

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.

Key areas of learning include: computer science, information technology, digital literacy

Through computing our children will develop:-

- as responsible, competent, confident and creative users of information and communication technology
- competence in coding for a variety of practical and inventive purposes
- the ability to connect with others safely and respectfully
- the ability to analyse problems in computational terms and have practical experience of writing computer programmes
- the ability to communicate ideas well by using applications and devices throughout the curriculum
- the ability to collect, organise and manipulate data effectively

Key Knowledge/Breadth of Study	
Key Stage 1	Key Stage 2
<ul style="list-style-type: none"> • Know what algorithms are, how they are implemented as programs on digital device , 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. 	<ul style="list-style-type: none"> • Design and write programs that accomplish specific goals, including controlling or simulating physical systems, solve problems by decomposing them into smaller parts. • Use sequence, selections 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, 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.

Computing skills, knowledge and vocabulary progress ladder

<ul style="list-style-type: none"> Communicate safely and respectfully online, keeping personal information private and recognise common uses of information technology beyond school. 	<ul style="list-style-type: none"> 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.
---	---

Computing skills, knowledge and vocabulary progress ladder - EYFS

Topic	Content
Nursery	<ul style="list-style-type: none"> Explore how things work Take a digital photo Select an app on an tablet Turn a device on and off
Reception	<ul style="list-style-type: none"> Perform simple functions using a mouse and keyboard Select and use an educational app on a tablet Use a keyboard to write their name using a capital letter Take a digital photo and edit it

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2

Topic	Year Group	Content
Computer Science	Year 1	<ul style="list-style-type: none"> Create a simple series of instructions to understand that algorithms are a sequence of instructions in everyday contexts Put two instructions together to control a programmable toy- Understand forwards, backwards, up and down Begin to plan and test a Bee-bot journey to implement an algorithm Record their routes Explain what they think a program will do, using a familiar piece of software (including computer games). GDS: Use and apply logical thinking to solve a problem involving programming (e.g. programming a toy)
	Year 2	<ul style="list-style-type: none"> Predict what they think a program will do Recognise that sequences of instructions or sets of rules can be thought of as algorithms. Examples could include recipes, but might also be procedures or rules in class, spelling rules, simple arithmetic operations or number patterns

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Program on screen using sequences of instructions to implement an algorithm. (scratchJr, etc) • Write/ create a simple program on screen, correcting any errors. • Debug any errors in their own code • Give logical explanations of what a program will do. • GDS: Appreciate that some algorithms are more efficient than others and use methods of efficiency to test these (e.g. most efficient method to enable a sprite to move left and right along the x axis or up and down along the y axis) • GDS: Apply a range of logical and computational thinking to program robotics and simulate this using an appropriate
	Year 3	<ul style="list-style-type: none"> • Experiment with variables to control models • Use 90 degree and 45 degree turns • Give an on-screen robot directional instructions • Draw a square, rectangle and other regular shapes on screen • Using commands write more complex programs
	Year 4	<ul style="list-style-type: none"> • Use repeat instructions to draw regular shapes on screen, using commands • Make turns specifying the degrees • Give an on-screen robot specific directional instructions that takes them from x to y • Make accurate predictions about the outcome of a program they have written • GDS: Give reasons for errors in programs and explain how they have corrected these through decomposition and debugging • GDS: Explain an algorithm using sequence, repetition and selection in their own words
	Year 5	<ul style="list-style-type: none"> • Combine sequences of instructions and procedures to turn devices on or of • Understand input and output • Use an ICT program to control an external device that is electrical and/or mechanical • Use ICT to measure sound or light or temperate using sensors • Explore 'what if' questions by playing adventure or quest games • Write programs that have sequences and repetitions • GDS: Write programs that have sequences, repetitions and variables (e.g. creating a scoring system as part of a Scratch game)
	Year 6	<ul style="list-style-type: none"> • Explain how an algorithm works • Detect errors in a program and correct them • Use an ICT program to control a number of events for an external device • Use ICT to measure sound, light or temperature using sensors and interpret the data

