Jerry Clay Academy: Computing – Year Group Expectations

EYFS			
Personal, Social and Emotional Development	Physical Development	Understanding the world	Expressive Arts and Design
• Remember rules without needing an adult to remind them. • Show resilience and perseverance in the face of a challenge. • Know and talk about the different factors that support their overall health and wellbeing: - sensible amounts of 'screen time'. • Be confident to try new activities and show independence, resilience and perseverance in the face of a challenge. • Explain the reasons for rules, know right from wrong and try to behave accordingly.	• Match their developing physical skills to take and activities in the setting • Develop their small motor skills so that they can use a range of tools competently, safely and confidently.	• Explore how things work	• Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Safely use and explore a variety of material, tools and techniques, experimenting with colour, design, texture, from and function.

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Year 1			
Unit	Learning outcomes	Programme of study	Online Safety
We are treasure hunters	Pupils learn: ● that a programmable robot can be controlled by inputting a sequence of instructions ● to develop and record sequences of instructions as an algorithm ● to program a robot to follow their algorithm ● to debug programs ● to predict how their programs will work.	● Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions. ● Create and debug simple programs. ● Use logical reasoning to predict the behaviour of simple programs	Pupils learn to use simple programmable toys safely and sensibly, as well as showing respect for the work of their peers. Web access is supervised and safe practices are encouraged. Similarly, any filming is done with appropriate consent and assent
We are TV chefs	Pupils learn to: ● break down a process into simple, clear steps (an algorithm) ● use different features of a video camera ● use a video camera to capture moving images ● edit a video to include an audio commentary ● develop collaboration skills ● discuss their work and think about how it could be improved.	● Understand what algorithms are. ● Use technology purposefully to create, organise, store, manipulate and retrieve digital content. ● Recognise common uses of information technology beyond school.	Pupils learn how to use digital video cameras safely and to show respect to those they are filming, including recognising the need for consent and assent. The importance of not sharing videos more widely than is appropriate is considered, as is the need to exclude information that might identify individuals from video recordings. When using the web, pupils learn to turn off the screen (or turn over the tablet) and tell their teacher if they encounter material that concerns them. Pupils also start to learn about copyright, recognising that they own the copyright in their original

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			work and that this cannot be published or copied without their permission
We are digital artists	Pupils learn: ● how to select and set brushes and colours ● to create artwork in a range of styles on iPads ● to use the undo function if they make mistakes, and to encourage experimentation ● to use multiple layers in their art ● to transform layers ● to paint on top of photographs.	● Use technology purposefully to create, organise, store, manipulate and retrieve digital content. ● Recognise common uses of information technology beyond school.	Pupils learn that that filters should be in place when searching for images on the web. Internet access is supervised and safe practices are encouraged. Pupils learn that they own the intellectual property in their work and their parents' or carers' consent is needed to publish this. The school may address this through a letter securing parental consent on a number of matters. Pupils learn that they should provide positive, constructive feedback to one another on their work, establishing from an early age the value of commenting positively on work in digital media
We are publishers	Pupils learn to: ● plan a small multimedia eBook ● choose and import images ● record audio commentary ● add and format titles and other text ● think carefully about protecting their privacy ● respect other people's copyright ● revise and improve their work.	● Use technology purposefully to create, organise, store, manipulate and retrieve digital content. ● 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 learn about how to keep personal information private, recognising that the extent to which they need to protect their privacy is determined by the audience to which they are exposed. In preparing their eBooks, pupils could make use of the school's photo collection – this provides a good opportunity to teach them

