



Computing Curriculum Map

SKILLS, KNOWLEDGE AND UNDERSTANDING PROGRESSION

National Curriculum

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 and 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 to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a 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 level suitable for the future workplace and as active participants in a digital world.

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

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs 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.

Key Stage 1

<p>YEAR ONE National Curriculum</p> <p>Computer Science 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.</p> <p>Information technology Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</p> <p>These include commonplace tasks such as word-processing, creating pictures using paint packages, working with digital photographs and video (including animations), writing computer programs, and creating online content such as blog posts, forum contributions, wiki entries and social network updates.</p> <p>Digital literacy: (E-SAFETY) 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.</p>	<p>Algorithms and Programs</p> <p>Can they create a simple series of instructions - left and right? Can they record their routes? Do they understand forwards, backwards, up and down? Can they put two instructions together to control a programmable toy? Can they begin to plan and test a Bee-bot journey?</p>	<p>Data Retrieving and Organising</p> <p>Can they capture images with a camera? Can they print out a photograph from a camera with help? Can they record a sound and play it back? Can they enter information into a template to make a graph? Can they talk about the results shown on a graph?</p>	<p>Communicating</p> <p>Do they recognise what an email address looks like? Have they joined in sending a class email? Can they use the @ key and type an email address? Can they word process ideas using a keyboard? Can they use the spacebar, back space, enter, shift and arrow keys? Can they print out a page from the internet?</p>
	<p>Esafety</p> <p>Can they follow the school's safer internet rules? Can they use the search engines agreed by the school? Can they 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)? Can they use the internet for learning and communicating with others, making choices when navigating through sites? Can they send and receive email as a class? Can they recognise advertising on websites and learn to ignore it? Can they use a password to access the secure network?</p>		
	<p>Challenge:</p> <p>Can they record pupils' voices as a voice over? Can they use a teacher prepared photo story to create a slideshow of photos?</p>		

<p>YEAR TWO National Curriculum</p> <p>Computer Science 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.</p> <p>Information technology Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</p> <p>These include commonplace tasks such as word-processing, creating pictures using paint packages, working with digital photographs and video (including animations), writing computer programs, and creating online content such as blog posts, forum contributions, wiki entries and social network updates.</p> <p>Digital literacy: (E-SAFETY) 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.</p>	<p>Algorithms and Programs</p> <p>Can they predict the outcomes of a set of instructions? Can they use right angle turns? Can they use the repeat commands? Can they test and amend a set of instructions? Can they write a simple program and test it? Can they predict what the outcome of a simple program will be?</p>	<p>Data Retrieving and Organising</p> <p>Can they find information on a website? Can they click links in a website? Can they print a web page to use as a resource? Can they experiment with text, pictures and animation to make a simple slide show? Can they use the shape tools to draw?</p>	<p>Communicating</p> <p>Can they send and reply to messages sent by a safe email partner (within school)? Can they word process a piece of text? Can they insert/delete a word using the mouse and arrow keys? Can they highlight text to change its format (B, U, I)?</p>
	<p>Esafety</p> <p>Can they follow the school's safer internet rules? Can they use the search engines agreed by the school? Can they 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)? Can they use the internet for learning and communicating with others, making choices when navigating through sites? Can they send and receive email as a class? Can they recognise advertising on websites and learn to ignore it? Can they use a password to access the secure network?</p>		
	<p>Challenge:</p> <p>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?</p>		

