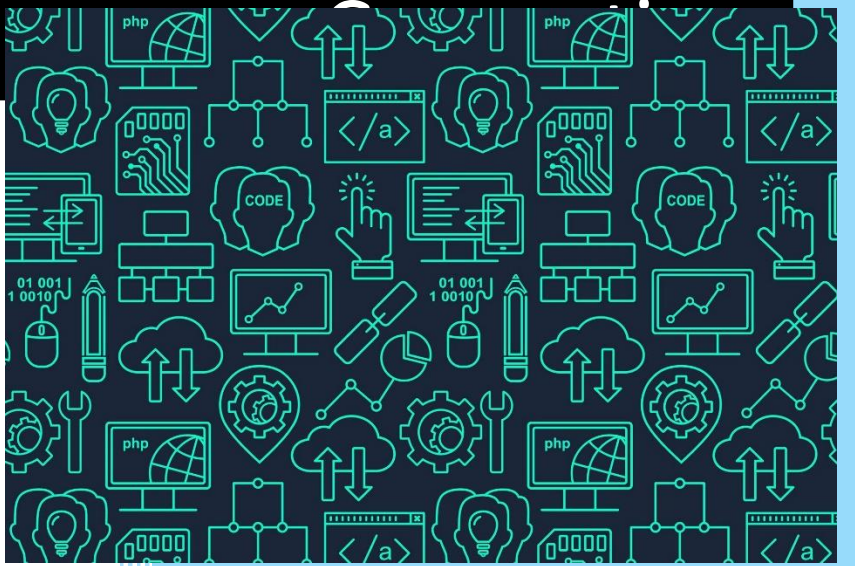
2019

Curriculum Skills and Progression Map



Nebula
where stars are born

The Nebula Federation

White Woman Lane Junior School

Computing Long Term Plan

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
3	**Word Processing** Basic word-processing skills and various features for formatting text.	**We are programmers** Create an animated cartoon using characters they design.	**We are bug fixers** Recognise common types of programming error, and practise solving problems through logical thinking.	**We are presenters** Make a short narrated video of themselves practising a sport or other skill, and to use this to help improve their performance.	**We are communicators** Learn how to use email and video conferencing safely.	**We are opinion pollsters** Children create their own opinion poll, seek responses, and then analyse the results.
4	**We are software developers** **Developing a simple educational game.**	**We are musicians** **Producing digital music.**	**We are HTML editors** **Editing and writing HTML.**	**We are toy designers** **Prototyping an interactive toy.**	**We are meteorologists** **Presenting the weather.**	**We are co-authors** **Producing a wiki.**
5	**We are game developers** Developing an interactive game.	**We are artists** Fusing geometry and art.	**We are web developers** Creating a web page.	**We are architects** Creating a virtual space.	**We are cryptographers** Cracking codes.	**We are bloggers** Sharing opinions and experiences.
6	**We are adventure gamers** Making a text-based adventure game.	**We are computational Thinkers** Mastering algorithms for searching, sorting and mathematics	**We are advertisers** Creating a short television advert.	**We are network Technicians** Exploring computer networks including the internet.	**We are travel writers** Using media and mapping to document a trip (Whitlingham).	**We are publishers** Creating a yearbook or magazine.

Skills Map

Year 3					
Sub-Strand	**Progression Statement**	**What to Look For Guidance (Working towards expectations)**	**What to Look For Guidance (Meeting expectations)**	**What to Look For Guidance (Exceeding expectations)**	**Unit**
Problem Solving	C.3.1.1. Use technology safely, respectfully and responsibly.	The child can use digital technology safely. The child should know that they need to keep themselves safe when using digital technology. E.g. They should take care when using the **Command** prompt and should treat attachments and links in emails with caution. *(E.g.In Word Processing, practise using safe passwords and consider their importance, In We are communicators, take care with links and attachments in email; respond appropriately to others.)*	The child can use digital technology safely and show respect for others when working online. The child should know that they need to keep themselves safe when using digital technology. E.g. They should show respect for others when filming and should not normally post videos online. They should take care when using the **Command** prompt and should treat links and attachments in emails with caution. If responding to online surveys, they should do so anonymously, thinking carefully about information they give out. *(E.g. In Word Processing, create passwords and understand their function, In We are presenters, take care to film appropriately and not publish video of other children. In We are communicators, take care with links and attachments in email. In We are presenters, ensure questions are answered anonymously.)*	The child can demonstrate that they can act responsibly when using computers. The child can demonstrate that they act responsibly when using computers. E.g. They should contribute positively to online communities, if allowed to do so, observing the terms and conditions. They should take care when filming others and should not post videos of others online. They should treat links and attachments in emails with caution. If responding to online surveys, they should do so anonymously, thinking carefully about information they give out. *(E.g. In Word Processing , create complex passwords that are difficult to crack, In We are programmers and We are bug fixers, contribute positively to the Scratch community, if allowed to do so. In We are presenters, take care to film appropriately and not publish video of other children.*	Word Processing We are programmers We are bug fixers We are presenters We are communicators We are presenters
	C.3.1.2. Recognise acceptable/unacceptable behaviour.	The child can give examples of things that they should or should not do when using digital technology. The child can give some examples of things they should or should not do when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; using the **Command** prompt; using email; filming or sharing video; using online survey tools. *(E.g. In We are presenters, give examples of good or bad practice when shooting or publishing video. In We are communicators, give examples of good or bad practice when using email. In We are presenters, give examples of good or bad practice when creating or completing online surveys.)*	The child can recognise unacceptable behaviour when using digital technology. The child can identify what would be unacceptable or inappropriate behaviour when using digital technology in a range of contexts. E.g. They should know what would be unacceptable when using online communities, such as the Scratch website, or when shooting or publishing video. They should know what would be unacceptable use of the **Command** prompt, email or online survey tools. *(E.g. In We are programmers and We are bug fixers, recognise unacceptable behaviour when using the Scratch community. In We are presenters, recognise unacceptable behaviour when shooting or publishing video. In We are communicators, recognise unacceptable behaviour when using email. In We are presenters, recognise unacceptable behaviour when creating or completing online surveys.)*	The child can understand the difference between acceptable and unacceptable behaviour when using digital technology. The child can discuss the difference between acceptable and unacceptable behaviour when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; using the **Command** prompt; using email; filming or sharing video; using online survey tools. *(E.g. In We are programmers andWe are bug fixers, understand the difference between acceptable and unacceptable behaviour when using the Scratch community. In We are presenters, understand the difference between acceptable and unacceptable behaviour when shooting or publishing video. In We are communicators, understand the difference between acceptable and unacceptable behaviour when using email. In We are presenters, understand the difference between acceptable and unacceptable behaviour when creating or completing online surveys.)*	We are programmers We are bug fixers We are presenters We are communicators We are presenters
	C.3.1.3. Know a range of ways to report concerns and inappropriate behaviour.	Know who to talk to about inappropriate behaviour in school. Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the **network** manager or another trusted adult. *(E.g. Know to tell a teacher about inappropriate behaviour in units We are presenters, We are communicators and We are presenters.)*	Know who to talk to about concerns and inappropriate behaviour in school. Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the **network** manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units.)*	Know who to talk to about concerns and inappropriate behaviour at home or in school. Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the **network** manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school. They should also know that any concerns over inappropriate behaviour with digital technology at home can be discussed with their parents, with you or with another trusted adult. Pupils might also know that they can report inappropriate behaviour to those running websites, to ChildLine, to CEOP or to the police. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the Scratch community can be reported to the community moderators (units We are programmers and We are bug fixers). Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	All Units

Programming	C.3.2.1. Use sequence, selection and repetition in programs; work with variables.	The child can understand that **programs** include **sequences** of instructions. The child can understand that **programs** are made up of **sequences** of instructions (ideally in code they have created themselves, but possibly that of their peers or **programs** they have been provided with). A typical program could be a **scripted a**nimation using movement and onscreen text. The child can look at a **program** on screen and list some of the instructions it includes. *(E.g. In We are programmers and We are bug fixers, notice that programs are made of sequences of instructions.)*	The child can use **sequence** in **programs.** In on-screen programming, the child's **program** should include a **sequence** of **commands** or **blocks** in an appropriate order. A typical program could be a simple **scripted** animation, e.g. telling a joke, a story or explaining an idea taken from elsewhere on the curriculum. The child's **program** might include multiple **sprites**; instructions could include movement, on-screen text, sound and/or costume changes. *(E.g. In We are programmers, use sequences of instructions in their Scratch animation program.)*	The child can use **sequence** and **repetition** in **programs**. In on-screen programming, the child can include **sequences** of **commands** or **blocks**. The child can include some repeating **loops**, typically using a 'forever' or 'while true' construction, or **repetition** for a fixed number of times. **Programs** could include simple animations (e.g. telling a joke, a story or explaining an idea taken from elsewhere on the curriculum) but could also include music as a **sequence** of steps to play notes or drawing as a **sequence** of steps to draw a shape. *(E.g. In We are programmers, use sequence and repetition in their animation program. In We are bug fixers, debug programs using sequence and repetition.)*	We are programmers We are bug fixers
	C.3.2.2. Work with various forms of input and output	The child can understand that computers accept **input** and produce **output**. The child can identify the most common forms of **input** (e.g. keyboard and mouse/trackpad or touch screen) and **output** (screen and speakers) for a computer. The child can distinguish between **input** and **output**. *(E.g. In We are bug fixers, notice that many of these programs accept input as well as producing output. In We are presenters and We are presenters, recognise input and output.)*	The child can write a **program** to produce **output** on screen. The child can create a **program** that produces **output** on screen, such as moving **sprites** or displayed text, e.g. a simple animation program. *(E.g. In We are programmers, create a simple animation program in Scratch.)*	The child can write a **program** to produce **output** on screen and through speakers/headphones. The child can write a program that produces **output** on screen (e.g. displayed text and moving **sprites** in a simple animation) as well as some sound (e.g. recorded audio, computer-generated music or sound effects for an animation **program**). *(E.g. In We are programmers, create an animation program in Scratch that includes some sound effects or recorded voices.)*	We are programmers We are bug fixers We are presenters,
Logical Thinking	C.3.3.1. Use logical reasoning to explain how some simple algorithms work.	The child can predict what an **algorithm** will do. The child can explain what will happen when their **algorithm** is implemented as a **program** on a computer or when its instructions or rules are followed. *(E.g. In We are programmers, use their storyboard to predict what happens next.)*	The child can explain a simple, sequence based **algorithm** in their own words. The child can give an explanation for a simple **algorithm** based on a **sequence** of instructions. The **algorithm** could be one of their own, or a simple one with which they have been provided. The **algorithms** could be recorded graphically, e.g. as a storyboard. *(E.g. In We are programmers, explain the idea for their animation in their own words. In We are presenters, explain the idea for their video in their own words.)*	The child can explain an **algorithm** using **sequence** and **repetition** in their own words. The child can give an explanation for a simple **algorithm** based on a **sequence** of instructions with some **repetition** (either 'forever' or for a fixed number of times). The **algorithm** could be one of their own, or a simple one with which they have been provided. The **algorithms** could be recorded graphically, such as a storyboard, or in other forms, such as staff notation. *(E.g. In We are programmers, explain the idea for their animation in their own words, discussing how they have used repetition in this.)*	We are programmers We are presenters
	C.3.3.2. Use logical reasoning to detect and correct errors in algorithms and programs.	The child can spot errors in **programs**. When running a **program**, the child can identify that there is an error and can describe what went wrong. The **programs** can be the child's own or ones provided for them. *(E.g. In We are programmers, spot bugs in their animation. In We are bug fixers, spot bugs in the programs provided.)*	The child can use logical reasoning to detect errors in programs. The child can give well-thought-through reasons for errors they find in **programs**. Typically, the child can find errors by reasoning logically about the **program** code, but they might also be able to use logical reasoning to identify errors in **programs** when they are executed. The **programs** do not have to be written originally by the child. *(E.g. In We are programmers, use logical reasoning to spot bugs in their animation. In We are bug fixers, use logical reasoning to spot the bugs in the programs provided.)*	The child can use logical reasoning to detect and correct errors in programs. The child can give well-thought-through reasons for errors they find in **programs** and explain how they have fixed these. The child can find and correct errors by reasoning logically about the **program** code, but they might also be able to use logical reasoning to identify errors in **programs** when executed and confirm that they have fixed these by testing the new version of their **program**. The p**rograms** do not have to be written originally by the child. *(E.g. In We are programmers, spot and correct errors in their animation using logical reasoning. In We are bug fixers, use logical reasoning to detect and correct errors in the provided programs.)*	We are programmers, We are bug fixers
	C.3.3.3. Understand computer networks including the internet.	The child can understand that computer **networks** transmit information. The child can understand that information of many different sorts can be transmitted through computer **networks** including the internet. The child will understand that this is (generally) fast and reliable.	The child can understand that computer **networks** transmit information in a digital (binary) format. The child can explain that any information has to be converted to numbers before it can travel through computer **networks**. The child should understand that this conversion happens according to an agreed system or code.	The child can understand some ways in which information can be converted into a binary code. The child can explain that any information has to be converted to numbers before it can travel through computer **networks**; these numbers are represented as binary (on/off or high/low) signals. The child should understand that this conversion happens according to an agreed system or code, and that a number of different systems are, or have been, used, e.g. Morse	We are communicators

