Computing Expectations

Overview

	Autumn		Spring		Summer	
Year 1	Introduction to Computer Science 1	We are collectors *(Finding images using the Web)*	We are celebrating *(Creating a greeting card)*	We are painters *(Illustrating a book)*	We are storytellers *(Producing a talking book)*	We are TV chefs *(Filming instructions)*
Year 2	Introduction to Computer Science 2	We are photographers *(Taking, selecting and editing photographs)*	We are astronauts *Programming on screen)*	We are zoologists *Programming on screen)*	We are games testers *(Exploring how computer games work)*	We are researchers/detectives *(Researching topic and communicating clues)*
Year 3	Introduction to Computer Science 3	We are communicators *(Communicating safely on the internet)*	We are programmers *(Programming an animation)*	We are performance *(Videoing performance)*	We are bug fixers *(Finding and correcting bugs)*	We are opinion pollsters *(Collecting and analysing data)*
Year 4	We are meteorologists *(Presenting the weather)*	We are software developers (Developing a simple educational game)	We are co-authors *(Produce a wiki)*	We are HTML editors (editing and writing HTML)	We are toy designers *(Prototyping an interactive toy)*	We are musicians *(Producing digital music)*
Year 5	We are bloggers *(Sharing experiences and opinions)*	We are web developers *(Creating a web page about cyber safety)*	We are Game developers *(developing an interactive game)*	We are Cryptographers *(Cracking codes)*	We are *(Fusing geometry and art)*	We are architects (Creating a virtual space)
Year 6	We are adventure gamers	We are computational thinkers	We are network technicians	We are advertisers	We are publishers	We are travel writers

Computing Expectations

Year 1

	Unit	Expectations	Computing POS	E-Safety
Autumn 1	Introduction to Computer Science 1	• 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.	• 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. • Recognise common uses of information technology beyond school.	
Autumn 2	We are collectors (Finding images using the Web)	• 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) questions about their images.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. • 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.	As pupils will be working with the web and searching for images, they'll need to make sure they use this technology safely, as well as showing respect for others' intellectual property through observing copyright conditions. The pupils are taught to turn the screen off and let their teacher know if they have any concerns over content they encounter. The pupils are also introduced to the school's Acceptable Use Policy, if they haven't already had this explained to them.
Spring 1	We are celebrating (Creating a greeting card)	• 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.	• 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.	The pupils have an opportunity to search for images on the web, and again learn to use technology safely, switching off the screen if they have concerns, and reporting these to their teacher. The pupils are taught to respect the copyright conditions associated with any third party images they use. Pupils only use photos of themselves if appropriate permission is in place. If children share their work, then attention is paid to protecting their identity and copyright. If they send cards by email they use a class address and consider some aspects of using email safely.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Spring 2	We are painters (Illustrating a book)	• 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. • Reflect on their work and act on feedback received.	• 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.	In searching for images on the web, pupils work initially from a set of carefully chosen sites. They again learn that they should turn the screen off and tell their teacher if they encounter material that concerns them. If work is uploaded to a public area, the importance of protecting the children's identities is recognised, as is their intellectual property rights over their original work. An extension activity provides an initial opportunity for the children to learn some aspects of using email safely.
Summer 1	We are storytellers (Producing a talking book)	• 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. • Share recordings with an audience.	• 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	The pupils learn to use audio recorders or microphones and audio recording software safely and sensibly. The pupils need to be aware of copyright material, and show appropriate respect for the owners of intellectual property when using technology. Regard is shown for appropriate consent and assent, school policies and third party terms and conditions if the pupils' stories are uploaded to external websites.
Summer 2	We are TV chefs (Filming instructions)	• 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.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. • Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school. • Use logical reasoning to predict the behaviour of simple programs.	The 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 the screen off and tell their teacher if they encounter material that concerns them. The pupils also start to learn about copyright, recognising that they own the copyright in their original work and that this cannot be published or copied without their permission.

