Curriculum Progression for Computing

Curriculum Lead: Zack Coates Link Governor: Rob Allerston

INTENT

At Frodsham CE, we believe it is important that pupils gain the appropriate skills, knowledge and understanding to have the confidence, creativity and capability to use computing throughout their lives. Therefore, we implement a complete computing curriculum which covers all aspects of the National Curriculum computing programme of study.
All pupils in our school are encouraged to become originators and creators rather than passive users of information technology systems. Each year group uses a range of software and hardware to explore computer science, information technology and digital literacy through different focuses: programming, computational thinking, creativity, computer networks, communication/collaboration and productivity.

We embed a thorough e-safety curriculum throughout school in order to equip our pupils with the knowledge needed to make the best use of the Internet and technology in a safe, considered and respectful way, regardless of the device, platform or app. We aim for children to enjoy their learning experiences with technology through fun lessons that build on prior learning.

IMPLEMENTATION

Staff use the *Rising Stars: Computing* scheme of work and adapt it as necessary to meet the needs of all pupils. They can teach it weekly, fortnightly or termly, depending on what works best within their timetables.

In Key Stage 1, pupils will be taught to:

- 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

Pupils in Key Stage 2 will be taught to:

- Use technology safely, respectfully and responsibly
- Recognise acceptable and unacceptable behaviour
- Identify a range of ways to report concerns about content and contact

By the end of primary school, pupils will know:

- That people sometimes behave differently online, including by pretending to be someone they are not
- That the same principles apply to online relationships as to face-to-face relationships, including the importance of respect for others online including when we are anonymous
- The rules and principles for keeping safe online, how to recognise risks, harmful content and contact, and how to report them

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- How to critically consider their online friendships and sources of information including awareness of the risks associated with people they have never met
- How information and data is shared and used online
- How to respond safely and appropriately to adults they may encounter (in all contexts, including online) whom they do not know

The safe and respectful use of social media (especially apps such a TikTok, Instagram and WhatsApp) and the Internet will also be covered in other subjects where relevant. The school will use assemblies and workshops to raise pupils' and parents' awareness of the dangers that can be encountered online and may also invite speakers to talk about this. Pupils' computing capabilities and work are assessed formatively throughout the year. Teacher judgement alongside Rising Stars outcomes are used for Key Stage 1 and Key Stage 2. Class teachers save examples of work on the school network.

YEAR 1					
We are treasure hunters	**We are TV chefs**	**We are painters**	**We are collectors**	**We are storytellers**	**We are celebrating**
Children can… • Understand that a programmable toy can be controlled by inputting a sequence of instructions. • Develop and record sequences of instructions as an algorithm. • Program the toy to follow their algorithm. • Debug their programs. • Predict how their programs will work.	**Children can…** • Break down a process into simple, clear steps, as in an algorithm. • Use different features of a video camera. • Use a video camera to capture moving images. • Develop collaboration skills. • Discuss their work and think about how it could be improved.	**Children can…** • Use the web safely to find ideas for an illustration. • Select and use appropriate painting tools to create and change images on the computer. • Understand how this use of ICT differs from using paint and paper. • Create an illustration for a particular purpose. • Know how to save, retrieve and change their work.	**Children can…** • Find and use pictures on the web. • Know what to do if they encounter pictures that cause concern. • Group images on the basis of a binary (yes/no) question. • Organise images into more than two groups according to clear rules. • Sort (order) images according to some criteria. • Ask and answer binary (yes/no)	**Children can…** • Use sound recording equipment to record sounds. • Develop skills in saving and storing sounds on the computer. • Develop collaboration skills as they work together in a group. • Understand how a talking book differs from a paper-based book. • Talk about and reflect on their use of ICT.	**Children can…** • Develop basic keyboard skills, through typing and formatting text. • Develop basic mouse skills. • Use the web to find and select images. • Develop skills in storing and retrieving files. • Develop skills in combining text and images. • Discuss their work and think about whether it could be improved.

