference between online communication tools used in school and those used at home.</li><li>• Understand the need to develop an alias for some public online use.</li><li>• Understand that the outcome of internet searches at home may be different than at school.</li></ul>	<ul style="list-style-type: none"><li>• Follow the school's safer internet rules.</li><li>• Recognise the difference between the work of others which has been copied (plagiarism) and re-structuring and re-presenting materials in ways which are unique and new.</li><li>• Begin to identify when emails should not be opened and when an attachment may not be safe.</li><li>• Explain how to use email safely.</li><li>• Use different search engines</li></ul>

Schools will need to review and amend their approaches to e-safety in order to take on board and address changes to technology.

# Knowledge, Skills and Understanding breakdown for Computing: Year 5

Algorithms and Programs	Data Retrieving and Organising	Communicating
<ul style="list-style-type: none"> <li>Can they combine sequences of instructions and procedures to turn devices on or off?</li> <li>Do they understand input and output?</li> <li>Can they use an ICT program to control an external device that is electrical and/or mechanical?</li> <li>Can they use ICT to measure sound or light or temperature using sensors?</li> <li>Can they explore 'What is' questions by playing adventure or quest games?</li> <li>Can they write programs that have sequences and repetitions?</li> </ul>	<ul style="list-style-type: none"> <li>Can they listen to streaming audio such as online radio?</li> <li>Can they download and listen to podcasts?</li> <li>Can they produce and upload a podcast?</li> <li>Can they manipulate sounds using Audacity?</li> <li>Can they select music from open sources and incorporate it into multimedia presentations?</li> <li>Can they work on simple film editing?</li> </ul>	<ul style="list-style-type: none"> <li>Can they use instant messaging to communicate with class members?</li> <li>Can they conduct a video chat with someone elsewhere in the school or in another school?</li> <li>Can they use the word count tool to check the length of a document?</li> <li>Can they use bullets and numbering tools?</li> </ul>
Using the Internet	Databases	Presentation
<ul style="list-style-type: none"> <li>Can they use a search engine using keyword searches?</li> <li>Can they compare the results of different searches?</li> <li>Can they decide which sections are appropriate to copy and paste from at least two web pages?</li> <li>Can they save stored information following simple lines of enquiry?</li> <li>Can they download a document and save it to the computer?</li> </ul>	<ul style="list-style-type: none"> <li>Can they create a formula in a spreadsheet and then check for accuracy and plausibility?</li> <li>Can they search databases for information using symbols such as = &gt; or &lt;?</li> <li>Can they create databases planning the fields, rows and columns?</li> <li>Can they create graphs and tables to be copied and pasted into other documents?</li> </ul>	<ul style="list-style-type: none"> <li>Can they use a range of presentation applications?</li> <li>Do they consider audience when editing a simple film?</li> <li>Do they know how to prepare and then present a simple film?</li> <li>Can they use ICT to record sounds and capture both still and video images?</li> <li>Can they make a home page for a website that contains links to other pages?</li> <li>Can they capture sounds, images and video?</li> </ul>

## Year 5 (Challenging)

- Can they make a multimedia presentation that contains: sound; animation; video and buttons to navigate?
- Can they save an image document as a gif or i peg. file format using the 'save as' command?
- Can they make an information poster using graphics skills to good effect?

# Knowledge, Skills and Understanding breakdown for Computing: Year 6

Algorithms and Programs	Data Retrieving and Organising	Communicating
<ul style="list-style-type: none"> <li>Can they explain how an algorithm works?</li> <li>Can they detect errors in a program and correct them?</li> <li>Can they use an ICT program to control a number of events for an external device?</li> <li>Can they use ICT to measure sound, light or temperature using sensors and interpret the data?</li> <li>Can they explore 'what if' questions by planning different scenarios for controlled devices?</li> <li>Can they use input from sensors to trigger events?</li> <li>Can they check and refine a series of instructions?</li> </ul>	<ul style="list-style-type: none"> <li>Can they explore the menu options and experiment with images (colour effects, options, snap to grid, grid settings etc.)?</li> <li>Can they add special effects to alter the appearance of a graphic?</li> <li>Can they 'save as' gif or i peg. wherever possible to make the file size smaller (for emailing or downloading)?</li> <li>Can they make an information poster using their graphics skills to good effect?</li> </ul>	<ul style="list-style-type: none"> <li>Can they confidently choose the correct page set up option when creating a document?</li> <li>Can they confidently use text formatting tools, including heading and body text?</li> <li>Can they use the 'hanging indent' tool to help format work where appropriate (e.g. a play script)?</li> </ul>
Using the Internet	Databases	Presentation
<ul style="list-style-type: none"> <li>Can they contribute to discussions online?</li> <li>Can they use a search engine using keyword searches?</li> <li>Can they use complex searches using such as '+' 'OR' "Find the phrase in inverted commas"?</li> </ul>	<ul style="list-style-type: none"> <li>Can they collect live data using data logging equipment?</li> <li>Can they identify data error, patterns and sequences?</li> <li>Can they use the formulae bar to explore mathematical scenarios?</li> <li>Can they create their own database and present information from it?</li> </ul>	<ul style="list-style-type: none"> <li>Can they present a film for a specific audience and then adapt same film for a different audience?</li> <li>Can they create a sophisticated multimedia presentation?</li> </ul>

## Year 6 (Challenging)

- Can they incorporate graphics where appropriate, using the most effective text wrapping formats?
- Can they conduct a video chat with more than one person at a time?
- Can they compare the information provided on two tabbed websites looking for bias and perspective?

## E-safety in Years 5 and 6

Knowledge & understanding	Skills
<ul style="list-style-type: none"><li>• Discuss the positive and negative impacts of the use of ICT in their own lives and those of their peers and family.</li><li>• Understand the potential risk of providing personal information online.</li><li>• Recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content.</li><li>• Understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented.</li><li>• Recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing).</li><li>• Understand that some material on the internet is copyrighted and may not be copied or downloaded.</li><li>• Understand that some messages may be malicious and know how to deal with this.</li><li>• Understand that online environments have security settings, which can be altered, to protect the user.</li><li>• Understand the benefits of developing a 'nickname' for online use.</li><li>• Understand that some malicious adults may use various techniques to make contact and elicit personal information.</li><li>• Know that it is unsafe to arrange to meet unknown people online.</li><li>• Know how to report any suspicions.</li><li>• Understand they should not publish other people's pictures or tag them on the internet without permission.</li><li>• Know that content put online is extremely difficult to remove.</li><li>• Know what to do if they discover something malicious or inappropriate.</li></ul>	<ul style="list-style-type: none"><li>• Follow the school's safer internet rules.</li><li>• Make safe choices about use of technology.</li><li>• Use technology in ways which minimises risk, e.g. responsible use of online discussions etc.</li><li>• Create strong passwords and manage them so that they remain strong.</li><li>• Independently, and with regard for e-safety, select and use appropriate communication tools to solve problems by collaborating and communicating with others within and beyond school.</li><li>• Competently use the internet as a search tool.</li><li>• Reference information sources.</li><li>• Use appropriate strategies for finding, critically evaluating, validating and verifying information, e.g. using different keywords, skim reading to check relevance of information, cross checking with different websites or other not ICT resources.</li><li>• Use knowledge of the meaning of different domain names and common website extensions (e.g. .co.uk; .com; .ac; .sch; .org; .gov; .net) to support validation of information.</li></ul>

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