		(In We are communicators, understand that email and videoconferencing also take place via the internet.)	*(E.g. In We are communicators, understand that email and videoconferencing also take place through transmitting binary information.)*	and **unicode** for text, bitmaps for images, **pulse code modulation (PCM)** encoding of audio. *(E.g. In We are communicators, think of ways in which information can be converted to a binary code.)*	
	C.3.4.1. Understand how networks can provide multiple services, such as the world wide web.	C.3.4.2. The child can understand that email works through the internet. The child can explain that email is sent and received via **servers** connected to the internet. *(E.g. In We are communicators, understand that emails are routed via the internet.)*	C.3.4.3. The child can understand that email and videoconferencing are made possible through the internet. The child should know that email messages are sent and received through **servers** connected to the internet. The child should know that Skype and other videoconferencing systems also work through the internet, but these services may be direct, peer-to-peer connections rather than via **servers**. *(E.g. In We are communicators, understand that emails and videoconferencing are routed via the internet.)*	C.3.4.4. The child can understand that the internet can provide a number of services in addition to the **web**. The child should demonstrate an understanding that the internet plays host to a range of different services including, e.g. the **web**, email, videoconferencing, online gaming, file sharing and instant messaging. *(E.g. In We are communicators, understand that services such as ping, traceroute, nslookup, email and videoconferencing all function via the internet.)*	We are communicators
E-safety	C.3.1.1. Select, use and combine a variety of software (including internet services) on a range of digital devices.	The child can use some simple **programs** on a computer. The child can use a range of **software** on laptop or tablet computers, with support when necessary. **Software** might include video editing, email clients, videoconferencing (with the teacher or another adult), survey design **software** and spreadsheets. *(E.g. Use Microsoft Word in Word Processing, Use Movie Maker In We are presenters, use Outlook or webmail and Skype, In We are communicators, use Google Forms and Google Sheets In We are presenters.)*	The child can use a range of **programs** on a computer. The child can use a range of **software** on laptop or tablet computers with some degree of independence. **Software** might include video editing, diagnostic tools, email clients, videoconferencing (with the teacher or another adult), survey design **software**, spreadsheets and presentation **software**. *(E.g. Use Microsoft Word in Word Processing, Use Movie Maker In We are presenters, use Outlook or webmail and Skype In We are communicators, use Google Forms, Google Sheets and Google Slides In We are presenters.)*	The child can use and combine a range of **programs** on a computer. The child can use multiple **programs** on laptop or tablet computers to achieve particular goals. E.g. They might create a presentation and then email this to a classmate; create a survey using a survey design application, analyse the results in a spreadsheet and then make a presentation about their findings. *(E.g. In Word Processing combine internet and word processing software,* *In We are communicators, combine email and presentation software.* *In We are presenters, combine Google Forms, Google Sheets and Google Slides.)*	Word Processing We are presenters We are communicators We are presenters
	C.3.1.2. Design and create a range of programs, systems and content that accomplish given goals.	The child can create content on a computer. The child can use **software** on a laptop or tablet to create digital content, with support if necessary. E.g. They could shoot a video, create an information text, create a presentation on a given topic or create an online survey. *(E.g. In Word Processing, create a short informative text,* *In We are presenters, shoot video.* *In We are communicators, compose emails and create a presentation.* *In We are presenters, write survey questions and create a presentation.)*	The child can design and create content on a computer. The child can plan and execute a project in which they use **software** on a laptop or tablet to create digital content with some degree of independence. E.g. They could plan and shoot a video, plan and create a presentation on a given topic or plan and then create an online survey. *(E.g. In Word Processing, create an information text using formatting skills,* *In We are presenters, plan and shoot video. In We are communicators, plan and create a presentation.* *In We are presenters, plan and then write survey questions, and plan and create a presentation.)*	The child can design and create content on a computer in response to a given goal. With a given goal, the child can plan and execute a project in which they use **software** on a laptop or tablet to create digital content with some degree of independence. E.g. They could plan and shoot a video, plan and create a presentation on a given topic or plan and then create an online survey. They should evaluate how effectively they have met the requirements of the original goal. *(E.g. In Word Processing, present informative data using a variety of formatting skills,* *In We are presenters, plan and shoot video for a given goal.* *In We are communicators, plan and create a presentation for a given goal.* *In We are presenters, plan and then write survey questions, and plan and create a presentation for a given research topic.)*	Word Processing We are communicators We are presenters
	C.3.1.3. Collecting, analysing, evaluating and presenting data and information.	The child can collect information. The child can use computers to collect or access information. E.g. They could shoot a video, read an email or conduct an online survey. They should be able to do this with appropriate support, if necessary. *(E.g. In Word Processing, present information found on the Internet as a class,* *In We are presenters, shoot video. In We are communicators, read emails.* *In We are presenters, read answers to survey questions.)*	The child can collect and present information. The child can use computers to collect information and present this to an audience. E.g. They could shoot and then show a video, read and respond to an email or conduct an online survey and present the results. They should be able to do this with a degree of independence. *(E.g. In Word Processing, present information found on the Internet,* *In We are presenters, shoot and then show video.* *In We are communicators, read and respond to email.* *In We are presenters, collect and present survey results.)*	The child can collect, evaluate and present information. The child can use computers to collect and evaluate information and present this to an audience. E.g. They could shoot, review and then show a video; read, consider and respond to an email or conduct an online survey, evaluate or summarise the results and present these. They should be able to do this independently for the most part. *(E.g. In Word Processing, present information and images found on the Internet independently,* *In We are presenters, shoot, review and then show video.* *In We are presenters, collect, review and present survey results.)*	Word Processing We are presenters We are communicators

	C.3.1.4. Be discerning in evaluating digital content. Do they recognise the difference between the work of others which has been copied (plagiarism) and restructuring and re-presenting materials in ways which are unique and new?	The child can make choices about which web page they consider most useful. When given a list of web pages, the child can decide which they think will be most useful for their purpose or to answer a question they have.	The child can decide whether a web page is relevant for a given purpose or question. The child can form a judgement about whether a web page is appropriate for finding out the answer to a question they have or for a given purpose.	The child can decide whether digital content is relevant for a given purpose or question. The child can form a judgement about whether a web page or other digital content is appropriate for finding out the answer to a question they have or for a given purpose. *(E.g. In We are programmers,We are presenters andWe are presenters, carefully consider whether their work is well suited to its intended purpose.)*	Across the curriculum We are programmers We are presenters
	C.3.1.5. Understand the opportunities networks offer for communication and collaboration.	The child can use email to communicate with a classmate. The child can email to communicate effectively with a classmate. This will typically be part of a whole-class activity. *(E.g. In We are communicators, use email to communicate.)*	The child can use email and videoconferencing in class. When working as part of the class, the child can use email effectively and participate in a whole-class videoconference. *(E.g. In We are communicators, use both email and videoconferencing to communicate.)*	The child can use email and videoconferencing effectively for a given purpose. When working as part of the class and with a given purpose, the child can use email effectively and actively participate in a whole-class videoconference. *(E.g. In We are communicators, use email and videoconferencing effectively for the given purpose.)*	We are communicators
Creating Content	C.3.1.1. Design, write and debug programs that accomplish specific goals.	The child can design and implement some aspects of a **program** using a **block language**, which can run automatically without user interaction. A typical **program** might be an animation to tell a joke or part of a story, or perhaps be linked to a curriculum topic studied by the children. The **program** could use movement and on-screen dialogue. Do not expect children at this level to control interaction between two **sprites**. *(E.g. In We are programmers, make progress towards creating an animation in Scratch.)*	The child can design and write a **program** using a **block language**, without user interaction. A typical program might be a **scripted** animation for a joke, part of a story, or linked to another area of the curriculum. **Programs** could use pre-built **sprites** or ones designed by the child. Expect p**rograms** to include movement and dialogue; they may also include sound effects and some use of costumes to allow for animated movement. There may be more than one **sprite** in the animation. *(E.g. In We are programmers, create an animation in Scratch.)*	The child can design, write and **debug** a **program** using a **block language**, without user interaction. At this level, expect the child to have successfully **debugged** their animation **programs,** which would typically include movement, on-screen dialogue, sound, costume changes and multiple **sprites.** Animations could be linked to curriculum topics, or simply tell jokes or a story. The child should be able to explain what bugs they found and how they fixed these. *(E.g. In We are programmers, create an animation in Scratch, independently debugging any errors they encounter. In We are bug fixers, debug the Scratch programs given.)*	We are programmers We are bug fixers
	C.3.1.2. Controlling or simulating physical systems.	The child can understand that physical systems can be simulated on screen. The child can identify where a physical system has been simulated on screen, e.g. a ball bouncing on a bat or a car moving around a track. **Simulations** may be linked to topics in other curriculum areas, including science. Computer games often include **simulations** of physical systems; the child should be able to identify when this is the case. *(E.g. In We are bug fixers, use the tennis and racing car simulator programs.)*	The child can explore **simulations** of physical systems on screen. The child can experiment with some on-screen **simulations** of physical systems, perhaps linked to topics from other curriculum areas, e.g. a ball bouncing on a bat or a car moving around a track. Many computer games include elements of computer **simulations**. The child can discuss what they have learned from using the **simulation**. (*E.g. In We are bug fixers, explore the tennis and racing car simulator programs.)*	The child can develop their own **simulations** of a simple physical system on screen. The child can develop **simulations** of simple physical systems, e.g. a simple tennis game or a racing car moving around a track. Do not expect the child to have a full understanding of underlying physics. The child can discuss the limitations of their **simulation**. *(E.g. In We are programmers, create an animation of a physical system. In We are bug fixers, fix the tennis and racing car programs.)*	We are programmers We are bug fixers We are presenters
	C.3.1.3. Solve problems by decomposing them into smaller parts	The child can identify parts of a project. When working on a project, such as an animation, a video or a survey, the child can identify the different stages of the project and/or the resources they will need for their project. In video work, parts of a project might include identifying a subject; storyboarding the video; sourcing media; recording video; filming; editing; exporting. *(E.g. In We are programmers, consider the different elements of an animation project.* *In We are presenters, consider the different parts of a video* *project.* *In We are presenters, consider the different parts of an online* *survey-based project.)*	The child can plan a project. Working with the teacher and, perhaps, other children, the child can develop an outline plan for a project in computing, involving multiple steps and resources, e.g. creating an animation, filming a video or conducting a survey. In video work, the plan might include identifying a subject; storyboarding the video; sourcing media; recording video; filming; editing; exporting. *(E.g. In We are programmers, plan an animation project.* *In We are presenters, plan their video project.* *In We are presenters, plan their online survey-based project.)*	The child can work with others to complete a project. In working on a project, such as an animation, a video or a survey, the child can contribute effectively to a team to accomplish the main project outcomes. In video work, the child could work with others to identify a subject; storyboard the video; source media; record video; film, edit and export. *(E.g. In We are programmers, work with others to complete their animation project.* *In We are presenters, work with others to complete their video project.* *In We are presenters, work with others to complete their online survey based project.)*	We are programmers, We are presenters, We Are Opinion Pollsters'
Searching	C.3.2.1. Use search technologies effectively.	The child can search for information on a web page. The child can use skimming and scanning strategies, and their web browser's Find **command,** to find specific information on a web page.	The child can search for information within a single site. The child can use browser-specific tools (e.g. the Find **command)** and site-specific tools (such as the search tools for Wikipedia or YouTube) to locate particular information on a web page or within a website.	The child can use a standard search engine to find information. The child can use a common search engine (such as Google with **safe search mode** locked in place) effectively to search for particular information on the **web**.	Across the curriculum
	C.3.2.2. Appreciate how search results are selected and ranked.	The child can understand that search engines make it easier to find content online.	The child can understand that search engines select pages according to keywords found in the content.	The child can understand that search engines rank pages according to relevance.	Across the curriculum

		The child can use at least one search engine to find appropriate online content. The child should consider how much harder it would be to find online content without a search engine.	When using search engines, the child should demonstrate their understanding that the pages shown include the keywords they have specified. The child can use this knowledge by thinking of good keywords appropriate for what they are searching.	The child can demonstrate their understanding that search engine results are ranked according to relevance, and that normally the top results on the first page are likely to be those most relevant to their query. If the child is unable to find good results on the first page, expect them to reconsider their keywords rather than looking at further pages of results.	

Year 3 Medium Term Plan

Unit	Expectations	Computing PoS	Subject Links
Word Processing In this unit, the pupils learn important computer skills and introduces children to screenshots and the Snipping Tool, and secure use of passwords.	• Select single words. • Cut, copy and paste text. • Format the font. • Insert images. • Copy a screenshot into another application. • Use a secure password. • • Use <ctrl> keyboard shortcuts.	• Revise basic computer skills from the previous units and learn to use effective passwords and take screenshots. • Typing and layout skills such; as align text and bullets and numbering and keyboard shortcuts. • Insert and format text boxes.	Children should use the word processing skills whenever they work with text at the computer.
We are programmers In this unit, the children create an animated cartoon using characters they Design. They use a paint tool to create characters and backgrounds. They then create an animation by translating a storyboard into a series of scripted instructions (program) for graphic objects.	• 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.	**Art and design:** The children could design characters and backgrounds using art and design techniques such as drawing, painting or sculpture. **English:** This unit links to the study of character, dialogue and narrative. **Languages:** The children could write or record dialogue for their character in a foreign language. **Music:** The children could compose and record backing music for their cartoons.