		● Recognise common uses of information technology beyond school.	about what images the school collects and their use. Pupils learn to use audio recorders or microphones and audio recording software safely and sensibly. Pupils learn that filters should be in place when searching for images on the web. Internet access is supervised and safe practices are encouraged. Pupils need to be aware of copyright material and show appropriate respect for the owners of intellectual property when using technology. They learn about the issues around copying images without permission and that it is best to use Creative Commons licensed or public domain images.
We are rhythmic	Pupils learn to: ● record audio on an iPad ● program sprites to playback recorded audio in ScratchJr ● program ScratchJr to create repeating rhythms using recorded audio ● explore different effects that can be applied to audio ● create a repeating percussion pattern using a virtual drum machine ● experiment with a range of virtual instruments.	● Use technology purposefully to create, organise, store, manipulate and retrieve digital content. ● Recognise common uses of information technology beyond school. ● Understand what algorithms are.	Pupils learn to use audio recorders or microphones and audio recording software safely and sensibly. If searching the web, pupils learn that safe search settings and web filters need to be in place. Pupils need to be aware of copyright material and show appropriate respect for the owners of intellectual property when using technology. They learn that digital music can be copied and the need

			to respect the rights of the owner of the work and the original creator when doing so.
We are detectives	Pupils learn: ● how data can be structured as records with fields for information ● how data can be organised into groups and subgroups ● how data can be structured as a tree ● how data can be organised into a table ● how data in a table can be filtered and searched	● Use technology purposefully to create, organise, store, manipulate and retrieve digital content. ● 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. ● Recognise common uses of information technology beyond school.	Pupils are introduced to the idea of databases being used to collect, store, process and retrieve personal information. The unit provides an opportunity to make pupils aware that they have their data held in databases used by the school and to discuss some of the issues raised by this. Pupils learn about the dangers of giving personal information on online forms, particularly if we have no clear idea of where this data is held and to what purposes it might be put. They should only give information if they know it is safe to do so.

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Year 2			
Unit	Learning outcomes	Programme of study	Online Safety
We are astronauts	Pupils learn to: ● plan a sequence of instructions to move sprites in ScratchJr ● create, test and debug programs for sprites in ScratchJr ● work with input and output in ScratchJr ● use repetition in their programs ● design costumes for sprites.	● Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions. ● Create and debug simple programs. ● Use logical reasoning to predict the behaviour of simple programs.	Remind parents/carers about their responsibility to monitor their children's use of technology and advise them to set sensible limits on the amount of screen time they have.
We are game testers	Pupils learn to: ● observe and describe carefully what happens in computer games ● use logical reasoning to make predictions of what a program will do and test these predictions ● think critically about computer games and their use ● create sequences of instructions for a virtual robot to solve a problem ● work out strategies for playing a game well ● be aware of how to use games safely and in balance with other activities.	● Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions. ● Use logical reasoning to predict the behaviour of simple programs. ● Recognise common uses of information technology beyond school. ● Use technology safely and respectfully, keeping personal information private.	Although the games mentioned in this unit are appropriate for pupils in Year 2, there are concerns about the violent nature of some games. Choosing games wisely, including observing PEGI age restrictions and playing in moderation, are aspects of the safe and respectful use of technology that pupils learn about in this unit. The Scratch online community is generally a safe, well moderated space, but if pupils encounter content or comments which cause distress, make sure they know what to do: typically turn off the screen/ turn over the tablet over and let an adult know straight away. Content and comments on the Scratch site can be flagged as inappropriate to the moderators. This provides an

			opportunity to learn about where to go for help and support when they have concerns about content or contact.
We are photographers	Pupils learn to: ● consider the technical and artistic merits of photographs ● use the iPad camera app ● take digital photographs ● review, reject or pick the images they take ● edit and enhance their photographs	● 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.	Pupils learn that once images are posted online, it is impossible to control what happens to them. Facial recognition software and geotagging mean that those posting images might inadvertently fail to keep some personal information private. Pupils learn how to minimise these risks and learn what they should do if they have concerns about images they encounter on the web. They also learn about what is acceptable and unacceptable to photograph, for example, that it is not a good idea to take or share photographs in which children can be identified, or that might reflect badly on the school.
We are safe researchers	Pupils learn to: ● develop collaboration skills through working as part of a group ● develop research skills through searching for information on the Internet ● think through privacy implications of their use of search engines ● be more discerning in evaluating online information	● 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	Pupils learn about Internet filters and Safe search, and how to stay safe while researching online. They are encouraged to think about whether the information they read online is reliable, and develop some strategies for being able to check. They show respect for others' ideas and intellectual property by using