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Explore 'what if' questions by planning different scenarios for controlled devices • Use input from sensors to trigger events • Check and refine a series of instructions • GDS: Apply a range of logical and computational thinking to program robotics and simulate this using an appropriate
Information technology	Year 1	<ul style="list-style-type: none"> • Children can mention some of the ways in which IT is used to communicate beyond school. E.g. They might know that some people email, video calls or online greetings • Print out a page from the internet • GDS: Use digital technology to organise and edit content (e.g. text in an app, editing images) • GDS: Apply their navigational skills for a specific function or purpose (e.g. capturing a photo in the Camera app and importing this into another appropriate app)
	Year 2	<ul style="list-style-type: none"> • Find information on a website • Click links in a website • Print a web page to use as a resource • With a given purpose, use a range of digital technologies to retrieve, organise and store digital content. • Know ways to use IT to communicate beyond school e.g. adults can share work and discuss ideas in online communities; that photos can be taken, edited and shared easily using digital technology; that the web is made up of information shared by people and organisations; that people use email for a range of purposes and in a variety of contexts; that scientists use computers when collecting and analysing data. • GDS: Use digital technology to create, organise and edit a range of content for a specific purpose using an appropriate app • GDS: Incorporate images within a document or project where appropriate, using the most effective text wrapping formats within documents (e.g. selecting 'wrap to text' or layering images in the Photoshop apps • GDS: Compare the information provided on two tabbed websites looking for bias and perspective (e.g. evaluating the source of content, reliability and credibility of content, sharing information on secure and encrypted websites)
	Year 3	<ul style="list-style-type: none"> • Find relevant information by browsing a menu. • Search for an image, then copy and paste it into a document • Use 'save picture as' to save an image • Copy and paste text into a document • Begin to use note making skills to decide what text to copy • Input data into a prepared database • Sort and search a database to answer simple questions

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Use a branching database • GDS: Recognise the impact of keyword choice on search engine results (e.g. results ranked according to relevance or reliability of content and credibility of sources) • GDS: Evaluate content (created/researched) against a given goal
	Year 4	<ul style="list-style-type: none"> • Recognise that information on the internet may not be accurate or reliable and may be used for bias, manipulation or persuasion • Understand that the internet contains fact, fiction and opinion and begin to distinguish between them • Understand that the outcome of internet searches at home may be different than at school • Recognise the difference between the work of others which has been copied (plagiarism) and restructuring / representing materials in ways which are unique and new • Capture images using webcams, screen capture, scanning and internet • Choose images and download into a file / app • Use different search engines • Use note-taking skills to decide which text to copy and paste into a document • Use tabbed browsing to open two or more web pages at the same time • Open a link to a new window • Open a document (pdf) and view it • Sort and search a database to answer simple questions • Recognise what a spread sheet is • Use the terms 'cells', 'rows' and 'columns' • Enter data, highlight it and make bar charts • Appreciate the benefits of ICT to send messages and to communicate
	Year 5	<ul style="list-style-type: none"> • Use instant messaging to communicate with class members • Conduct a video chat with someone elsewhere in the school or in another school • Independently, and with regard for online safety, select and use appropriate communication tools to solve problems by collaborating and communicating with others within and beyond school • Use a search engine using keyword searches and compare the results of different searches • Decide which sections are appropriate to copy and paste from at least two web pages • Understand that some material on the internet is copyrighted and may not be copied or downloaded • Save stored information following simple lines of enquiry • Create a formula in a spreadsheet and then check for accuracy and plausibility • Search databases for information using symbols such as = > or <

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Create databases planning the fields, rows and columns • Create graphs and tables to be copied and pasted into other documents • Make a home page for a website that contains links to other pages • Listen to streaming audio such as online radio • Download and listen to podcasts • Produce and upload a podcast • GDS: Evaluate content according to its effectiveness and impact on a target audience
	Year 6	<ul style="list-style-type: none"> • Conduct a video chat with people in another country or organisation contribute to discussions online • Use complex searches using such as '+' 'or' "find the phrase in inverted commas" • Recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content • Understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented • 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 non ict resources • Reference information sources • 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 • Collect live data using data logging equipment • Identify data error, patterns and sequences • Use the formulae bar to explore mathematical scenarios • Create their own database and present information from it
Digital Literacy	Year 1	<ul style="list-style-type: none"> • Know that personal information should not be shared online • Know they must tell a trusted adult immediately if anyone tries to meet them via the internet • 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.) • Capture images with a camera • Record a sound/ video and play it back • Child can create original content using software e.g. art program • Use ICT components- e.g. a mouse, keyboard
	Year 2	<ul style="list-style-type: none"> • Understand the different methods of communication (e.g. email, online forums etc)