We are bug fixers In this unit, the children work with six example Scratch projects. They explain how the scripts work, finding and correcting errors in them, and explore creative ways of improving them. The children learn to recognise some common types of programming error, and practise solving problems through logical thinking.	• 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.	**English:** Programming emphasises a precise use of language and, in traditional, text-based programming languages, the importance of correct spelling and punctuation. **Maths:** This unit develops skills in logical reasoning and problem solving that can be applied right across the programme of study. **Science:** The work in this unit links to the requirements for working scientifically; in particular, making systematic and careful observations, and using results to draw simple conclusions and suggest improvements.
We are presenters This unit gives them a chance to make a short narrated video of themselves practising a sport or other skill, and to use this to help improve their 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.	**PE:** Making a video provides pupils with an opportunity to develop an understanding of how to improve in different physical activities. **English:** This project develops skills in spoken language, particularly participating in presentations and performances. **Maths:** Evaluating performance in sports whose results are compared by time or distance links to work in measurement. Evaluating performance in sports whose results are compared by scores links to work in number.

We are communicators This unit allows the children to learn about a number of e-safety matters in a positive way. They will work with a partner in another class, learning how to use email and video conferencing safely.	• Develop a basic understanding of how email works gain skills in using email • Be aware of broader issues surrounding email, including 'netiquette' and e-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.	**English:** This unit provides opportunities for the children to write for a range of real purposes and audiences as part of their work across the curriculum. **History:** You could link this unit to a history topic, such as communication through the ages. **Sport, music, art and drama** would also provide contexts for communication, making it particularly relevant to share rich media.
We are opinion pollsters In this unit, the children create their own opinion poll, seek responses, and then analyse the results.	• 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.	**English:** The children can apply their knowledge of sentence structures by creating well-structured and unambiguous questions. Reporting on the results of the survey provides an opportunity to participate in presentations. **Maths:** This unit allows the children to apply work in statistics on interpreting and presenting data. **PSHE:** The topics the children choose to investigate may be concerned with the broader aspects of school life, such as enjoyment of lessons, school food, play time or homework.

Year 3 Greater Depth Opportunities

Unit	Greater Depth activities/extensions
Word Processing	• Pupils could create a presentation using learnt computing skills to show how they can complete certain activities using representitive screenshots. • Pupils could type up a family favourite recipe using as many shortcuts as possible for reinforced learning.
We are programmers	• The children may be interested to learn more about traditional hand-drawn animation techniques, stop-motion animation and the key-frame approach to computer animation. Open source software such as Pencil (www.pencil-animation.org) and Google Web Designer (www.google.com/webdesigner) allow children to explore these. • The children could use Scratch to create simple interactive educational resources and games, perhaps using the characters they created in this project.
We are bug fixers	• Pupils could help other Scratch users debug and improve their programs. If they have accounts on the Scratch website, they could create and publish improved versions of other people's programs.
We are presenters	• You could explore using video editing software to combine still images with video images, and experiment with title effects and transition effects. • Encourage the children to be more critical when watching television and film, looking closely at the techniques of editors and directors.
We are communicators	• A compare and contrast exercise using handwritten letters sent by post would further develop the children's understanding of communication. • Discussion forums and chat could be used for shared activities, and you could extend the unit by team-teaching both classes via video conference. • You could link this unit to a topic in local studies, in which you could explore the contrasts between the localities of the two partner schools.
We are opinion pollsters	• Think about ways of incorporating simple surveys of opinion into other aspects of school life, encouraging the children to suggest occasions when a survey might be useful to improve the school community. • Encourage the children to question the methods used in some surveys – looking for bias in questions, implicit assumptions or nonrepresentative samples.

Skills Map Year 4

Year 4					
Sub-Strand	**Progression Statement**	**What to Look for Guidance (Working towards expectations)**	**What to Look for Guidance (Meeting expectations)**	**What to Look for Guidance (Exceeding expectations)**	**Unit**
Problem Solving	C.4.1.1. Design, write and debug programs that accomplish specific goals.	The child can design and implement some elements of a **program** using a **block language** to a given brief, including simple interaction. The child can plan and partially implement a **program** in Scratch (or similar) in which the user has to provide some **input,** perhaps as an answer to a question on screen, or by using key presses or the mouse. *(E.g. In We are Software Developers, make progress towards developing a simple educational game, e.g. a maths quiz, in Scratch.* *In We are Toy Designers, develop some elements of their interactive toy prototype in Scratch.)*	The child can design and write a **program** using a **block language** to a given brief, including simple interaction. The child can write a **program** in Scratch (or similar) in which the user has to provide some **input**, perhaps as an answer to a question on screen, or by using key presses or the mouse. The **program** could be a simple game or a set of questions and typed responses. (*E.g. In We are Software Developers, plan and develop a simple educational game, e.g. a maths quiz, in Scratch.* *In We are Toy Designers, plan and develop a prototype for an interactive toy in Scratch.)*	The child can design, write and **debug** a **program** using a **block language** to a given brief, including simple interaction. The child can write a **program** in Scratch (or similar) in which the user has to provide some **input**, perhaps as an answer to a question on screen, or by using key presses or the mouse. The child can **debug** their code thoroughly, explain what bugs they found and what they needed to do to correct these. *(E.g. In We are Software Developers, plan and develop a simple educational game in Scratch, e.g. a maths quiz, correcting any bugs themselves.* *In We are Toy Designers, plan and develop a prototype for an interactive toy in Scratch, correcting any bugs themselves.)*	We are Software Developers We are Toy Designers
	C.4.1.2. Controlling or simulating physical systems.	The child can implement some elements of a **simulation** on screen. The **simulation** could be of a physical system (such as an interactive toy or a set of traffic lights), perhaps as a simple animation or as an on-screen prototype for a product made in design and technology. *(E.g. In* We are Toy Designers*, create some elements of an on-screen prototype for an interactive toy.)*	The child can develop their own **simulation** of a simple physical system on screen. The child can create a Scratch (or similar) **program** to simulate a simple physical system. This could be in the form of a simple animation or an on-screen prototype for a product made in design and technology. *(E.g. In* We are Toy Designers *, develop a prototype for an interactive toy.)*	The child can develop their own **simulation** of a physical system on screen including interactivity. The child can create a Scratch (or similar) **program** to simulate a simple physical system including some elements of interaction with the user. This could be in the form of a simple computer game or an interactive on-screen prototype for a product made in design and technology. Interaction is likely to be via the mouse pointer. *(E.g. In* We are Toy Designers*, develop a working prototype for an interactive toy that responds to user input.)*	We are Toy Designers
	C.4.1.3. Solve problems by decomposing them into smaller parts.	The child can identify different ways to tackle a project. Given a particular project, the child can scope a number of alternative approaches to tackling it. *(E.g. In We are Software Developers and We are Toy Designers, think of different ways to tackle these programming projects.* *In We are co-authors,, think of different ways to work together on a wiki.)*	The child can work with others to plan a project. Given a particular project, the child can work as part of a team to plan how to accomplish their goal, breaking the project down into a set of tasks. Examples of projects could include creating an educational game, developing a wiki or monitoring the weather. *(E.g. In We are Software Developers and We are Toy Designers, work with a partner to plan how to tackle these programming projects.* *In We are Meteorologists and We are co-authors, contribute to a discussion about how the class could create a wiki or monitor and forecast the weather.)*	The child can work collaboratively to complete a project according to an agreed plan. Given a particular project, the child can work as part of a team to plan how to accomplish their goal, breaking the project down into a set of tasks. They should use this plan to accomplish their project as a team. Examples of projects could include creating an educational game, developing a wiki or monitoring the weather. *(E.g. In We are Software Developers and We are Toy Designers, work with a partner to plan and carry out these programming projects.* *In We are Meteorologists, contribute effectively to class projects on developing a wiki and monitoring and forecasting the weather.* *In We are Software Developers and We are Toy Designers,* *In We are co-authors and We are Meteorologists, contribute effectively to class projects on developing a wiki and monitoring and forecasting the weather.)*	We are Software Developers We are Toy Designers We are co-authors We are Meteorologists
Programming	C.4.2.2. Work with various forms of input and output.	The child can write a **program** to produce **output** on screen. The child can write a **program** in which **sprites** move on screen and/or text is displayed on screen. *(E.g. In We are Software Developers, questions should be displayed on screen.* *In We are Toy Designers, toy should be shown on screen.)*	The child can write a **program** that accepts keyboard **input** and produces on-screen **output**. In Scratch (or similar), the child can write a **program** that displays a question, accepts typed **input** and responds in an appropriate way to what is typed. This might be used as the basis for a dialogue **program** or a simple maths game. *(E.g. In We are Software Developers, display questions on screen and accept typed input.)* *In We are Toy Designers, show toy on screen and have it respond to key presses.)*	The child can write a **program** that accepts keyboard or other **input** and produces **output** on screen and through speakers. In Scratch (or similar), the child could write a **program** that displays a question on screen or reads a question aloud, accepts a typed answer and then shows appropriate **output** on screen and plays an appropriate effect through the speakers. Alternatively, or additionally, the child could create a simple computer game, using the keyboard or mouse for **input** and the screen and speakers for **output**. *(E.g. In We are Software Developers, display questions on screen and provide some stimulus or feedback through speakers (e.g. sound effects or voice-over); accept input via typed responses or through clicking on multiple-choice elements on screen.*	*We are Software Developers* We are Toy Designers,

				In We are Toy Designers, show toy on screen and include some sound effects; respond to key presses or mouse clicks on screen.)	
Logical Thinking	C.4.3.3. Understand computer networks including the internet.	The child can understand that computer **networks** transmit information in a digital (binary) format. The child can explain that any information has to be converted to numbers before it can travel through computer **networks**. The child should understand that this conversion happens according to an agreed system or code. *(E.g. In We are Musicians,, understand that music is represented digitally on a computer.* *In We are HTML Editors , understand that HTML is transmitted digitally via the internet.* *In We are Meteorologists, understand that a process of digitisation happens in digital weather sensors.)*	The child can understand that the internet transmits information as **packets of data**. When working online, the child can explain that the information they send and receive is automatically broken down into **packets of data**, and that these sometimes take different routes across the internet. *(E.g. In We are Musicians, understand that music is broken down into packets for transmission over the internet.* *In We are HTML Editors, understand that the HTML for a web page is broken into packets for transmission over the internet.)*	The child can understand that **packets** are not routinely **encrypted** on the internet. The child should show an awareness that their emails, requests for web pages and the contents of those pages, can be viewed by others, e.g. the school's **network** manager or internet provider. They might also show an awareness of when content is **encrypted** (e.g. passwords or **HTTPS web** traffic). *(E.g. In We are HTML Editors realise that the web pages they create are transmitted without any guarantee of privacy over the internet.* *In We are co-authors, realise that requests for, and contents of, wiki pages are transmitted without any guarantee of privacy over the internet.)*	We are Musicians We are HTML Editors We are co-authors We are Meteorologists
	C.4.4.1. Understand how networks can provide multiple services, such as the world wide web.	The child can understand that the internet and the **web** are not the same. The child can give a clear explanation of some of the differences between the internet and the **web**. *(E.g. In We are HTML Editors and We are co-authors, recognise the difference between the web and the internet.)*	The child can understand how the internet makes the **web** possible. The child can give an explanation of how requests for web pages, and the **HTML** for those pages, are transmitted via the internet. *(E.g. In We are HTML Editors and We are co-authors, recognise how the internet makes it possible to request and receive web pages.)*	The child can show an awareness of how **HTTP** operates. The child can give an explanation of how **HTTP** GET requests and responses are transmitted via the internet, and show some awareness of how **URLs** are made up. *(E.g. In We are HTML Editors and We are co-authors, recognise the request and response aspects of HTTP; show some understanding of how data can be sent to the web server, e.g. edits to a Wikipedia page; be familiar with 404 not-found errors.)*	We are HTML Editors We are co-authors
E-safety	C.4.1.1. Use technology safely, respectfully and responsibly.	The child can use digital technology safely and show respect for others when working online. The child should know that they need to keep themselves safe when using digital technology. E.g. They should be respectful to others in online communities, such as the Scratch community, if they are allowed to use this. They should show respect when creating or remixing web pages. They should respect others' points of view when editing wiki pages. *(E.g.* We are software developers and We are toy designers*, show respect for others when using the Scratch community, if permitted to do so.* *In We are HTML editors, take care to act respectfully when creating or remixing web pages.* *In We are co-authors, show respect for others' content and points of view when editing wiki pages.)*	The child can demonstrate that they can act responsibly when using computers. The child can act responsibly when using computers. E.g. They should act responsibly when developing computer games or prototype products. They should behave responsibly when using sampled music or creating a composition. They should show responsibility when creating or remixing online content, including observing copyright and any terms and conditions. They should contribute positively to a shared wiki. *(E.g. In* We are software developers and We are toy designers*, act responsibly in developing their game and toy prototype. In We are musicians, act responsibly when creating their composition.* *In We are HTML editors, take care to act responsibly when creating or remixing web pages, including observing copyright.* *In We are co-authors, contribute positively to the class wiki.)*	The child can demonstrate that they can act responsibly when using the internet. The child can act responsibly when using the internet. E.g. They should act responsibly in participating in an online community, such as the Scratch community, if they are allowed to use this. They should show responsibility when creating or remixing online content, including observing copyright and any terms and conditions. They should contribute positively to a shared wiki and/or Simple Wikipedia. *(E.g. In* We are software developers and We are toy designers, *contribute positively to the Scratch community, if permitted to do so.* *In We are HTML editors, take care to act responsibly when creating or remixing web pages, including observing copyright.* *In We are co-authors, contribute positively to the class wiki and to Simple Wikipedia.)*	We are software developers We are toy designers We are musicians We are HTML editors We are co-authors
	C.4.1.2. Recognise acceptable/unacceptable behaviour.	The child can recognise unacceptable behaviour when using digital technology. The child can identify what would be unacceptable or inappropriate behaviour when using digital technology in a range of contexts. E.g. They should know what would be unacceptable when using online communities, such as the Scratch website. They should recognise that copyright and the terms and conditions of web-based services should be respected. They should know what would be unacceptable in remixing a web page or editing a class wiki or Wikipedia. *(E.g. In We are software developers and We are toy designers, recognise what would be unacceptable in the Scratch community.* *In We are musicians, recognise the importance of respecting copyright.* *In We are HTML editors, recognise what would be unacceptable in a remix of a web page.*	The child can understand the difference between acceptable and unacceptable behaviours when using digital technology. The child can discuss the difference between acceptable and unacceptable behaviours when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; the use of others' original content, such as music samples or web pages; wikis, including Wikipedia. *(E.g. In We are software developers and We are toy designers, know the difference between acceptable and unacceptable behaviour in the Scratch community.* *In We are HTML editors, know the difference acceptable and unacceptable web pages and remixes, recognising what constitutes parody or fair use.* *In We are co-authors, recognise the difference between acceptable and unacceptable behaviour in a class wiki or on Wikipedia.)*	The child can discuss the consequences of particular behaviours when using digital technology. The child can discuss the likely or possible consequences of particular behaviours when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; the use of others' original content, such as music samples or web pages; wikis, including Wikipedia. *(E.g. In We are software developers and We are toy designers, consider the consequences of positive or negative behaviour in the Scratch community.* *In We are HTML editors, consider the consequences of positive or negative behaviour when remixing web content or creating web pages.* *In We are co-authors, consider the consequences of positive or negative behaviour when editing a class wiki or wikipedia.)*	We are software developers We are toy designers We are musicians We are HTML editors We are co-authors