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	● improve note-taking skills through the use of mind mapping ● develop presentation skills through creating and delivering a short multimedia presentation.	they have concerns about content or contact on the Internet or other online technologies.	Creative Commons licensed images and crediting their sources.
We are animators	Pupils learn to: ● understand how animation works ● use storyboards to plan an animation ● create their own original characters, props and backgrounds for an animation ● film, review and edit a stop-motion animation ● record audio to accompany their animation ● provide constructively critical feedback to their peers.	● 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.	Pupils could source character designs or view animations online. If they do, remind pupils what to do if they encounter content that is inappropriate or makes them feel uncomfortable. If pupils upload their work to share with a wider audience, they should do so in accordance with your school's policy, typically ensuring that pupils are not shown or identified in the videos. They should make sure that any third-party content in their animations is credited.
We are zoologists	Pupils learn to: ● sort and classify a group of items by answering questions ● collect data using tick charts or tally charts ● take, edit and enhance photographs ● use Google Sheets or Microsoft Excel to produce basic charts ● record information on a digital map ● summarise what they have learned in a presentation.	● 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	Pupils learn that when sharing photographs and geo-location information online, they need to consider the importance of keeping personal information private, for example not including names or photographs of people. Pupils are taught to respect rules for using digital equipment when out of the classroom, to ensure the equipment is kept safe, and that they are not so focused on using it

			that they become unaware of risks around them.

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Year 3			
Unit	Learning outcomes	Programme of study	Online Safety
We are programmers	Pupils learn to: ● plan and create an algorithm for an animated scene in the form of a storyboard ● write a program in Scratch to create the animation, including characters, dialogue, costumes, backdrops and sound ● review their animation programs and correct mistakes.	● Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts. ● Use sequence in programs; work with variables and various forms of output. ● Use logical reasoning to detect and correct errors in algorithms and programs.	Pupils need to consider copyright when sourcing images for their programs and uploading their own work to the Scratch community site. Searching for content for programs or viewing others' cartoons also offers an opportunity to develop safe search habits. Exploring online animation galleries may expose pupils to inappropriate content. Talk about what to do if they see something inappropriate – turn their iPads over (or turn screens off/close laptop lids) and tell a teacher/adult. If the pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission.
We are bug fixer	Pupils learn to: ● 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 bugs in software.	● Debug programs that accomplish specific goals. ● 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	Pupils could consider the implications of bugs in software. Participating in the Scratch community would enable the pupils to help others with their projects as well as allowing them to receive help. If pupils participate in the Scratch community, they need to think about what information they

		detect and correct errors in algorithms and programs.	can share and how to participate positively in an online community, as well as obtaining parental permission. If pupils upload screencasts of their solutions, make sure you take the usual precautions to protect their identity.
We are presenters	Pupils learn to: ● develop their web-based research skills ● structure, prepare and deliver a talk about a given topic or subtopic studied in another curriculum area ● record a piece to camera ● edit a movie using static images and green screen footage ● give constructive, critical feedback on recorded presentations.	● 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 information. ● Use technology safely, respectfully and responsibly	Pupils should know what to do if they encounter inappropriate images or other content while searching online. Pupils should respect the intellectual property of others. Show them how they can restrict their search to Creative Commons licensed content. In filming one another, the pupils need to ensure that the appropriate permission has been obtained, and that they act respectfully and responsibly when filming, editing and presenting their work. The pupils should think through the implications of videos being made available on the school network or more widely via the Internet. They should discuss why schools and other organisations have strict policies over filming.
We are who we are	Pupils learn to: ● create a number of structured presentations ● narrate presentations	● Select, use and combine a variety of software to design and create content that accomplishes given goals, including presenting information.	Pupils should know what to do if they encounter inappropriate images or other content while searching online. Pupils should think about what is appropriate to