Computing Expectations

Year 2

	Unit	Expectations	Computing POS	E-Safety
Autumn 1	Introduction to Computer Science 2	• 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.	• 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.	
Autumn 2	We are photographers (Taking better photos)	• 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.	• 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.	The children learn that once images are posted online, it's 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. The children learn how to minimise these risks, and learn what they should do if they have concerns about images they encounter on the web. The children also learn about what is acceptable and unacceptable to photograph, for example, that it is usually not a good idea to take or share photographs in which children can be identified, or that might reflect badly on the school.
Spring 1	We are astronauts (Programming on screen)	• 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.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute 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.	The pupils must let their teacher know if they encounter inappropriate material when they search the web. If the pupils use third-party images in their projects, they should use images with public domain or Creative Commons licences. The pupils may upload their projects to the Scratch website, if they have registered for accounts using a parent's e-mail address. They learn to observe MIT's terms and condition.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Spring 2	We are zoologists (Collecting data)	• 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.	• 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.	The pupils again learn that when sharing photographs and geo-location information online they need to consider the importance of keeping personal information private; they achieve this by not including names or photographs of people. The 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.
Summer 1	We are games testers (Exploring how computer games work)	• 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.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute 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.	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. As in Unit 2.1, the pupils may upload their projects to the Scratch website, if they have registered for accounts using a parent's e-mail address. Comments on the Scratch website are not moderated before they appear, although the pupils can report any which are inappropriate. This provides an opportunity to learn about where to go for help and support when they have concerns about content or contact.
Summer 2	We are researchers / detectives (Researching topic and communicating clues)	• 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.	• 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.	The pupils consider how to stay safe while researching online, and show respect for others' ideas and intellectual property by citing their sources, and using licensed images. Safe search filters are in place for using Google or Bing and school internet access is filtered.

Computing Expectations

Year 3

	Unit	Expectations	Computing POS	E-Safety
Autumn 1	Introduction to Computer Science 3	• 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.	• 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.	
Autumn 2	We are bug fixers (Finding and correcting bugs)	• 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.	• 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.	The 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 on their own. Participation requires parental permission, and the pupils should consider what behaviour is acceptable online.
Spring 1	We are programmers (Programming an animation)	• 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.	• 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 input and output. • Use logical reasoning to detect and correct errors in algorithms and programs. • Select, use and combine a variety of software to design and create content that accomplish(es) given goals, including presenting information.	The pupils need to consider copyright when sourcing images for their programs and/or 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. 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.
Spring 2	We are presenters (Videoing performance)	• 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.	• 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. • Work with various forms of input and output. • Use technology safely, respectfully and responsibly.	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.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Summer 1	We are communicators (Communicating safely on the internet)	• 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.	• 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.	The pupils should think about the safe use of email. They learn how email can be used positively. They become aware of some of its risks, including malware attachments, hacked accounts, spam and spoofed links, but also learn how their exposure to such risks can be reduced. They consider the importance of introductions in extending circles of trust. They learn how video conferencing can be used positively, to support learning with a known partner.
Summer 2	We are opinion pollsters (Collecting and analysing data)	• 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.	• 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. • 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.	The 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. The pupils can use online tools for collaborating on survey design and analysis, considering how to use these appropriately. The survey itself could address issues of the pupils' attitudes to online safety.

Computing Expectations

Year 4

	Unit	Expectations	Computing POS	E-Safety
Autumn 1	We are meteorologists (Presenting the weather)	• 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.	• 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 and information.	The pupils consider the importance of obtaining and using accurate data for any information-processing work. If the 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. The pupils should think carefully about the implications of uploading their films to the school network or to the internet.
Autumn 2	We are software developers (Developing a simple educational game)	• 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.	The 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 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.
Spring 1	We are co-authors (Produce a wiki)	• 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.	• Solve problems by decomposing them into smaller parts. • 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. • Use a variety of software (including internet services) to create content including presenting information. • Use technology safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour; identify a range of ways to report concerns about content and contact.	The 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. The pupils develop a shared wiki, thinking carefully about how to do so safely and responsibly, and considering what conduct is appropriate when collaborating on a shared resource.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Spring 2	We are HTML editors (editing and writing HTML)	• 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.	• 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; know a range of ways to report concerns and unacceptable behaviour. • Use and combine a variety of software (including internet services) to accomplish given goals, including presenting information.	The 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. They learn how easily web pages can be modified, which provides an opportunity to consider the reliability of web-based content.
Summer 1	We are toy designers (Prototyping an interactive toy)	• 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.	• 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.	The pupils again 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 the 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 their parents' consent. If the pupils link their programs to hardware, they need to take care to work safely with a range of tools and electronic equipment.
Summer 2	We are musicians (Producing digital music)	• 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.	• Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • Understand computer networks including the internet; and the opportunities they offer for communication and collaboration. • 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.	The pupils need to think about copyright when sourcing audio or publishing their own compositions. They are encouraged to use Creative Commons licensed content if working with others' audio files. There's an opportunity to discuss how copyright relates to music performed in school as well as illegal downloading and sharing of copyrighted music.