		In We are co-authors, recognise what would be unacceptable edits in the class wiki or on Wikipedia.)			
	C.4.1.3. Know a range of ways to report concerns and inappropriate behaviour.	Know who to talk to about concerns and inappropriate behaviour in school. Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the **network** manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units.)*	Know who to talk to about concerns and inappropriate behaviour at home or in school. Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the **network** manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school. They should also know that any concerns over, or inappropriate behaviour with, digital technology at home can be discussed with their parents, with you or with another trusted adult. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the Scratch community can be reported to the community moderators (units We are software developers, and We are toy designers). Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	Know how to report concerns and inappropriate behaviour in a range of contexts. Pupils should know how to report inappropriate behaviour when using technology in school: typically this will be to their teacher, the **network** manager or another trusted adult. They should know how to report any concerns over, or inappropriate behaviour with, digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or to the police. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the Scratch community can be reported to the community moderators (We are software developers, and We are toy designers).* *In unit We are musicians, know that concerns over illegal web content can be reported to the police, but be aware that other countries have different legal codes. Know that they should talk to their parents about concerns and inappropriate behaviour outside school.* *In unit We are co-authors, have some understanding of how the Wikipedia community deals with concerns and inappropriate behaviour. Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	We are software developers We are toy designers We are musicians We are HTML editors We are co-authors We are meteorologists
	C.4.1.4. Be discerning in evaluating digital content.	The child can decide whether a web page is relevant for a given purpose or question. The child can form a judgement about whether a web page, such as a Wikipedia article, is appropriate for finding out the answer to a question they have or for a given purpose. *(E.g. In* We are co-authors*, decide if a given Wikipedia page is helpful for the topic they are researching.)*	The child can decide whether digital content is relevant for a given purpose or question. The child can form a judgement about whether a web page, such as a Wikipedia article, or other digital content is appropriate for finding out the answer to a question they have or for a given purpose. *(E.g. In* We are co-authors*, decide if a given Wikipedia page or other content is helpful for the topic they are researching.)*	The child can decide whether digital content is reliable and unbiased. The child can discuss whether particular content, such as a Wikipedia article or a page in a class wiki, is reliable and whether it has been written from a neutral point of view. They should be able to spot some examples of bias in digital content. *(E.g. In* We are co-authors*, decide if pages in the class wiki are reliable and presented from a neutral point of view; decide whether Simple Wikipedia pages meet the Wikipedia community's standards for authority and neutrality.)*	We are co-authors
Creating Content	C.4.1.1. Select, use and combine a variety of software (including internet services) on arange of digital devices.	The child can use a range of **programs** on a computer. The child can use a range of **software** on laptop or tablet computers, possibly with some support as appropriate. S**oftware** might include audio editing, music composition, web browsers, text editors, spreadsheets and presentation **software**. *(E.g. Use music software in We are musicians, use web browsers in We are HTML editors and We are co-authors, use a text editor inWe are HTML editors, use spreadsheet and presentation software in We are meteorologists.)*	The child can use and combine a range of **programs** on a computer. The child can use multiple **programs** on laptop or tablet computers to achieve particular goals. E.g. They might record audio and then use this as samples in a composition; create **HTML** content in a text editor and preview it in a browser; analyse **data** in a spreadsheet and then create a presentation to show the results of their analysis. *(E.g. Combine composition and audio editing software in We are musicians, combine a text editor and web browser in We are HTML editors, combine spreadsheet and presentation software in We are meteorologists.)*	The child can use and combine a range of **programs** on multiple devices. The child can use multiple **digital devices** (such as tablets and laptops or digital cameras and laptops) to achieve particular goals. The devices might include web **servers,** allowing them to use cloudbased applications. E.g. They might use portable audio recorders to collect audio samples and then laptop-based sequencing **software** to use these in their own composition; a laptop text editor and a web **server** to create and host a web page; a digital weather station and a laptop spreadsheet **program** to collect and record weather **data**. *(E.g. Use audio recorders, computers and web-based applications in We are musicians, use desktop and web-based applications in We are HTML editors, use weather sensors, desktop computers and web-based services in We are meteorologists.)*	We are musicians We are HTML editors We are co-authors We are meteorologists
	C.4.1.2. Design and create a range of programs, systems and content that accomplish given goals.	The child can design and create content on a computer. The child can plan and execute a project in which they use **software** on a laptop or tablet to create digital content, with appropriate support if necessary. E.g. They could plan and compose original music using sequencing software; plan and create a web page; plan how they could contribute to a shared wiki and then do so; plan and create a presentation about the weather.	The child can design and create content on a computer in response to a given goal. With a given goal, the child can plan and execute a project in which they use **software** on a laptop or tablet to create digital content with some degree of independence. E.g. They could plan and compose original music using sequencing software; plan and create a web page; plan how they could contribute to a shared wiki and then do so; plan and create a presentation about the weather. They should evaluate how effectively they have met the requirements of the	The child can design and create content on a computer in response to a given goal, paying attention to the needs of a known audience. With a given goal and a known audience in mind, the child can plan and execute a project in which they use **software** on a laptop or tablet to create digital content with some degree of independence. E.g. They could plan and compose original music using sequencing software; plan and create a web page; plan how they could	We are Musicians We are HTML Editors We are co-authors We are meteorologists

		(E.g. In We are Musicians, compose original music. *In We are HTML Editors, create web content through writing HTML code.* *In We are co-authors, contribute content to a wiki.* *In We are meteorologists, create a presentation on the weather.)*	original goal. *(E.g. In We are Musicians, compose original music for a particular purpose.* *In We are HTML Editors, create web content through writing HTML code for a particular purpose.* *In We are co-authors, contribute content to a wiki for a particular purpose.* *In We are meteorologists, create a presentation on the weather.)*	contribute to a shared wiki and then do so; plan and create a presentation about the weather. They should evaluate how effectively they have met the requirements of the original goal and the needs of the intended audience. *(E.g. In We are Musicians, compose original music for a particular purpose andwith a particular audience in mind.* *In We are HTML Editors, create web content through writing HTML code for a particular purpose and with a particular audience in mind.* *In We are co-authors, contribute content to a wiki for a particular purpose and with a particular audience in mind; contribute to Simple Wikipedia.* *In We are meteorologists create a presentation on the weather with a particular audience in mind.)*	
	C.4.1.3. Collecting, analysing, evaluating and presenting data and information.	The child can collect **data**. The child can use computers to collect numerical **data** with appropriate support, if necessary. E.g. They could collect and present **data** about the weather over a period of time. *(E.g. In We are musicians, record audio samples.* *In We are meteorologists, record weather data.)*	The child can collect and present **data.** The child can use computers to collect numerical **data** and present this to an audience. E.g. They could collect and present **data** about the weather over a period of time. They should be able to do this with a degree of independence. *(E.g. In We are musicians, record and use audio samples.* *In We are meteorologists, collect weather data and make a presentation about the weather.)*	The child can collect, analyse and present **data**. The child can use computers to collect numerical **data**, analyse this (typically in a spreadsheet) and present this to an audience. E.g. They could collect, analyse and present **data** about the weather over a period of time. They should be able to do this with a degree of independence. *(E.g. In We are meteorologists, collect weather data, use this to look for trends or patterns, and make a presentation about the weather.)*	We are musicians We are meteorologists
Searching	C.4.2.1. Use search technologies effectively.	The child can search for information within a single site. The child can use browser- and site-specific tools to locate particular information on a web page or within a website such as Wikipedia. *(E.g. In We are co-authors, find information on Wikipedia.)*	The child can use a standard search engine to find information. The child can use a common search engine (such as Google with **safe search mode** locked in place) effectively, to search for particular information on the **web**, such as answers to questions they identify in a research project. *(E.g. In We are co-authors, use Google to support their wiki research project.)*	The child can use filters to make more effective use of a standard search engine. The child can use a common search engine (such as Google with **safe search mode** locked in place) effectively, to search for particular information on the **web**, such as answers to questions they identify in a research project. They should use built-in search tools to filter their results, such as by time, location or reading level. *(E.g. In We are co-authors, use filters to make their use of Google in support of their research project more effective.)*	We are co-authors Across the curriculum
	C.4.2.2. Appreciate how search results are selected and ranked.	The child can understand that search engines select pages according to keywords found in the content. When using search engines, the child should demonstrate their understanding that the pages shown include the keywords they have specified. The child can use this knowledge by thinking of good keywords appropriate for what they're searching. *(E.g. In We are meterologists, know how to search for content in Wikipedia.)*	The child can understand that search engines rank pages according to relevance. The child can demonstrate their understanding that search engine results are ranked according to relevance, and that normally the top results on the first page are likely to be those most relevant to their query. If the child is unable to find good results on the first page, expect them to reconsider their keywords rather than looking at further pages of results. *(E.g. In We are meterologists, appreciate how Wikipedia's search engine ranks results.)*	The child can understand that search engines use a **cached** copy of the crawled **web** to select and rank results. The child can explain how a search engine creates an index from a **cached** copy of the **web** and uses this to select and rank results. The child might also show an awareness of the Page Rank **algorithm** in which results are ranked according to the number and quality of in-bound links. *(To be assessed across the curriculum.)*	We are meterologists Across the curriculum

Year 4 Medium Term Plan

Unit	Expectations	Computing PoS	Subject Links
We are software developers Pupils plan and design a game, with a clear target audience in mind. They create a working prototype, and then develop it further to add functionality and improve the user interface. They test their game and make any necessary changes.	• 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.	**Maths:** Games can be used for reinforcing many areas of mathematics. Possible applications include practising recall of multiplication and/or division facts, rounding decimals with one decimal place to the nearest whole number, or converting between different units of measure. **English:** Using audio recording and playback, it is possible to create spelling tests. **Languages:** Games can be used to practise vocabulary in foreign languages.
We are musicians In this unit, the children produce music suitable for any purpose they choose.	• 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.	**Music:** Pupils develop their understanding of musical and staff notation (extensions). **Maths:** The unit provides opportunities for links with recalling multiplication and division facts if the idea of ‘beats per bar’ is discussed. Aspects of dance, drama, geography, history and religious education might provide a context for the children’s compositions.

We are HTML editors In this unit the children learn about the history of the web, before studying HTML (hypertext mark-up language), the language in which web pages are written. They learn to edit and write HTML, and then use this knowledge to create a web page.	• 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.	**English:** As with any text-based coding, spelling, punctuation and grammar are important. **History:** Written communication over time, with the web as the successor to printing, could form the subject of 'a study of an aspect or theme in British history that extends pupils' chronological knowledge beyond 1066'.
We are toy designers In this unit, the children work together to design a simple toy that incorporates sensors and outputs and then create an on-screen prototype of their toy in Scratch.	• 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.	**D&T:** Pupils could construct the toys they have designed, and use the computer to control them. **Music:** The toy could be a simple musical instrument, using inputs to control sounds played by the computer.
We are meteorologists This unit brings together data measurement, analysis and presentation, as the children take on the role of	• understand different measurement techniques for weather, both analogue and digital. • use computer-based data logging to automate the recording of some weather data.	• 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,	**Geography:** There are opportunities for the pupils to consolidate their knowledge of the geographical regions of the UK and the eight points of the compass. **Science:** This unit covers almost all the statutory requirements for 'Working scientifically' in the

meteorologists and weather presenters.	• use spreadsheets to create charts analyse data, explore inconsistencies in data and make predictions practise using presentation software and, optionally, video.	• systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	programme of study for lower Key Stage 2. **Maths:** Pupils practise interpreting and presenting discrete and continuous data using appropriate graphical methods, including bar charts.
We are co-authors Wikipedia is a free online encyclopaedia that anyone can view and edit. In this unit, the pupils collaborate to create a 'mini ikipedia'. They then go on to add or amend content on the real Wikipedia.	• 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. • Be discerning in evaluating digital content. • 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.	**English:** The unit helps develop the pupils' sense of writing for an audience and for a purpose. The proofreading and copy-editing skills the pupils use will reinforce spelling and grammar work. This unit works well if you link it with a topic or theme you're teaching in another subject.