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	● consider issues of trust and privacy when sharing information.	● Use technology safely, respectfully and responsibly	share online, even when the intended audience is well known to them. It is important that pupils recognise their rights not to share information that they consider private.
We are co-authors	Pupils learn to: ● 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.	● 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. ● Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content.	Pupils learn about Wikipedia, considering some strategies for evaluating the reliability of online content as well as the rules and processes that the Wikipedia community has evolved. Pupils develop a shared wiki, thinking carefully about how to do so safely and responsibly, considering what conduct is appropriate when collaborating on a shared resource.
We are opinion pollsters	Pupils learn to: ● understand some elements of survey design ● understand some ethical and legal aspects of online data collection ● use the Internet to facilitate data collection ● use charts to analyse data ● interpret results.	● 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. ● Understand computer networks, including the Internet; how they can provide multiple services, such as the World Wide Web; and the opportunities	Pupils learn some of the legal and ethical requirements for designing online surveys and processing data. They also consider what information it would be appropriate for them to give in an online survey, and some implications of data processing. Pupils can use online tools for collaborating on survey design and analysis, considering how to use these appropriately. The

		they offer for communication and collaboration.	survey itself could address issues of the pupils' attitudes to online safety.

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Year 4			
Unit	Learning outcomes	Programme of study	Online Safety
We are software developers	Pupils learn to: ● 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.	● Design, write and debug programs that accomplish specific goals. ● 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.	Pupils need to consider copyright when sourcing images or media for their programs and/or uploading their own work to the Scratch community site. Searching for content for their programs or viewing others' games also offers an opportunity to develop safe search habits. If pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission.
We are makers	Pupils learn: ● about the input – process – output model of computation ● about the inputs and outputs available on a BBC micro:bit ● to program using the MakeCode block-based environment ● to test and debug programs they write, using an on-screen simulator and the micro:bit ● how to convert and transfer a program written on screen to the micro:bit.	● Design, write and debug programs that accomplish specific goals. ● 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.	Pupils can publish their programs to the MakeCode website. If they are to do so, parental permission will be needed. Pupils might explore the projects uploaded by others to the MakeCode website. They must let an adult know if they come across any inappropriate content when looking at these, although this is very unlikely.
We are musicians	Pupils learn to: ● create a repeating percussion rhythm ● play music using virtual instruments	● Use sequence and repetition; work with various forms of input and output.	Pupils need to think about copyright when sourcing audio or publishing their own compositions.

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	● compose or edit tunes using the piano roll (pitch and duration) tool ● perform electronic music using pre-recorded loops, and create their own loops ● create a multi-track composition or performance using multiple instruments ● give feedback to others on their compositions and performances.	● Be discerning in evaluating digital content. ● Select, use and combine a variety of software on a range of digital devices to design and create a range of content that accomplishes given goals. ● Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour.	They are encouraged to use Creative Commons licensed content if working with others' audio files. There is an opportunity to discuss how copyright relates to music performed in school as well as illegal downloading and sharing of copyrighted music.
We are bloggers	Pupils learn to: ● 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.	● 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 a variety of software (including Internet services) on a range of digital devices to design and create a range of content that accomplish given goals. ● Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour.	Pupils write content for their own or a shared blog, thinking carefully about what can be appropriately shared online. They consider issues of copyright and digital footprint as well as what constitutes acceptable behaviour when commenting on others' blog posts. Pupils also think about the importance of creating high-quality, online content and become more discerning in evaluating content as they review others' blogs. If the pupils' blogs are publicly accessible, it is important that any comments are moderated by their teacher.
We are artists	Pupils learn to: ● 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	● Use sequence, selection and repetition in programs; work with variables and various forms of output. ● Select, use and combine a variety of software (including Internet services) on a range of digital devices to design and	If pupils use Google image seach to study examples of artists' work, this offers an opportunity to develop safe search habits. Precautions over protecting personal information should be in place if pupils upload work they create for others to see,

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	● 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 computer-generated art.	create a range of content that accomplish given goals.	and pupils should think about the protection of their own copyright.
We are meteorologists	Pupils learn to: ● 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 and video software.	● Work with variables and various forms of input and output. ● Use logical reasoning to explain how some simple algorithms work. ● 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.	Pupils consider the importance of obtaining and using accurate data for any information-processing work. If pupils film one another, they need to ensure appropriate permission is obtained and that recordings are made, edited and shown in safe, respectful and responsible ways. Pupils should think carefully about the implications of uploading their films to the school network or to the web.