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		• Reflect on their work and act on feedback received.	questions about their images	• Share recordings with an audience	
Key vocabulary: algorithm debug instructions predict programming robot treasure	**Key vocabulary:** algorithm clip edit film instructions recipe robot video camera	**Key vocabulary:** character eBook edit illustration traditional tale	**Key vocabulary:** algorithm copyright e-safety mammal permission personal private	**Key vocabulary:** audio book copyright microphone recording sound effects talking book	**Key vocabulary:** celebrate copyright edit greeting keyboard save type
YEAR 2					
We are astronauts	**We are games testers**	**We are photographers**	**We are researchers**	**We are detectives**	**We are zoologists**
Children can… • Have a clear understanding of algorithms as sequences of instructions. • Convert simple algorithms to programs. • Predict what a simple program will do. • Spot and fix (debug) errors in their programs.	**Children can…** • Describe carefully what happens in computer games. • Use logical reasoning to make predictions of what a program will do. • Test these predictions. • Think critically about computer games and their use. • Be aware of how to use games safely and in balance with other activities.	**Children can…** • Consider the technical and artistic merits of photographs. • Use a digital camera or camera app. • Take digital photographs. • Review and reject or rate the images they take. • Edit and enhance their photographs. • Select their best images to include in a shared portfolio.	**Children can…** • Develop collaboration skills through working as part of a group. • Develop research skills through searching for information on the internet. • Improve note-taking skills through the use of mind mapping. • Develop presentation skills through creating and delivering a short multimedia presentation.	**Children can…** • Understand that email can be used to communicate. • Develop skills in opening, composing and sending emails. • Gain skills in opening and listening to audio files on the computer. • Use appropriate language in emails. • Develop skills in editing and formatting text in emails. • Be aware of online safety issues when using email.	**Children can…** • Sort and classify a group of items by answering questions. • Collect data using tick charts or tally charts. • Use simple charting software to produce pictograms and other basic charts. • Take, edit and enhance photographs. • Record information on a digital map.
Key vocabulary:	**Key vocabulary:**	**Key vocabulary:**	**Key vocabulary:**	**Key vocabulary:**	**Key vocabulary:**

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algorithm instructions predict problem program robot Scratch sprite	algorithm predict rules Scratch test	camera image Picasa pixel portfolio theme	Google mind map presentation research search engine	address attachment database evidence email fact file header safety	chart classification key data database photograph tally chart tick chart
YEAR 3					
We are programmers	**We are bug fixers**	**We are presenters**	**We are vloggers**	**We are communicators**	**We are opinion pollsters**
Children can… • Create an algorithm for an animated scene in the form of a storyboard. • Write a program in Scratch to create the animation. • Correct mistakes in their animation programs	**Children can…** • Develop a number of strategies for finding errors in programs. • Build up resilience and strategies for problem solving. • Increase their knowledge and understanding of Scratch. • Recognise a number of common types of bug in software.	**Children can…** • Gain skills in shooting live video, such as framing shots, holding the camera steady, and reviewing. • Edit video, including adding narration and editing clips by setting in/out points. • Understand the qualities of effective video, such as the importance of narrative, consistency, perspective and scene length.	**Children can…** • Use a search engine to learn about a new topic. • Plan, design and deliver an interesting and engaging presentation. • Search for and evaluate online images. • Create their own original images. • Create a video slide cast of a narrated presentation. • Develop understanding of how the internet, the web and search engines work.	**Children can…** • Develop a basic understanding of how email works. • Gain skills in using email. • Be aware of broader issues surrounding email, including ‘netiquette’ and online safety. • Work collaboratively with a remote partner. • Experience video conferencing.	**Children can…** • Understand some elements of survey design. • Understand some ethical and legal aspects of online data collection. • Use the web to facilitate data collection. • Gain skills in using charts to analyse data. • Gain skills in interpreting results.
Key vocabulary:	**Key vocabulary:**	**Key vocabulary:**	**Key vocabulary:**	**Key vocabulary:**	**Key vocabulary:**

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algorithm animation input output program script storyboard	algorithm bugs debug instruction program script	audio close-up editing footage panning shooting video camera zooming	vlogging search engine internet presentation narration Creative Commons copyright images audio screencast	attachment email e-safety spam spoofed link video conference virus	chart data graph opinion questions rating scale research survey
YEAR 4					
We are software developers	**We are toy designers**	**We are musicians**	**We are HTML editors**	**We are co-authors**	**We are meteorologists**
Children can… • Develop an educational computer game using selection and repetition. • Understand and use variables. • Start to debug computer programs. • Recognise the importance of user interface design, including consideration of input and output.	**Children can…** • Design and make an on-screen prototype of a computer-controlled toy. • Understand different forms of input and output (such as sensors, switches, motors, lights and speakers). • Design, write and debug the control and monitoring program for their toy	**Children can…** • Use one or more programs to edit music. • Create and develop a musical composition, refining their ideas through reflection and discussion. • Develop collaboration skills. • Develop an awareness of how their composition can enhance work in other media.	**Children can…** • Understand some technical aspects of how the internet makes the web possible. • Use HTML tags for elementary mark up. • Use hyperlinks to connect ideas and sources. • Code up a simple web page with useful content. • Understand some of the risks in using the web.	**Children can…** • Understand the conventions for collaborative online work, particularly in wikis. • Be aware of their responsibilities when editing other people's work. • Become familiar with Wikipedia, including potential problems associated with its use. • Practise research skills. • Write for a target audience using a wiki tool. • Develop collaboration skills. • Develop proofreading skills	**Children can…** • Understand different measurement techniques for weather, both analogue and digital. • Use computer-based data logging to automate the recording of some weather data. • Use spreadsheets to create charts. • Analyse data, explore inconsistencies in data and make predictions. • Practise using presentation software and, optionally, video.