Year 4 Greater Depth Opportunities

Unit	Greater Depth activities/extensions
We are software developers	• Other toolkits are available for developing educational games, such as 2DIY from 2Simple and the Quiz and Game activity modules in Moodle. The repeated question/response/feedback algorithm could be implemented in many programming languages, including text-based languages such as Logo and Python, or even as a spreadsheet in Microsoft Excel or Google Docs. • Encourage the pupils to try to work out, and to explain, the algorithms underlying other educational games that they use, especially those that don't conform to the pattern of question/response/feedback. • The pupils might like to download and adapt educational games from the Scratch website. All work uploaded to Scratch is under a Creative Commons licence, which encourages remixing.
We are musicians	• Invite the children to consider the way background music is used in television and film, perhaps focusing on occasions when it enhances atmosphere. • Provide opportunities for the children to share their extra-curricular musical activities with their classmates, if you haven't already done this.
We are HTML editors	• Markdown is a simple, plain text approach to marking up a document that converts readily into HTML, and is supported by growing numbers of text editors and websites. Encourage the pupils to use the page source view command in their browser from time to time, particularly when they visit well-designed websites.
We are toy designers	• Explore how these ideas can be extended to controlling hardware instead of on-screen simulations. • Moving on from computer-controlled toys, the pupils could start to program robots with built-in controllers.
We are meteorologists	• The project would link with broader work on climate change, environmental concerns and school sustainability. • Explore other occasions for which data logging might be used, such as monitoring indoor temperatures or for science experiments.
We are co-authors	• You could encourage the pupils to continue building the wiki from this unit, or to create new wikis, to share their learning from other topics. • Ask the pupils to try co-editing a document using Google Docs, the collaborative document tool on your school's learning platform (where applicable), and the review toolbar on your word processor – or demonstrate these to the class. Invite the pupils to discuss the likely advantages and disadvantages of each of these.

Skills Map Year 5

Year 5					
Sub-Strand	**Progression Statement**	**What to Look for Guidance (Working towards expectations)**	**What to Look for Guidance (Meeting expectations)**	**What to Look for Guidance (Exceeding expectations)**	**Unit**
Problem Solving	C.5.1.1. Design, write and debug programs that accomplish specific goals	The child can design and write a **program** using a **block language** based on their own ideas. The child can design a **program** of their own and write this in a **block**-based language such as Scratch. The **program** need not be complex (a simple game or a turtle graphics **program** would suffice) but it should be accomplished with a degree of independent working. *(E.g. In We are game developers, design and write their own game in Scratch.* *In We are artists, design and program their own geometric pattern in Scratch.)*	The child can design, write and **debug** a **program** using a **block language** based on their own ideas. The child can design a **program** of their own and write this in a **block**-based language such as Scratch. The child can test and **debug** their code, explain what bugs they found and how they fixed them. The **program** need not be complex (a simple game or a turtle graphics **program** would suffice) but it should be accomplished with a degree of independent working. *(E.g. In We are game developers, design, write and debug their own game in Scratch.* *In We are artists design, program and debug their own geometric pattern in Scratch.)*	The child can design, write and **debug** a **program** using a **block language** based on their own ideas; the child can use iterative development to make improvements. The child can design a **program** of their own and write this in a **block**-based language such as Scratch. The child can test and **debug** their code, explain what bugs they found and how they fixed them. The child can then review their code, decide for themselves how this might be extended or improved, and then implement, test and **debug** these modifications. The **program** should be accomplished with a degree of independent working. *(E.g. In We are game developers, design, write and debug their own game in Scratch.* *In We are artists, design, program and debug their own geometric pattern in Scratch.* *They should use iterative development approaches to make improvements to these.)*	We are game developers We are artists
	C.5.1.3. Solve problems by decomposing them into smaller parts.	The child can identify component parts of a problem. When given a complex problem or project, the child can identify the component parts of the problem or project and explain how they might tackle these in order to solve the original problem or complete the given project. Projects might include designing a computer game, creating a website or designing a building. *(E.g. In We are game developers, think about the different parts of a game.* *In We are web developers, think about the different elements that make up a web page or a website.* *In We are architects, think of the different parts of a building.)*	The child can plan a solution to a problem using decomposition. The child can take a complex problem, identify component parts, use decomposition to break this problem down and then plan how they can solve the problem by working through the elements they have identified. Projects could include developing a computer game, creating a website or designing a building. *(E.g. In We are game developers, use decomposition to plan how they will create their game.* *In We are web developers, use decomposition to plan how to make a website.* *In We are architects, use decomposition to plan how to create a virtual art gallery.)*	The child can solve problems using decomposition, tackling each part separately. The child can take a complex problem, identify component parts, use decomposition to break this problem down and then plan how they can solve the problem by working through the elements they have identified. They can then use their plan to solve the original problem. Projects could include developing a computer game, creating a website or designing a building. *(E.g. In We are game developers, tackle the parts of their game separately.* *In We are web developers, work together to tackle the different elements of a website eparately.* *In We are architects, tackle each of the different stages of their gallery.)*	We are game developers We are web developers We are architects
Programming	C.5.2.1. Use sequence, selection, and repetition in programs; work with variables.	The child can use **sequence** and **repetition** in **programs**. The child's **program,** typically written in Scratch, or similar, should include **sequences** of **commands** or **blocks** and some **repetition**. **Repetition** would typically be for a fixed number of times, but might also include exit conditions (e.g. epeat...until...). **Programs** might include turtle graphics or a simple game. *(E.g. In We are game developers, their game should use sequence and repetition.* *In We are artists, their turtle graphics program should use sequence and repetition.)*	The child can use **sequence**, **selection** and **repetition** in **programs**. The child's program, typically written in Scratch, or similar, should include **sequences** of **commands** or **blocks,** some **repetition** and **selection. Repetition** might include exit conditions (e.g. repeat...until...). Selection would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine **repetition** with **selection**. **Programs** might include a computer game or a turtle graphics design. *(E.g. In We are game developers, their game program should include sequence, selection and repetition.)*	The child can use **sequence**, **selection**, **repetition** and **variables** in **programs**. The child's program, typically written in Scratch, or similar, should include **sequences** of **commands** or **blocks**, **repetition**, **selection** and **variables**. **Repetition** might include exit conditions (e.g. repeat...until...) and perhaps a counter-variable for **iteration**. **Selection** would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine **repetition** with **selection** and **variables**. **Programs** might include a computer game and a more complex turtle graphics design. *(E.g. In We are game developers, use sequence, selection and repetition in their game, and keep track of score, lives or time remaining using a variable.)*	We are game developers We are artists
	C.5.2.2. Work with various forms of input and output.	The child can write a **program** that accepts keyboard **input** and produces on-screen **output**. In Scratch (or similar), the child can write a **program** that uses the keyboard to control the behaviour of a **sprite** on screen. This might be used as the basis for a simple computer game. *(E.g. In We are game developers, use the keyboard for control, producing output on screen.)*	The child can write a **program** that accepts keyboard and mouse **input** and produces **output** on screen and through speakers. In Scratch (or similar), the child can create a computer game using the keyboard or mouse for **input** and the screen and speakers for **output**. *(E.g. In We are game developers, use the keyboard and/or mouse for input for their game, produce output on screen and use sound effects, music or narration.)*	The child can show an awareness of the importance of good user-**interface** design when developing a **program**. In developing their **program,** the child should take account of the needs of their users and be able to explain how these have influenced design and development. They should test their **program** with users, making changes on the basis of feedback received. *(E.g. In We are game developers explain how they have developed the user interface for their game, taking into account its intended users; discuss how they have tested this. In We are web developers and We are bloggers,* *discuss the design elements of their website and blog. In We are architects, demonstrate how their virtual gallery has been designed with its users in mind.)*	We are game developers We are web developers We are bloggers We are architects

Logical Thinking	C.5.3.1. Use logical reasoning to explain how some simple algorithms work.	The child can predict the outcomes of a rule-based **algorithm**. When provided with rule-based **algorithms** (e.g. for a computer game) the child should be able to predict what would happen under a range of circumstances. *(E.g. In* We are game developers*, predict what happens in their game.)*	The child can explain a rule-based **algorithm** in their own words. When provided with a rule-based **algorithm** (e.g. for a computer game), the child should be able to explain what it does and how it works, in their own words. *(E.g. In* We are game developers*, explain the rules of their game in their own words.)*	The child can give a clear and precise explanation of a rule-based **algorithm**. When provided with a rule-based **algorithm** (e.g. for a computer game), the child should draw on logical reasoning to give a clear and precise explanation of what it does and how it works. *(E.g. In* We are game developers*, give a clear and precise explanation for the rules of their game.)*	We are game developers
	C.5.3.2. Use logical reasoning to detect and correct errors in algorithms and programs.	The child can spot errors in **algorithms**. When given an **algorithm** for a particular purpose, e.g. a rule-based **algorithm** for a computer game or a **sequence** of steps to draw a geometric pattern, the child can identify possible errors in their **algorithm**. *(E.g. In We are game developers, spot errors in the rules of their game.* *In We are artists, spot errors in the algorithm for their geometric pattern.)*	The child can use logical reasoning to detect errors in **algorithms**. When given an **algorithm** for a particular purpose, e.g. a rule-based **algorithm** for a computer game or a **sequence** of steps to draw a geometric pattern, the child can use logical reasoning to identify possible errors in the **algorithm**, explaining why they believe the **algorithm** is incorrect. *(E.g. In We are game evelopers, spot and correct errors in the rules of their game.* *In We are artists, spot and correct errors in the algorithm for their geometric pattern.)*	The child can use logical reasoning to detect and correct errors in **algorithms**. When given an **algorithm** for a particular purpose, e.g. a rule-based **algorithm** for a computer game or a **sequence** of steps to draw a geometric pattern, the child can use logical reasoning to identify possible errors in the **algorithm**, explaining why they believe the **algorithm** is incorrect. The child can use logical reasoning to suggest possible corrections to the **algorithm**, explaining why these would correct the bug they identified. *(E.g. In We are game developers, use logical reasoning to detect and correct errors in the rules of their game.* *In We are artists, use logical reasoning to detect and correct errors in the algorithm for their geometric pattern.)*	We are game developers We are artists
	C.5.3.3. Understand computer networks including the internet.	The child can understand the internet as a **network** of networks. The child can give some explanation of how the internet allows computers on different **networks** (e.g. at school and at home) to communicate with one another. *(E.g. In We are cryptographers, understand that multiple networks may be involved in passing encrypted messages.* *In We are web developers and We are bloggers, recognise that multiple networks may be involved in providing web-based content.)*	The child can understand how data routing works on the internet. The child can give a coherent explanation of how **data packets** are routed from one computer to another on a separate **network**, which is also connected to the internet. *(E.g. In We are cryptographers, understand how encrypted messages are routed on the internet.* *In We are web developers and We are bloggers, understand how web pages are routed on the internet.)*	The child can explain how internet routing adapts to faults in the **network**. The child can give a coherent explanation of how **data packets** are routed from one computer to another on a separate **network**, which is also connected to the internet, and how this routing would change if the **network** were to develop a fault. *(E.g. In We are cryptographers, explain how encrypted messages could still be transmitted if there were faults on the network.* *In We are web developers and We are bloggers, explain how web pages could still be transmitted if there were faults on the network.)*	We are cryptographers We are web developers We are bloggers
	C.5.4.1. Understand how networks can provide multiple services, such as the world wide web.	The child can show an understanding of basic **HTML (hypertext mark-up language)**. The child can explain how a web page is transmitted in the form of **HTML** code. The child should be able to use simple tools (e.g. X-Ray Goggles) to view and edit the **HTML** code for a web page. *(E.g. In We are web developers and We are bloggers, recognise that the web pages they are creating are transmitted and stored as HTML.)*	The child can understand how web pages are created and transmitted. The child can explain how **HTML** is used to create a web page and how it is transmitted as **packets** of digital **data** over the internet. The child should have an awareness of simple **HTML** tags (such as <h1> and <p>) for marking up a web page. *(E.g. In We are web developers and We are bloggers, gain experience of creating web pages using content management systems and understand how these pages are transmitted via the internet.)*	The child can show an understanding of how **content management systems** are used on the **web**. The child can explain some differences between static web pages written as simple **HTML** files and those generated from a database of content elements by **content management systems** such as WordPress, MediaWiki or Moodle. *(E.g. In We are web developers and We are bloggers, recognise that the content of the pages they create is stored in a database, and programs on the web server generate the transmitted HTML from this when pages are requested.)*	We are web developer We are bloggers
E-safety	C.5.1.1. Use technology safely, respectfully and responsibly.	The child can demonstrate that they can act responsibly when using computers. The child can act responsibly when using computers. E.g. They appreciate the importance of using **encryption** to keep information private and the need for strong passwords to protect their identity. They should act responsibly when creating web pages or writing blog posts. *(E.g. In We are cryptographers, recognise the importance of encrypting private information and using strong passwords.* *In We are web developers and We are bloggers, act responsibly when creating pages or blog posts.)*	The child can demonstrate that they can act responsibly when using the internet. The child can act responsibly when using the internet. E.g. They should act responsibly when participating in an online community, such as the Scratch community, if permitted to do so. They should demonstrate that they understand the importance of **encrypted** (**HTTPS**) connections when browsing the **web** and of using strong passwords to protect their identity online. They should act responsibly when creating, editing or commenting on web pages or blog posts. *(E.g. In We are game developers, contribute positively to the Scratch community, if permitted to do so.* *In We are cryptographers, recognise the importance of encrypting private information when communicating online and of using strong passwords.* *In We are web developers and We are bloggers, act responsibly when creating, editing or commenting on pages or blog posts.)*	The child can show that they can think through the consequences of their actions when using digital technology. The child can discuss likely and potential consequences of their actions when using digital technology in a range of contexts. Contexts might include participation in online communities, such as the Scratch community, if they are permitted to do so; the use (or non-use) of **encryption**, of using weak passwords or sharing their passwords with others; of creating particular content for a class website or blog. *(E.g. In We are game developers, consider the consequences of uploads and comments to the Scratch community.* *In We are cryptographers, consider the consequences of their own and others' use (or non-use) of encryption when communicating online and of setting weak passwords.* *In We are web developers and We are bloggers, recognise the consequences of creating particular content in a class website or blog.)*	We are game developers We are cryptographers We are web developers We are bloggers