Computing Expectations

Year 5

	Unit	Expectations	Computing POS	E-Safety
Autumn 1	We are bloggers (Sharing experiences and opinions)	• 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. • 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 be discerning in evaluating digital content.	The 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. The 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; it is worth discussing with the pupils why the comments should be moderated.
Autumn 2	We are web developers (creating a web page about cyber safety)	• 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.	• 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. • 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.	Online safety forms the focus of this unit, with the pupils working collaboratively to develop a website in which they present their own authoritative content on a broad range of issues around the safe and responsible use of technology. In doing so, they consider the reliability and bias of online content, how to contribute positively to a shared resource, and how to use search engines safely and effectively.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Spring 1	We are Game developers (developing an interactive game)	• 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; 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. • 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.	The pupils need to consider copyright when sourcing images or media for their games and/or 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. The pupils might also consider some personal implications of playing games perhaps including violent computer games.
Spring 2	We are Cryptographers (Cracking codes)	• 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.	• 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 acceptable / unacceptable behaviour; identify a range of ways to report concerns about content and contact.	The 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.
Summer 1	We are artists (Fusing geometry and art)	• 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 computer generated art, in particular fractal-based landscapes.	• 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. • 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.	The unit provides an opportunity to reinforce messages around safe searching and evaluating the quality of online content. If the pupils upload their work for others to see, they should consider the importance of protecting personal information as well as recognising that they are sharing their own copyrighted work with an audience.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Summer 2	We are architects (Creating a virtual space)	• 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.	• 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.	The pupils should observe good practice when searching for and selecting digital content. If the pupils choose to locate their 3D models geographically, they should avoid sharing private information. The pupils should think about copyright when adding content to their model or publishing images or videos of their model.

Computing Expectations

Year 6

	Unit	Expectations	Computing POS	E-Safety
Autumn 1	We are adventure gamers	• 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.	• 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.	Pupils learn to program a simple text-based adventure game in Python. It's important that pupils do not have admin privileges on their computers as Python can be used to provide access to shell/operating system commands. An alternative is to use the trinket.io online Python interpreter: the pupils need to observe terms and conditions and the usual precautions about not sharing information publicly. If the pupils base their games on published stories, they need to show respect for intellectual property in those works.
Autumn 2	We are computational thinkers	• 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.	• 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.	The 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 and 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 terms and conditions, which typically require parental consent.
Spring 1	We are network technicians	• 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.	• 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 acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	The 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. They become aware of the importance of DNS for safe use of the internet. They have the opportunity to use command line diagnostic tools safely and responsibly. They create posters or other documents to share their knowledge with others.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Spring 2	We are advertisers	• 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.	• 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.	The 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.
Summer 1	We are publishers	• 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.	The 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.

Computing Expectations

	Unit	Expectations	Computing POS	E-Safety
Summer 2	We are travel writers	• 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.	• 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. • 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.	The pupils take photographs, video and audio recordings on an educational visit. They should do so in accordance with school policy and any regulations of the venue for their visit. They should make sure they have permission if they are photographing a person, and of the landowner if on private property. Pupils learn about geotagging GPS location data in photographs and smartphone tracklogs, and consider the privacy implications of this. Pupils think carefully about what media, metadata and information it is safe, respectful and responsible to share publicly. There is the opportunity in this unit for pupils to use their own smartphones or tablet computers, which should be done in accordance with relevant school policies.