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Key vocabulary: debug input interface output program prototype repetition variable	**Key vocabulary:** algorithm debug input interactive output pitch prototype simulation	**Key vocabulary:** audio composition copyright digital instruments pitch sample sequencing software	**Key vocabulary:** code HTML HTTP (hypertext transfer protocol) hyperlink tag URL web page	**Key vocabulary:** edit information mind map reliable style wiki Wikipedia's Five pillars	**Key vocabulary:** chart data-logging forecast graph measurement prediction spreadsheet temperature
YEAR 5					
We are game developers	**We are cryptographers**	**We are artists**	**We are web developers**	**We are bloggers**	**We are architects**
Children can… • Create original artwork and sound for a game. • Design and create a computer program for a computer game, which uses sequence, selection, repetition and variables. • Detect and correct errors in their computer game. • Use iterative development techniques (making and testing a series of small changes) to improve their game.	**Children can…** • Be familiar with semaphore and Morse code. • Understand the need for private information to be encrypted. • Encrypt and decrypt messages in simple ciphers. • Appreciate the need to use complex passwords and to keep them secure. • Have some understanding of how encryption works on the web.	**Children can…** • Develop an appreciation of the links between geometry and art. • Become familiar with the tools and techniques of a vector graphics package. • Develop an understanding of turtle graphics. • Experiment with the tools available, refining and developing their work as they apply their own criteria to evaluate it and receive feedback from their peers. • Develop some awareness of	**Children can…** • Develop their research skills to decide what information is appropriate. • Understand some elements of how search engines select and rank results. • Question the plausibility and quality of information. • Develop and refine their ideas and text collaboratively. • Develop their understanding of online safety and responsible use of technology.	**Children can…** • Become familiar with blogs as a medium and a genre of writing. • Create a sequence of blog posts on a theme. • Incorporate additional media. • Comment on the posts of others. • Develop a critical, reflective view of a range of media, including text.	**Children can…** • Understand the work of architects, designers and engineers working in 3D. • Develop familiarity with a simple CAD (computer aided design) tool. • Develop spatial awareness by exploring and experimenting with a 3D virtual environment. • Develop greater aesthetic awareness.

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		computer-generated art, in particular fractal-based landscapes.			
Key vocabulary: algorithm debugging code programming sprites storyboard	**Key vocabulary:** binary code cipher decrypt encrypt Morse code password security semaphore	**Key vocabulary:** geometric landscape op art sprite symmetry tessellations	**Key vocabulary:** bias e-safety Page Rank revision history search engine wiki	**Key vocabulary:** audience blog blogroll copyright dashboard hyperlinks podcast	**Key vocabulary:** 3D animation gallery navigation screencast sculpture virtual
YEAR 6					
We are adventure gamers	**We are computational thinkers**	**We are advertisers**	**We are network technicians**	**We are travel writers**	**We are publishers**
Children can… • Learn some of the syntax of a text-based programming language. • Use commands to display text on screen, accept typed user input, store and retrieve data using variables and select from a list. • Plan a text-based adventure with multiple 'rooms' and user interaction. • Thoroughly debug the program.	**Children can…** • Develop the ability to reason logically about algorithms. • Understand how some key algorithms can be expressed as programs. • Understand that some algorithms are more efficient than others for the same problem. • Understand common algorithms for sorting and searching. • Appreciate algorithmic approaches to problems in mathematics	**Children can…** • Think critically about how video is used to promote a cause. • Storyboard an effective advert for a cause. • Work collaboratively to shoot suitable original footage and source additional content, acknowledging intellectual property rights. • Work collaboratively to edit the assembled content to make an effective advert.	**Children can…** • Appreciate that computer networks transmit and receive information digitally. • Understand the basic hardware needed for computer networks to work. • Understand key features of internet communication protocols. • Develop a basic understanding of how domain names are converted to numerical IP addresses.	**Children can…** • Research a location online using a range of resources appropriately. • Understand the safe use of mobile technology, including GPS. • Capture images, audio and video while on location. • Showcase shared media content through a mapping layer.	**Children can…** • Manage or contribute to large collaborative projects, facilitated using online tools. • Write and review content. • Source digital media while demonstrating safe, respectful and responsible use. • Design and produce a high-quality print document.

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Key vocabulary: Python repetition variable selection print procedure syntax	**Key vocabulary:** algorithm flowchart pseudocode linear search random search binary search selection sort quicksort	**Key vocabulary:** footage rough cut storyboard advert Creative Commons video camera rushes of footage final cut	**Key vocabulary:** command prompt internet IP address packet of data the web webserver network Domain Name Service (DNS)	**Key vocabulary:** geotagging GPS route location tracklog smartphone map metadata	**Key vocabulary:** Desktop publishing (DTP) magazine yearbook collaboration design images typeface layout

Love each other, as God loves us.