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Year 5			
Unit	Learning outcomes	Programme of study	Online Safety
We are game developers	Pupils learn to: ● 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.	● Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems and solving 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.	Pupils need to consider copyright when sourcing images or media for their games and uploading their own work to the Scratch community site. Searching for content for their games or viewing others' games also offers an opportunity to develop safe search habits. If the pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission. Pupils might also consider some personal implications of playing games, perhaps including violent, costly or addictive computer games.
We are cryptographers	Pupils learn to: ● 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 Internet.	● 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 technology safely, respectfully and responsibly; recognise	Pupils learn how information can be communicated in secret over open channels, including the internet, using cryptography. They learn about the public key system used to sign and encrypt content on the web and how they can check the security certificates of encrypted websites. They learn about the importance of password security for online identity and consider what makes a secure password.

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		acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	
We are architects	Pupils learn to: ● understand the work of architects, designers and engineers working in 3-D ● develop familiarity with a simple CAD (computer-aided design) tool ● develop spatial awareness by exploring and experimenting with a 3-D virtual environment ● develop greater aesthetic awareness.	● 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 information.	Pupils should observe good practice when searching for and selecting digital content. If the pupils choose to locate their 3-D models geographically, they should avoid sharing private information. Pupils should think about copyright when adding content to their model or publishing images or videos of their model.
We are web developers	Pupils learn: ● the name and function of components making up the school's network ● how information is passed between the components that make up the Internet ● what the source code for a web page looks like, and how it can be edited ● how a website can be structured ● how to add content to a web page.	● 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. ● 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.	Pupils learn about how networks, including the Internet, operate. They learn that data transmitted via the Internet is not always encrypted. They consider some of the implications for privacy, e.g. their 'digital footprint' associated with using the Internet. Pupils learn how easy it is to create content for the web. The unit provides an opportunity to address some of the risks of using the web, and how pupils could best keep themselves safe while doing so. Pupils learn how easily web pages can be modified, which provides an opportunity to consider the reliability of web-based content.

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		● Be discerning in evaluating digital content	
We are adventure gamers	Pupils learn: ● how to plan a non-linear presentation ● to create text as part of a presentation ● to add and edit images in a presentation ● to use hyperlinks for navigation between the slides of a presentation ● to record and add audio narration to a presentation ● to use commenting tools to give feedback on a presentation.	● Use search technologies effectively. ● Use a variety of software (including Internet services) on a range of digital devices to design and create content that accomplish given goals, including presenting information. ● Use technology safely, respectfully and responsibly.	Pupils should observe good practice when searching for and selecting digital content. They should use Creative Commons licensed images in their interactive presentation and should respect the conditions attached to these. Pupils will be working collaboratively on a shared presentation, and later will be providing online feedback to other pupils. Establish ground rules of respect and kindness and ensure that pupils' contributions can be identified.
We are VR designers	Pupils learn to: ● explore real-world and imagined locations in VR (if possible) ● create 360° photosphere images ● link physical objects to digital content using QR codes ● create their own VR scene ● program objects and interactions in VR.	● 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. ● 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 information.	The Street View activities provide an opportunity for pupils to consider privacy issues in real world contexts. Pupils should remember that the GPS sensor on smartphones/iPads automatically records location information, using this to locate their photosphere on a map. Pupils should know how to switch off location recording. Pupils should understand why photospheres uploaded to Google should have any faces, number plates or other personal information blurred. Pupils should recognise that care is needed when

			scanning QR codes from unknown sources. As with other online work, use of CoSpaces should be with necessary filters and monitors in place; pupils should know what to do if they encounter inappropriate content and pupils should respect copyright for any third-party content they include.