<p>YEAR THREE National Curriculum</p> <p>Computer Science 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.</p> <p>Information Technology: 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.</p>	<p>Algorithms and Programs Can they experiment with variables to control models? Can they use 90 degree and 45 degree turns? Can they give an on-screen robot directional instructions? Can they draw a square, rectangle and other regular shapes on screen, using commands? Can they write more complex programs?</p>	<p>Data Retrieving and Organising Can they review images on a camera and delete unwanted images? Have they experienced downloading images from a camera into files on the computer? Can they use photo editing software to crop photos and add effects? Can they manipulate sound when using simple recording story boarding?</p>	<p>Communicating Can they use the email address book? Can they open and send an attachment?</p>	
	<p>Using the internet Can they find relevant information by browsing a menu. Can they search for an image, copy and paste it into a document? Can they use 'Save picture as' to save an image to the computer? Can they copy and paste text into a document? Do they begin to use note making skills to decide what text to copy?</p>	<p>Databases Can they input data into a prepared database? Can they sort and search a database to answer simple questions? Can they use a branching database?</p>	<p>Presentation Can they create a presentation that moves from slide to slide and is aimed at a specific audience? Can they combine text, images and sounds and show awareness of audience? Do they know how to manipulate text, underline text, centre text, change font and size and save text to a folder?</p>	
	<p>Esafety Can they discuss the positive and negative impact of the use of ICT in their own lives and those of their peers and family? Do they understand the potential risk of providing personal information online? Do they recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content? Do they understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented? Do they recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing)? Do they understand that some material on the internet is copyrighted and may not be copied or downloaded? Do they understand that some messages may be malicious and know how to deal with this? Do they understand that online environments have security settings, which can be altered, to protect the user? Do they understand the benefits of developing a 'nickname' for online use? Do they understand that some malicious adults may use various techniques to make contact and elicit personal information? Do they know that it is unsafe to arrange to meet unknown people online? Do they know how to report any suspicions? Do they understand they should not publish other people's pictures or tag them on the internet without permission? Do they know that content put online is extremely difficult to remove? Do they know what to do if they discover something malicious or inappropriate?</p>			

Digital Literacy: (E-SAFETY)

Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; Identify a range of ways to report concerns about content and contact.

Challenge:

- 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?

<p>YEAR FOUR National Curriculum</p> <p>Computer Science 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.</p> <p>Information Technology: 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.</p>	<p>Algorithms and Programs Can they use repeat instructions to draw regular shapes on screen, using commands? Can they experiment with variables to control models? Can they make turns specifying the degrees? Can they give an on-screen robot specific directional instructions that takes them from x to y? Can they make accurate predictions about the outcome of a program they have written?</p>	<p>Data Retrieving and Organising Can they capture images using webcams, screen capture, scanning, visualiser and internet? Can they choose images and download into a file? Can they download images from the camera into files on the computer? Can they copy graphics from a range of sources and paste into a desktop publishing program?</p>	<p>Communicating Do they appreciate the benefits of ICT to send messages and to communicate? Can they use the automatic spell checker to edit spellings?</p>
	<p>Using the internet Can they use a search engine to find a specific website? Can they use note-taking skills to decide which text to copy and paste into a document? Can they use tabbed browsing to open two or more web pages at the same time? Can they open a link to a new window? Can they open a document (PDF) and view it?</p>	<p>Databases Can they input data into a prepared database? Can they sort and search a database to answer simple questions? Do they recognise what a spread sheet is? Can they use the terms 'cells', 'rows' and 'columns'? Can they enter data, highlight it and make bar charts?</p>	<p>Presentation Can they create a lengthy presentation that moves from slide to slide and is aimed at a specific audience? Can they insert sound recordings into a multi media presentation? Do they know how to manipulate text, underline text, centre text, change font and size and save text to a folder?</p>
	<p>Esafety Can they discuss the positive and negative impact of the use of ICT in their own lives and those of their peers and family? Do they understand the potential risk of providing personal information online? Do they recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content? Do they understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented? Do they recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing)? Do they understand that some material on the internet is copyrighted and may not be copied or downloaded? Do they understand that some messages may be malicious and know how to deal with this? Do they understand that online environments have security settings, which can be altered, to protect the user? Do they understand the benefits of developing a 'nickname' for online use? Do they understand that some malicious adults may use various techniques to make contact and elicit personal information? Do they know that it is unsafe to arrange to meet unknown people online? Do they know how to report any suspicions? Do they understand they should not publish other people's pictures or tag them on the internet without permission? Do they know that content put online is extremely difficult to remove? Do they know what to do if they discover something malicious or inappropriate?</p>		

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Challenge:

- 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?