	C.5.1.2. Recognise acceptable/unacceptable behaviour.	The child can understand the difference between acceptable and unacceptable behaviour when using digital technology. The child can discuss the difference between acceptable and unacceptable behaviour when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; using cryptography and passwords; creating websites or writing blog posts. *(E.g. In We are game developers, understand the differences between acceptable and unacceptable behaviour in the Scratch community.* *In We are cryptographers, understand the differences between acceptable and unacceptable behaviour when using cryptography and when using passwords.* *In We are web developers and We are bloggers, understand the differences between* *acceptable and unacceptable behaviour when developing online content for a website or blog.)*	The child can discuss the consequences of particular behaviours when using digital technology. The child can discuss the likely or possible consequences of particular behaviours when using digital technology in a range of contexts. Contexts could include the Scratch website, or other online communities; using cryptography and passwords; creating websites or writing blog posts. *(E.g. In We are game developers, discuss the consequences of particular behaviours in the Scratch community.* *In We are cryptographers, discuss the consequences of particular behaviours when using cryptography and when using passwords.* *In We are web developers and We are bloggers, discuss the consequences of particular behaviours when developing online content for a website or blog.)*	The child can identify principles underpinning acceptable use of digital technologies. The child can identify some principles underpinning acceptable behaviour when using technologies in a range of contexts. Contexts could include the Scratch website, or other online communities; using cryptography and passwords; creating websites or writing blog posts. *(E.g. In We are game developers, identify principles underpinning acceptable behaviour in the Scratch* *community.* *In We are cryptographers, identify principles underpinning acceptable behaviour when using* *cryptography and when using passwords.* *In We are web developers and We are bloggers, identify principles underpinning acceptable*	We are game developers We are cryptographers We are web developers We are bloggers
	C.5.1.3. Know a range of ways to report concerns and inappropriate behaviour.	Know who to talk to about concerns and inappropriate behaviour at home or in school. Pupils should know to report inappropriate behaviour when using technology in school to their teacher, the **network** manager or another trusted adult, and that they can discuss any concerns they have with their teacher or other trusted adults in school. They should also know that any concerns over, or inappropriate behaviour with, digital technology at home can be discussed with their parents, with you or with another trusted adult. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the Scratch community can be reported to the community moderators (units We are game developers and We are artists). Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	Know how to report concerns and inappropriate behaviour in a range of contexts. Pupils should know how to report inappropriate behaviour when using technology in school: preferably this will be to their teacher, the **network** manager or another trusted adult. They should know how to report any concerns over inappropriate behaviour with digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or to the police. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the Scratch community can be reported to the community moderators (units We are game developers and We are artists).* *In unit We are web developers and We are bloggers, know that concerns over illegal web* *content can be reported to the police. Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	Know a range of ways to report concerns and inappropriate behaviour in a variety of contexts. Pupils should know how to report inappropriate behaviour when using technology in school: typically this will be to their teacher, the **network** manager or another trusted adult. They should know how to report any concerns over inappropriate behaviour with digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or the police. Pupils should know that illegal content or activities can be reported to the police. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the Scratch community can be reported to the community moderators (units We are game developers and We are artists).* *In unit We are web developers and We are bloggers, know that concerns over illegal web content can be reported to the police, but be aware that other countries have different legal codes. Know that they should talk to their parents about concerns and inappropriate behaviour outside school. Know that they can also discuss concerns with CEOP or ChildLine)*	We are game developers We are artists We are web developers We are bloggers
	C.5.1.4. Be discerning in evaluating digital content.	The child can decide whether digital content is relevant for a given purpose or question. The child can form a judgement about whether digital content, such as sound and graphics for a game or media for a web page or 3D model, is appropriate for finding out the answer to a question they have or for a given purpose. *(E.g. In We are game developers, decide whether particular sound and graphics are appropriate for their game.* *In We are web developers, decide whether particular content is relevant to the purpose of the web page they are developing.* *In We are architects, decide whether particular media would be suitable for their virtual gallery.)*	The child can decide whether digital content is reliable and unbiased. The child can discuss whether particular content (such as a web page, other children's pages or blog posts) is reliable and whether it has been written from a neutral point of view. They should be able to spot some examples of bias in digital content. *(E.g. In We are web developers, decide whether external content is reliable and unbiased before using it in their own web page.* *In We are web developers and We are bloggers, comment on the reliability and bias of others' pages or posts.)*	The child can form an opinion about the effectiveness of digital content. Taking into account the intended audience and purpose of the content, the child should be able to form a judgement, and provide reasons, for the extent to which they consider digital content to be effective. Content could be a game or media, their own or their peers' artwork, their own or classmates' pages or posts or a 3D model. *(E.g. In We are game developers, form a view of the effectiveness of their game and the media they use in it.* *In We are artists, form an opinion about how effective their artwork is.* *In We are web developers and We are bloggers, form an opinion about how effective their own and their classmates'* *pages and posts are.* *In We are architects, form an opinion about how effective their virtual gallery is.)*	We are game developers We are artists We are web developers We are bloggers We are architects
	C.5.1.5. Understand the opportunities networks offer for communication and collaboration.	The child can contribute to a class website or blog. The child can make a positive contribution to a shared website or class blog. *(E.g. Contribute to the class website in We are web developers and blog in We are bloggers.)*	The child can work collaboratively with classmates on a class website or blog. The child can work productively and positively with others when developing a shared website or contributing to a class blog. *(E.g. Work collaboratively with classmates on the class website in We are web developers and the class blog in We are bloggers.)*	The child can provide constructively critical feedback to classmates in a class website or blog project. Showing appropriate sensitivity, the child can provide constructive, critical feedback to another, e.g. on others' contributions to a shared website or a class blog. *(E.g. Provide constructively critical feedback to one another on contributions to the class website in We are web developers and blog in We are bloggers.)*	We are web developers We are bloggers

Creating Content	C.5.1.1. Select, use and combine a variety of software (including internet services) on a range of digital devices.	The child can use and combine a range of **programs** on a computer. The child can use multiple **programs** on laptop or tablet computers to achieve particular goals. E.g. They might use an audio editor or image editor to develop media content for a computer game; use image or video editing **software** to develop media content for a web page or blog; use image-editing **software** to develop images to use in 3D design **software**. *(E.g. In We are game developers, make use of audio and image content in Scratch.* *In We are web developers and We are bloggers, add media content to their web pages or blog.* *In We are architects, add images to the walls of their virtual gallery.)*	The child can use and combine a range of **programs** on multiple devices. The child can use multiple **digital devices** (such as tablets and laptops or digital cameras and laptops) to achieve particular goals. The devices might include web **servers,** allowing them to use cloud-based applications. E.g. They might use local media in conjunction with a cloud-based programming **platform**, such as Scratch; digital cameras and video cameras to capture content to use on an externally hosted website or blog; a digital camera to take photos they could import into 3D design **software** on a laptop. *(E.g. In We are game developers, combine local media with web-based Scratch programs.* *In We are web developers and We are bloggers, combine local media, including that captured using portable technology, with a web-based content management system.* *In We are architects, use digital photographs and other media in a virtual art gallery.)*	The child can select, use and combine a range of **programs** on multiple devices. The child can choose for themselves from a range of available **programs** on laptops, tablets or cloud-based services to achieve particular goals. E.g. They might select and use an audio editor or image editor to develop media content for a computer game; use their own choice of image or video editing **software** to develop media content for a web page or blog; use their own choice of image-editing **software** to develop images to use in 3D design **software**. The child should be able to use multiple **digital devices** (such as tablets and laptops or digital cameras and laptops) to meet their given goals. *(E.g. In We are game developers, choose how they will develop graphics and sound for their game.* *In We are web developers and We are bloggers, choose how they will develop original media for their web pages or blogs.* *In We are architects, choose how they will create content for their gallery.)*	We are game developers We are web developers We are bloggers We are architects
	C.5.1.2. Design and create a range of programs, systems and content that accomplish given goals.	The child can design and create **programs** on a computer. The child can design a **program** of their own and write this in a **block**-based language such as Scratch. The **program** need not be complex – a simple game or a turtle graphics **program** would suffice. *(E.g. In We are game developers, design and create a computer game.* *In We are artists, design and create a geometric pattern using turtle graphics.)*	The child can design and create **programs** on a computer in response to a given goal. The child can design a **program** of their own in response to a given goal and write this in a **block**-based language such as Scratch. The program need not be complex - a simple game or a turtle graphics **program** would suffice, but it should be accomplished with a degree of independent working. *(E.g. In We are game developers, design and create a computer game in response to a given brief.* *In We are artists, design and create a geometric pattern using turtle graphics in response to a given brief.)*	The child can design and create **programs** on a computer in response to a given goal and paying attention to the needs of a known audience. With a given audience in mind, the child can design a program of their own in response to a given goal and write this in a **block**based language such as Scratch. E.g. The child could design and create a computer game for a particular, known audience. *(E.g. In We are game developers, design and create a computer game in response to a given brief, paying attention to the needs of the intended* *audience.)*	We are game developers We are artists
	C.5.1.3. Collecting, analysing, evaluating and presenting data and information.	The child can evaluate information. Working with text, audio, images or video, the child can evaluate the quality of the information, perhaps looking for bias or questioning assumptions that have been made, or considering the effectiveness of its presentation. E.g. They could work with a number of sources of information on **e-safety**, evaluating its quality, or they could provide constructive critical feedback to peers on the quality of their work in design projects. *(E.g. In We are artists, evaluate the quality of their own and others' artwork.* *In We are web developers, evaluate the quality of the information on which they base their web page.* *In We are bloggers, provide feedback to classmates about the quality of their pages.)*	The child can analyse and evaluate information. Working with text, audio, images or video, the child can analyse information, perhaps summarising this. They should evaluate the quality of the information, looking for bias or questioning assumptions that have been made. E.g. They could work with information on **e-safety**, evaluating its quality and providing a clear and coherent summary. *(E.g. In We are web developers, evaluate the quality of the information on which they are drawing. Analyse this to provide a clear and coherent summary on their own page.)*	The child can analyse and evaluate information from multiple sources. Working with text, audio, images or video, the child can analyse information, perhaps summarising this or looking for common features or exceptions. They should evaluate the quality of the information, looking for bias or questioning assumptions that have been made. E.g. They could work with a number of sources of information on e-safety, evaluating their quality and providing a clear and coherent summary, drawing on multiple sources. *(E.g. In We are web developers, evaluate the quality of the information from the multiple sources on which they are drawing. Analyse this to provide a clear and coherent synthesis on their own page.)*	We are artists We are web developers We are blogger We are architects
Searching	C.5.2.1. Use search technologies effectively.	The child can use a standard search engine to find information. The child can use a common search engine (such as Google with **safe search mode** locked in place) effectively, to search for particular information on the **web**, such as answers to questions they identify in a research project. *(E.g. In We are web developers, use Google to search for information relevant to the topic of their web page.)*	The child can use filters to make more effective use of a standard search engine. The child can use a common search engine (such as Google with **safe search mode** locked in place) effectively, to search for particular information on the **web**, such as answers to questions they identify in a research project. They should use built-in search tools to filter their results, such as by time, location or reading level. *(E.g. In We are web developers, use the filters in Google to search for information relevant to the topic of their web page and appropriate for its intended audience.)*	The child can use advanced search options to make more effective use of a standard search engine. The child can use a common search engine (such as Google with **safe search mode** locked in place) effectively, to search for particular information on the **web**, such as answers to questions they identify in a research project. They should use advanced search options to filter their results, perhaps searching for a key phrase rather than keywords, using alternate keywords, or restricting their search to particular locations or domains. *(E.g. In We are web developers, use 'advanced search' in Google to search for information relevant to the topic of their web page and appropriate* *for its intended audience.)*	We are web developers
	C.5.2.2. Appreciate how search results are selected and ranked.	The child can understand that search engines use a **cached** copy of the crawled **web** to select results. The child can explain how a search engine creates a **cached** copy of the **web** and uses an index of this to select results.	The child can understand that search engines use a **cached** copy of the crawled **web** to select and rank results. The child can explain how a search engine creates an index from a **cached** copy of the **web** and uses this to select and rank results. The child might also show an awareness of the	The child can understand how search engines build a **cached** copy of the **web** using **HTTP** and web-crawler **programs**. The child can explain how a search engine creates a **cached** copy of the **web** using automated **HTTP** GET requests, follows links found, indexes results and uses the resulting index to select and rank	We are web developers