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Year 6			
Unit	Learning outcomes	Programme of study	Online Safety
We are toy makers	Pupils learn: ● how computers use stored programs to connect input to output ● how to generate and evaluate designs in response to a brief ● to plan a complex project by decomposing it into smaller parts ● to work with physical components of a system ● how to design and write a program for an embedded system ● to use criteria to provide others with feedback on their work.	● Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems. ● Use sequence, selection, and repetition in programs; work with 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.	Pupils need to think carefully about copyright in sourcing images and other media for their toy prototypes and presentations, or if uploading their own work to the Scratch community. If pupils do participate in the online Scratch community, they should think through how to do so in a safe and responsible manner, and should obtain consent from their parents or carers. If pupils link their programs to hardware, they need to take care to work safely with a range of tools and electronic equipment.
We are computational thinkers	Pupils learn to: ● 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 searching and sorting a list.	● Design, write and debug programs that accomplish specific goals. ● 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.	Pupils learn about some common algorithms, recognising that more efficient solutions to the same problem can reduce the impact of computation on energy and other resources. They remix code on Scratch or Snap! websites, as permitted by Creative Commons licences for the code they work with, in much the same way as they might modify open source software. Pupils who wish to register for accounts on these sites need to observe the associated

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			terms and conditions, which typically require parental consent.
We are publishers	Pupils learn to: ● 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.	● Understand computer networks including the Internet 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.	Pupils create a school magazine or yearbook. They consider carefully the implications of including photographs of pupils in their work, recognising that typically names would not be used in captions and that they should have permission to publish any pictures they use. They respect school policies and relevant legislation. They also recognise that intellectual property exists in other pupils' work and that this should be respected, so include such excerpts only with permission. They also learn that sensitive personal information should not be included in publications such as these, thinking carefully about what this means in practice.
We are connected	Pupils learn: ● about appropriate rules or guidelines for a civil online discussion ● how search results are selected and ranked ● how to argue their point effectively, supporting their views with sources ● how to counter someone else's argument while showing respect and tolerance ● how to judge the reliability of an online source	● Understand the opportunities computer networks offer for communication and collaboration. ● Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. ● Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content.	Pupils consider how online debates should best be conducted, searching the Internet safely, using a blog to argue a case, responding respectfully to others, evaluating the quality of sources and considering how online bullying might best be addressed. It is important that pupils' work is not accessible outside the school. Posts and responses should be moderated. Ensure that safe search

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	● some strategies for dealing with online bullying		filters, Internet filters and monitoring software are in place. Make sure online bullying advice matches your school policy.
We are advertisers	Pupils learn to: ● think critically about how video is used to promote a cause ● storyboard an effective advert for a cause ● work collaboratively to shoot original footage and source additional content ● acknowledge intellectual property rights ● work collaboratively to edit the assembled content to make an effective advert.	● 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.	Pupils create short advertising videos. They learn the importance of observing school policy in relation to videoing, and the need to obtain consent. They think carefully about the implications of sharing content publicly on sites such as YouTube and consider how such publication would limit what they might include in their advert. They recognise the need to use video search platforms in restricted or education-specific modes and bring to mind what they should do if they encounter inappropriate content. They learn to respect the intellectual property rights of others, and the need to observe licence terms for any content they do not create themselves.
We are AI developers	Pupils learn: ● how decision trees can be trained automatically to classify data ● how speech recognition works ● how a neural net recognises images ● to train a neural net to classify images ● to train a machine learning system to identify sentiments	● Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. ● Use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content that accomplish	Pupils should remember not to share personal information when using online services. If Teachable Machine is used it would be best not to use pupils' own faces in the training data. You could broaden the discussion of facial recognition by machine learning systems and whether this is an invasion of

	● to consider some ethical principles in designing AI systems.	given goals, including collecting, analysing, evaluating and presenting data and information.	privacy or needed in certain circumstances.