<p>YEAR FIVE National Curriculum</p> <p>Computer Science 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.</p> <p>Information Technology: 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</p>	<p>Algorithms and Programs Can they combine sequences of instructions and procedures to turn devices on or off? Do they understand input and output? Can they use an ICT program to control an external device that is electrical and/or mechanical? Can they use ICT to measure sound or light or temperate using sensors? Can they explore 'What is' questions by playing adventure or quest games? Can they write programs that have sequences and repetitions?</p>	<p>Data Retrieving and Organising Can they listen to streaming audio such as online radio? Can they download and listen to podcasts? Can they produce and upload a podcast? Can they manipulate sounds using Audacity? Can they select music from open sources and incorporate it into multimedia presentations? Can they work on simple film editing?</p>	<p>Communicating Can they use instant messaging to communicate with class members? Can they conduct a video chat with someone elsewhere in the school or in another school?</p>	
	<p>Using the Internet Can they use a search engine using keyword searches? Can they compare the results of different searches? Can they decide which sections are appropriate to copy and paste from at least two web pages? Can they save stored information following simple lines of enquiry? Can they download a document and save it to the computer?</p>	<p>Databases Can they create a formula in a spreadsheet and then check for accuracy and plausibility? Can they search databases for information using symbols such as = > or <? Can they create databases planning the fields, rows and columns? Can they create graphs and tables to be copied and pasted into other documents?</p>	<p>Presentation Can they use a range of presentation applications? Do they consider audience when editing a simple film? Do they know how to prepare and then present a simple film? Can they use ICT to record sounds and capture both still and video images? Can they make a home page for a website that contains links to other pages? Can they capture sounds, images and video? Can they use the word count tool to check the length of a document? Can they use bullets and numbering tools?</p>	
	<p>Esafety Can they discuss the positive and negative impact of the use of ICT in their own lives and those of their peers and family? Do they understand the potential risk of providing personal information online? Do they recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content? Do they understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented? Do they recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing)? Do they understand that some material on the internet is copyrighted and may not be copied or downloaded? Do they understand that some messages may be malicious and know how to deal with this? Do they understand that online environments have security settings, which can be altered, to protect the user? Do they understand the benefits of developing a 'nickname' for online use? Do they understand that some malicious adults may use various techniques to make contact and elicit personal information? Do they know that it is unsafe to arrange to meet unknown people online?</p>			

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Do they know how to report any suspicions?
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Do they know what to do if they discover something malicious or inappropriate?

Challenge:

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 jpeg. file format using the 'save as' command?
Can they make an information poster using graphics skills to good effect?

<p>YEAR SIX National Curriculum</p> <p>Computer Science 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.</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> <p>Information Technology: 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</p>	<p>Algorithms and Programs Can they explain how an algorithm works? Can they detect errors in a program and correct them? Can they use an ICT program to control a number of events for an external device? Can they use ICT to measure sound, light or temperature using sensors and interpret the data? Can they explore 'what if' questions by planning different scenarios for controlled devices? Can they use input from sensors to trigger events? Can they check and refine a series of instructions?</p>	<p>Data Retrieving and Organising Can they explore the menu options and experiment with images (colour effects, options, snap to grid, grid settings etc.)? Can they add special effects to alter the appearance of a graphic? Can they 'save as' gif or i peg. wherever possible to make the file size smaller (for emailing or downloading)? Can they make an information poster using their graphics skills to good effect?</p>	<p>Communicating Can they conduct a video chat with people in another country or organisation?</p>	
	<p>Using the internet Can they contribute to discussions online? Can they use a search engine using keyword searches? Can they use complex searches using such as '+' 'OR' "Find the phrase in inverted commas"?</p>	<p>Databases Can they collect live data using data logging equipment? Can they identify data error, patterns and sequences? Can they use the formulae bar to explore mathematical scenarios? Can they create their own database and present information from it?</p>	<p>Presentation Can they present a film for a specific audience and then adapt same film for a different audience? Can they create a sophisticated multimedia presentation? Can they confidently choose the correct page set up option when creating a document? Can they confidently use text formatting tools, including heading and body text? Can they use the 'hanging indent' tool to help format work where appropriate (e.g. a play script)?</p>	
	<p>Esafety Can they discuss the positive and negative impact of the use of ICT in their own lives and those of their peers and family? Do they understand the potential risk of providing personal information online? Do they recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content? Do they understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented? Do they recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing)? Do they understand that some material on the internet is copyrighted and may not be copied or downloaded? Do they understand that some messages may be malicious and know how to deal with this? Do they understand that online environments have security settings, which can be altered, to protect the user? Do they understand the benefits of developing a 'nickname' for online use?</p>			

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Do they understand that some malicious adults may use various techniques to make contact and elicit personal information?
Do they know that it is unsafe to arrange to meet unknown people online?
Do they know how to report any suspicions?
Do they understand they should not publish other people's pictures or tag them on the internet without permission?
Do they know that content put online is extremely difficult to remove?
Do they know what to do if they discover something malicious or inappropriate?

Challenge:

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?