		(E.g. In We are web developers, understand that Google uses a cached copy of the crawlable web to generate search results.)	Page Rank **algorithm** in which results are ranked according to the number and quality of in-bound links. *(E.g. In We are web developers, understand that Google uses a cached copy of the crawlable web to generate search results, using the links between the pages in the cache to determine the rank order in which results are displayed.)*	results. The child might also show an awareness of the Page Rank **algorithm** in which results are ranked according to the number and quality of in-bound links. *(E.g. In We are web developers, understand that Google's web-crawler programs run on their servers simply using HTTP requests to obtain copies of* *web pages, using the links in these for further HTTP requests to add or update pages in their cache.)*	

Year 5 Medium Term Plan

Unit	Expectations	Computing PoS	Subject Links
We are game developers The pupils plan their own simple computer game. They design characters and backgrounds, and create a working prototype, which they develop further based on feedback they receive.	• 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.	**Art and design:** Pupils can improve their art and design skills by creating artwork for their games. **Music:** Pupils can record sound or compose music for their games. The games may require an understanding of aspects of maths and science to ensure the computer model on which the game is based is realistic.
We are artists The pupils use vector and turtle graphics to explore geometric art, taking inspiration from the work of Escher, Riley and traditional Islamic artists, as well as	• 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.	**Art and design:** The children learn about some famous artists. **Maths:** This unit draws on pupils' knowledge of angles, 2D shapes, translations and that angles at a point total 360°. **RE:** There are opportunities to explore Islamic art. **PE:** The pupils can explore turtle graphics instructions within a PE or dance context.

experimenting with complex 'fractal' landscapes.			
We are web developers In this unit, the pupils work together to create a website.	• 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 e-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.	**English:** There is scope for pupils to apply their skills in summarising text, as well as their knowledge of spelling, grammar and punctuation. **History:** Children could make use of skills in conducting an enquiry and in considering the authority and potential bias of source documents.
We are architects In this unit, the pupils research examples of art gallery architecture, before using Trimble SketchUp to create their own virtual gallery. Finally, they use the gallery to exhibit their own artwork.	• 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.	**Art and design:** Pupils could take scans or photos of their original drawings, paintings or sculptures before uploading them to their virtual galleries. **Maths:** Pupils apply skills from maths work in the domains of measurement and geometry. **Science:** There are opportunities to link this unit to work on properties and changes of materials, e.g. by exploring the properties of building materials, such as their hardness and transparency.

We are cryptographers The pupils learn more about communicating information securely through an introduction to cryptography (the science of keeping communication and information secret). They investigate early methods of communicating over distances, learn about two early ciphers, and consider what makes a secure password.	• 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.	**Maths:** Encryption and decryption use mathematical functions. Frequency tables play a role in cracking substitution ciphers. **History:** There are interesting stories involving the use of cryptography throughout history. **PSHE:** Privacy, safety and identity can link to topics in the school PSHE curriculum. **D&T and science:** The pupils could make simple electrical telegraph circuits.
We are bloggers Blogging provides a worldwide audience for pupils' work. Commenting on others' work extends pupils' sense of membership of a learning community beyond school. In this unit, pupils create a media-rich blog, comment on blogs and respond to comments.	• 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.	**English:** There are ample writing opportunities in this unit where children plan, draft and evaluate their own (and others') writing. **History:** The blog activity could replace a diary or journal activity, e.g. the blog of an ancient Greek.

Year 5 Greater Depth Opportunities

Unit	Greater Depth activities/extensions
We are game developers	• Once the pupils have mastered programming in Scratch, they might like to explore the very different interface and tools available in Kodu. • Encourage the pupils to think about the algorithms and programs that lie behind the computer games they play. • The pupils can remix others' games on the Scratch community website. • More advanced tools such as Game Salad (http://gamesalad.com) and GameMaker: Studio (www.yoyogames.com/studio) might appeal to talented or gifted pupils who have acquired expertise in Scratch.
We are artists	• There are some interesting mathematical principles involved in tessellation, which you may wish to explore with the pupils. • There is scope to look at other artists creating work with a distinctly geometric character, including Josef Albers, Giacomo Balla, Ross Bleckner, Kasimir Malevich, Joseph Stella and Victor Vasarely. • Some pupils might like to explore geometric art in 3D. Trimble SketchUp provides some tools for this. For an introduction to the program, see *Unit 5.6 – We are architects*. • Inkscape is also a great program for creating snowflake images with six-fold symmetry.
We are architects	• Once pupils are familiar with Trimble SketchUp, they could use it to construct models or buildings in many other curriculum areas. • The galleries the pupils create can continue to be extended, with further work added over time, becoming a 3D e-portfolio. • More ambitious projects might be to create a virtual reality representation of a location from a book or a pupil's creative writing, or from locations linked to work in history or RE.
We are cryptographers	• The cryptographic work by Alan Turing, Tommy Flowers and others at Bletchley Park in World War II was of great significance in British history and in the history of computing. The Bletchley Park website is one starting point for finding out more about this. • Broader issues around online rights and security might be worth discussing. The US Electronic Frontier Foundation (www.eff.org) and Open Rights Group (www.openrightsgroup.org) are active pressure groups in this area. • The pupils could explore steganography (the study of hiding information).
We are bloggers	• Consider adapting the class blog created as an extension to this unit, or create a new blog, to serve as an online newsletter or shared portfolio of the pupils' work. • A school residential visit could provide material for a blog, allowing parents to read about their children's activities as they take place. • Pupils might be encouraged to maintain their blogs independently, particularly as a portfolio of their independent learning within and beyond the school's curriculum. • Consider involving pupils in the 100 Word Challenge (see http://100wc.net), in which each pupil responds to the weekly creative writing challenge set by former headteacher Julia Skinner. • Consider enrolling your class in David 'Deputy' Mitchell's quadblogging project (www.quadblogging.com), in which your class is linked with three others worldwide, taking turns to read and comment on the other classes' blogs.

Skills Map Year 6

Year 6					
Sub-Strand	**Progression Statement**	**What to Look for Guidance (Working towards expectations)**	**What to Look for Guidance (Meeting expectations)**	**What to Look for Guidance (Exceeding expectations)**	**Unit**
Problem Solving	C.6.1.1. Design, write and debug programs that accomplish specific goals.	The child can design and write a **program** using a second programming language based on their own ideas. The child can design a **program** of their own and write this in a programming language other than Scratch (or whichever language has formed the focus for their programming in other years), such as Touch Develop or App Inventor, and be aware of errors in their **program**. The **program** need not be complex - a simple app would suffice. *(E.g. In We are adventure gamers, We are network engineers, We are travel writers, plan and implement their own app for a smartphone or tablet and be aware of errors in their program.)*	The child can design, write and **debug** a **program** using a second programming language based on their own ideas. The child can design a program of their own and write this in a programming language other than Scratch (or whichever language has formed the focus for their programming in other years), such as Touch Develop or App Inventor. The second language does not need to be text based, but Logo or Python could be used. The child can test and **debug** their code, explain what bugs they found and how they fixed these. The **program** need not be complex - a simple app would suffice. *(E.g. In We are adventure gamers, We are network engineers, We are travel writers, plan, implement and debug their own app for a smartphone or tablet.)*	The child can design, write and **debug** a **program** using a second programming language based on their own ideas, using iterative development to make improvements. The child can design a program of their own and write this in a programming language other than Scratch (or whichever language has formed the focus for their programming in other years), such as Touch Develop or App Inventor. The second language does not need to be text based, but Logo or Python could be used. The child can test and **debug** their code, explain what bugs they found and how they fixed these. The child can review their code, decide for themselves how this might be extended or improved, and then implement, test and **debug** these modifications. At this level, expect the child to be able to develop relatively complex apps with a degree of independence. *(E.g. In We are adventure gamers, We are network engineers, We are travel writers, plan, implement and debug their own app for a smartphone or tablet, drawing on iterative development approaches to make improvements.)*	We are adventure gamers We are network engineers We are travel writers
	C.6.1.2. Controlling or simulating physical systems.	The child can experiment with computer control applications. The child can use simple computer control and/or sensors using smartphone **hardware** or with products they make in design and technology, perhaps using Lego WeDo kits, MaKey MaKey or similar. *(E.g. In We are adventure gamers, We are network engineers, We are travel writers, learn about additional input and output available in smartphones and tablets, making use of this in their app, if appropriate.)*	The child can design, write and **debug** their own computer control application. The child can add computer control and/or sensors to a smartphone app or to products they design and make in design and technology, perhaps using Lego WeDo kits, MaKey MaKey or similar. The child can show evidence of designing, writing and debugging their **program,** ensuring that this functions correctly on the available **hardware platform.** *(E.g. In We are adventure gamers, We are network engineers, We are travel writers, incorporate additional input and output available in the smartphone or tablet for which they are developing their app, if appropriate.)*	The child can design, write and **debug** own computer control application, using iterative development to make improvements. The child can add computer control and/or sensors to a smartphone app or to products they design and make in design and technology, perhaps using Lego WeDo kits, MaKey MaKey or similar. The child can show evidence of designing, writing and debugging their **program**, ensuring that this functions correctly on the available **hardware platform**. The child can review their code and, perhaps, their **hardware**, decide for themselves how this might be extended or improved, and then implement, test and **debug** these modifications. *(E.g. In We are adventure gamers, We are network engineers, We are travel writers, incorporate additional input and output available in the smartphone or tablet for which they are developing their app, if appropriate, making use of iterative development approaches to make improvements.)*	We are adventure gamers We are network engineers We are travel writers
	C.6.1.3. Solve problems by decomposing them into smaller parts.	The child can plan a solution to a problem using decomposition. The child can take a complex problem, identify component parts, use decomposition to break this problem down and then plan how they can solve the problem by working through the elements they have identified. Projects could be extended, such as developing a smartphone app. *(E.g. In We are computational thinkers, use decomposition to plan how they will tackle the app development project.)*	The child can solve problems using decomposition, tackling each part separately. The child can take a complex problem, identify component parts, use decomposition to break this problem down and then plan how they can solve the problem by working through the elements they have identified. they can then use their plan to solve the original problem. Projects can be extended, such as developing a smartphone app. *(E.g. In We are computational thinkers, use decomposition to plan how they will tackle the app development project; follow their plan in subsequent units.)*	The child can apply decomposition to help understand complex systems. The child can apply the principle of decomposition to help them to understand how complex systems operate. This could be **software** or combined **hardware**/**software** systems such as a smartphone. In this case, the child could consider **input**, processing, memory, **output** and connectivity **hardware**, **operating system**, application **software** and **data** as separate, interconnected component systems. *(E.g. In We are adventure gamers, use decomposition approaches to develop their understanding of the different hardware and software components of smartphones or tablets.)*	We are adventure gamers We are computational thinkers