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Know the difference between email and communication systems such as blogs and wikis • Use the internet for learning and communicating with others, making choices when navigating through sites • Understand what personal information they should and should not share online • Word process/ create a slide show to present a piece of text • Include pictures and clipart • Use shape tools to draw • GDS: Consider how text is presented and formatted and adapt this to suit the purpose of a document
	Year 3	<ul style="list-style-type: none"> • Create a presentation that moves from slide to slide and is aimed at a specific audience • Combine text, images and sounds and show awareness of audience • Know how to manipulate text, underline text, centre text, change font and size and save text to a folder • Review images on a camera and delete unwanted images • Experienced downloading images from a camera into files on the computer • Use photo editing software to crop photos and add effects • Manipulate sound when using simple recording story boarding • Understand the need for rules to keep them safe when exchanging learning and ideas online • Understand that copyright exists on most digital images, video and recorded music • Understand the need to keep personal information and passwords private • Understand that if they make personal information available online it may be seen and used by others • Know how to respond if asked for personal information or feel unsafe about content of a message • Follow the school's safer internet rules • Begin to identify when emails should not be opened and when an attachment may not be safe • Explain how to use email safely • Use the email address book • Open and send an attachment
	Year 4	<ul style="list-style-type: none"> • Insert sound recordings into a multimedia presentation • Download images from the camera into files on the computer • Copy graphics from a range of sources and paste into a desktop publishing program • Use strategies to verify information eg cross checking • Recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy • Know how to report an incident of cyber bullying • Know the difference between online communication tools used in school and those used at home • Understand the need to develop an alias for some public online use

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Use the automatic spell checker to edit spellings • GDS: Create a multimedia project that contains an appropriately selected range of media (e.g. audio, video clips) • GDS: Save an image using a range of commands (e.g. 'control' and 'save image as' or 'drag and drop to 'downloads' folder) •
	Year 5	<ul style="list-style-type: none"> • Use a range of presentation applications • Consider audience when editing a simple film • Know how to prepare and then present a simple film • Use the word count tool to check the length of a document • Use bullets and numbering tools • Manipulate sounds using Audacity • Select music from open sources and incorporate it into multimedia presentations • Work on simple film editing • Understand the potential risk of providing personal information online • Understand the benefits of developing a 'nickname' for online use • Understand that some malicious adults may use various techniques to make contact and elicit personal information • Know that it is unsafe to arrange to meet unknown people online • Know how to report any suspicions • Understand they should not publish other people's pictures or tag them on the internet without permission • Know that content put online is extremely difficult to remove • Know what to do if they discover something malicious or inappropriate • Understand that some messages may be malicious and know how to deal with this • Make safe choices about use of technology • Create strong passwords and manage them so that they remain strong
	Year 6	<ul style="list-style-type: none"> • Present a film for a specific audience and then adapt same film for a different audience • Create a sophisticated multimedia presentation • Confidently choose the correct page set up option when creating a document • Confidently use text formatting tools, including heading and body text • Use the 'hanging indent' tool to help format work where appropriate (e.g. A play script) • Explore the menu options and experiment with images (colour effects, options, snap to grid, grid settings etc.)

Computing skills, knowledge and vocabulary progress ladder

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2		
Topic	Year Group	Content
		<ul style="list-style-type: none"> • Add special effects to alter the appearance of a graphic • 'Save as' gif or i peg. wherever possible to make the file size smaller (for Emailing or downloading) • Make an information poster using their graphics skills to good effect • Discuss the positive and negative impact of the use of ICT in their own lives and those of their peers and family • Recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing) • Use technology in ways which minimises risk, e.g. responsible use of online discussions, etc • Understand that online environments have security settings, which can be altered, to protect the user • GDS: Incorporate images within a document or project where appropriate, using the most effective text wrapping formats within documents (e.g. selecting 'wrap to text' or layering images in the Photoshop app) • GDS: Compare the information provided on two tabbed websites looking for bias and perspective (e.g. evaluating the source of content, reliability and credibility of content, sharing information on secure and encrypted websites)

Computing Key Vocabulary					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
instructions, repeat, sequence, code, bug, predict, retrieve, amend, digital, device, save, load, Beebot, route, software, commands, email, internet	logical, reasoning, predict, program, debugging, debug relevant, retrieve, purposeful, manipulate, personal information, private, format, code, website	digital, media, video, audio, image, download, upload, browse, attachment, text, font, copy, paste, information, degrees, directional, database, window	content, contact, algorithm, detect, capture, graphics, manipulate, bias, plagiarism, cells, rows, columns, cyberbullying, alias	publish, permission, sequence, instruction, procedure, sensor, input, output, solution, decomposition, streaming, broadcast, manipulate, audio, editing, software, multimedia, presentation, application, formula, podcast, tag	privacy, stereotype, abstraction, decomposition, composition, development platform, systematic, line of code, variables, in-puts, outputs, shooting/editing, WAN, LAN, pop-up, gif,

Computing skills, knowledge and vocabulary progress ladder – KS1 & KS2

Topic

Year Group

Content