Programming	C.6.2.1. Use sequence, selection and repetition in programs; work with variables.	The child can use **sequence**, **selection** and **repetition** in **programs**. The child's **program** should include **sequences** of **commands** or **blocks**, some **repetition** and **selection**. **Repetition** might include exit conditions (e.g. repeat...until...). **Selection** would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine **repetition** with **selection**. **Programs** might include a simple smartphone app. *(E.g. In We are travel writers, make use of sequence, selection and repetition in their app.)*	The child can use **sequence**, **selection**, **repetition** and **variables** in **programs**. The child's **program** should include **sequences** of **commands** or **blocks**, **repetition**, **selection** and **variables**. **Repetition** might include exit conditions (e.g. repeat...until...) and perhaps a counter-variable for **iteration**. Selection would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine **repetition** with **selection** and **variables**. **Programs** might include a simple smartphone app. *(E.g. In We are travel writers, make use of sequence, selection, repetition and variables in their app.)*	The child can use **sequence**, **selection**, **repetition**, **variables** and procedures in **programs**. The child's program should include **sequences** of **commands** or **blocks**, **repetition**, **selection**, v**ariables** and user-defined procedures, functions or custom **blocks**. **Repetition** might include exit conditions (e.g. repeat...until...) and perhaps a counter-variable for **teration**. **Selection** would normally be of an if...then or if...then...else type. At this level, expect the child to be able to combine **repetition** with **selection** and **variables**. Procedures or custom **blocks** need not include passing parameters, although they might. **Programs** might include a smartphone app. *(E.g. In We are travel writers, make use of sequence, selection, repetition variables and procedures or functions in their app.)*	We are travel writers
	C.6.2.2. Work with various forms of input and output.	The child can write a program that accepts keyboard and mouse or touch screen **input** and produces **output** on screen and through speakers. The child could create a smartphone app, using the touch screen for input and the screen and speakers or headphones for **output**. *(E.g. In We are network engineers and We are travel writers, use touch screen input and screen and speaker output in their app.*)	The child can write a program that accepts **inputs** other than keyboard and mouse and produces **outputs** other than screen or speakers. The child could create a smartphone app, using the touch screen and the GPS sensor or accelerometer for **input**, and the screen and speakers or headphones plus vibration motor or **network** connection for **output**. *(E.g. In We are network engineers and We are travel writers, use touch screen and other input (e.g. GPS or accelerometer) and screen, speaker and other output (e.g. vibration motor, network connectivity) in their app.)*	The child can use principles of good user-**interface** design, including accessibility, when developing **programs**. In developing their program, the child should take account of the needs of their intended users and be able to explain how these have influenced design and development decisions. The child should test their program with intended users, making changes on the basis of the feedback they receive. The child should consider design for accessibility, perhaps providing haptic feedback, audio narration or internationalisation to make, e.g. a smartphone app, more accessible. *(E.g. In We are network engineers, explain how they have designed the interface of their program with principles of effective design, their* *intended audience and some elements of accessibility in mind.)*	We are network engineers We are travel writers
Logical thinking	C.6.3.1.Use logical reasoning to explain how some simple algorithms work.	The child can explain an **algorithm** using **sequence, repetition** and **selection** in their own words. Given an **algorithm** using **sequence, repetition** and **selection**, the child can give a coherent, logically reasoned explanation of what it does and how it works. **Repetition** is likely to be using end conditions (e.g. repeat...until...), and **selection** is likely to be simply if...then. **Algorithms** used in familiar smartphone apps would be good examples. *(E.g. In We are network engineers and We are travel writers, explain the event-driven algorithms they've used in the app.)*	The child can give clear and precise logical explanations of a number of **algorithms**. Given an **algorithm**, the child can describe what it does and, using logical reasoning, give precise explanations of how it works. **Algorithms** could be linked to programming projects, but might include a key **algorithm** such as binary search. *(E.g. In We are network engineers and We are travel writers, give clear and precise explanations of the event-driven algorithms they've* *used in the app.)*	The child can use logical reasoning to explain how more complex **algorithms** work. Given an **algorithm**, the child should be able to describe what it does and, using logical reasoning, give precise explanations of how it works. **Algorithms** could be linked to programming projects, but might include key **algorithms** such as binary search, bubble sort or finding highest common factors. *(E.g. In We are adventure gamers, discuss some of the underlying algorithms for smartphone or tablet operating systems or GUIs.)*	We are adventure gamers We are network engineers We are travel writers
	C.6.3.2. Use logical reasoning to detect and correct errors in algorithms and programs.	The child can use logical reasoning to detect errors in **algorithms**. When given an **algorithm** for a particular purpose, e.g. a rule-based **algorithm** for a smartphone app, the child can use logical reasoning to identify possible errors in the **algorithm**, explaining why they believe the **algorithm** is incorrect. *(E.g. In We are network engineers and We are travel writers, use logical reasoning to detect errors in the event-based algorithms they use in their app.)*	The child can use logical reasoning to detect and correct errors in **algorithms** (and **programs**). When given an **algorithm** for a particular purpose, e.g. a rule-based **algorithm** for a smartphone app, the child can use logical reasoning to identify possible errors in the **algorithm**, explaining why they believe the **algorithm** is incorrect. The child can use logical reasoning to suggest possible corrections to the **algorithm**, explaining why these would correct the bug they identified. *(E.g. In We are network engineers and We are travel writers, use logical reasoning to detect and correct errors in the event-based algorithms they use in their app and in their code.)*	The child can suggest ways in which the efficiency of **algorithms** and **programs** can be improved. The child can consider alternative **algorithms** for particular problems, using logical reasoning to compare these for efficiency. Examples might include comparing linear and binary search, or comparing exhaustive search and Euclid's **algorithm** for finding highest common factors. *(E.g. In We are network engineers and We are travel writers, suggest ways in which their algorithms or code can be made more efficient.)*	We are network engineers We are travel writers
	C.6.3.3. Understand computer networks including the internet.	The child can understand that computers can communicate through **network** technologies other than the internet. The child can demonstrate an awareness of other networking technologies they might encounter, such as Bluetooth, mobile phone **networks** and the telephone **network**.	The child can understand how mobile phone or other **networks** operate. The child can give an explanation of how mobile phone (or other) **networks** operate: they should know that information is transmitted digitally, and have some understanding of the network topology involved. In the case of mobile phone **networks,** the child should show some understanding of the	The child can understand differences between **network** technologies. The child can compare and contrast different **network** technologies, discussing differences in topology, range, bandwidth and fault tolerance. *(In We are adventure gamers, explain some of the differences between the cellular telephone network, the internet, Bluetooth and NFC.)*	We are adventure gamers

		(E.g. In We are adventure gamers, recognise other networking technology provided in a smartphone or tablet.)	interactions between a phone, cell transmitters/receivers and the **network**'s control systems. *(E.g. In We are adventure gamers, demonstrate an understanding of how networks such as the cellular telephone system, Bluetooth and NFC operate.)*		
	C.6.4.1. Understand how networks can provide multiple services, such as the world wide web.	The child can understand the difference between a domain name and an **IP address**. The child can distinguish between a domain name used by people (e.g. risingstars-uk.com) and an **IP address** used by computers (e.g. 192.237.142.203), and appreciate why domain names are more commonly used on the internet. *(E.g. In developing a website in* We are publishers*, know the difference between a domain name and an IP address.)*	The child can understand how domain names are converted into **IP addresses** on the internet. The child can give some explanation of how a domain name is converted into an **IP address** using the distributed **domain name system (DNS)** using something similar to a set of phone books. The child should show an awareness of the looked-up addresses (**DNS** records) being copied (**cached**), and that more local records are used in preference to more authoritative records in most circumstances. *(E.g. In* We are publishers*, know how a domain name is converted into an IP address.)*	The child can show awareness of some of the security implications of **DNS** lookups. The child can discuss some of the security implications of being given the wrong **IP address** when looking up a domain name, recognising that malware could compromise the integrity of this system on their computer and the importance of **network** managers maintaining the integrity of this system at internet service provider level. The child might also be aware of how seriously the security of root **DNS servers** is treated.	We are publishers
E-safety	C.6.1.1. Use technology safely, respectfully and responsibly.	C.6.7.2. The child can demonstrate that they can act responsibly when using the internet. The child can demonstrate that they act responsibly when using the internet. E.g. They should show responsibility when conducting web-based research; in using online project management tools; when creating and analysing surveys (including paying due regard to data protection legislation and ethical principles); in observing the terms and conditions of online tools; when creating digital content. *(E.g. In We are adventure gamers, conduct research safely.* *In We are computational thinkers, use online project management tools responsibly.* *In We are advertisers, create surveys, paying due regard to data protection and ethical guidance.* *In We are network engineers and We are travel writers, use online tools responsibly.* *In We are publishers, consider carefully how to protect personal information and act responsibly when creating digital content.)*	C.6.7.3. The child can show that they can think through the consequences of their actions when using digital technology. The child can discuss likely and potential consequences of their actions when using digital technology in a range of contexts. Contexts might include developing smartphone apps; using online project management tools; collecting information for market research; posting original content online. *(E.g. In We are adventure gamers, We are network engineers and We are travel writers, consider the potential consequences of any apps they develop for themselves and their users.* *In We are computational thinkers, think through the consequences of how they use online project management tools.* *In We are advertisers, consider the consequences of collecting information in market research.* *In We are publishers, consider the consequences of posting original content online.)*	C.6.7.4. The child can consider critically some of the wider implications of the use of digital technology. The child can discuss critically some wider implications of the use of digital technology, such as the ready availability of smartphones and connectivity; creating and distributing digital content; designing and developing apps. *(E.g. In We are adventure gamers, consider some of the wider implications of the ready availability of smartphones or tablets and their embedded sensors and network connections.* *In We are network engineers and We are travel writers, consider the wider implications of app design and development.* *In We are publishers, consider the wider implications of the ready availability of tools to create and distribute digital content.)*	We are adventure gamers We are computational thinkers We are advertisers We are network engineers We are travel writers We are publishers
	C.6.1.2. Recognise acceptable/unacceptable behaviour.	C.6.7.2. The child can discuss the consequences of particular behaviours when using digital technology. The child can discuss the likely or possible consequences of particular behaviours when using digital technology in a range of contexts. Contexts could include smartphone or tablet use; the use of online project management tools; online surveys and recording of interviews; creating and sharing digital content. *(E.g. In We are adventure gamers, We are network engineers and We are travel writers, discuss the consequences of positive or negative smartphone and tablet use.* *In We are computational thinkers, discuss the consequences of positive or negative use of online project management tools.* *In We are advertisers, discuss the consequences of positive or negative use of surveys and recorded interviews.* *In We are publishers, discuss the consequences of the positive or negative creation and sharing of digital content.)*	C.6.7.3. The child can identify principles underpinning acceptable use of digital technologies. The child can identify some principles underpinning acceptable behaviour when using technologies in a range of contexts. Contexts could include smartphone or tablet use; the use of online project management tools; online surveys and recording of interviews; creating and sharing digital content. *(E.g. In We are adventure gamers, We are network engineers and We are travel writers, identify principles underpinning acceptable smartphone and tablet use.* *In We are computational thinkers, identify principles underpinning acceptable use of online project management tools.* *In We are advertisers, identify principles underpinning acceptable use of surveys and recorded interviews.* *In We are publishers, identify principles underpinning acceptable creation and sharing of digital content.)*	C.6.7.4. The child can consider questions of ethics and morality in relation to digital technology. The child can consider some of the ethical or moral questions raised by the use of digital technology in a range of contexts. Contexts could include smartphone or tablet use; the use of online project management tools; online surveys and recording of interviews; creating and sharing digital content. *(E.g. In We are adventure gamers, We are network engineers and We are travel writers consider ethical and moral questions relating to smartphone and tablet use.* *In We are computational thinkers, consider ethical and moral questions relating to the use of online project management tools.* *In We are advertisers, consider ethical and moral questions relating to the use of surveys and recorded interviews.* *In We are publishers, consider ethical and moral questions relating to the creation and sharing of digital content.)*	We are adventure gamers We are computational thinkers We are advertisers We are network engineers We are travel writers We are publishers

	C.6.1.3. Know a range of ways to report concerns and inappropriate behaviour.	Know how to report concerns and inappropriate behaviour in a range of contexts. Pupils should know how to report inappropriate behaviour when using technology in school: preferably this will be to their teacher, the **network** manager or another trusted adult. They should know how to report any concerns over, or inappropriate behaviour with, digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or to the police. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the App Inventor or Touch Develop can be reported to the providers of these services. Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	Know a range of ways to report concerns and inappropriate behaviour in a variety of contexts. Pupils should know how to report inappropriate behaviour when using technology in school: preferably this will be to their teacher, the **network** manager or another trusted adult. They should know how to report any concerns over, or inappropriate behaviour with, digital technology at home. Preferably this would be through discussion with their parents, with you or with another trusted adult. Pupils should also know how to report inappropriate behaviour to those running websites which they regularly use, and to ChildLine, CEOP or the police. Pupils should know that illegal content or activities can be reported to CEOP or the police. *(E.g. Know to tell a teacher about any concerns or inappropriate behaviour in any units. Know that concerns in relation to the App Inventor or Touch Develop can be reported to the providers of these services. Know that concerns over the content of digital media can be reported to those hosting this content. Know that they should talk to their parents about concerns and inappropriate behaviour outside school.)*	Consider how they would determine the best way to address particular concerns or inappropriate behaviour. Pupils should think about how they would determine the best way to address particular concerns or inappropriate behaviour. They should take into account whether their concerns, or the behaviour, relates to home or to school, whether the person is another pupil, an adult they know or someone else, whether it might be illegal, how serious it is and whether others are likely to be affected.	We are adventure gamers We are computational thinkers We are advertisers We are network engineers We are travel writers We are publishers
	C.6.1.4. Be discerning in evaluating digital content.	C.6.5.2. The child can decide whether digital content is reliable and unbiased. The child can discuss whether particular content (such as advertising copy and product reviews) is reliable, and whether it has been written from a neutral point of view. They should be able to spot some examples of bias in digital content. *(E.g. In We are adventure gamers, consider how reliable or unbiased advertising copy and reviews for apps are. In We are publishers, consider how reliable and unbiased their own copy on their app is.)*	C.6.5.3. The child can form an opinion about the effectiveness of digital content. Taking into account the intended audience and purpose of the content, the child can form a judgement as to, and provide reasons for, the extent to which they consider digital content to be effective. The content might be an app, media resources or marketing materials. *(E.g. In We are adventure gamers, form an opinion about the effectiveness of the apps they explore. In We are network engineers, form an opinion about how effective their own media resources and interface designs are. In We are publishers, form an opinion about how effective their own marketing materials are.)*	C.6.5.4. The child can consider principles they can use to evaluate digital content. The child should identify some principles they could use to evaluate digital content, such as absence of bias, effective design, acknowledgement of sources, agreement with other sources, the reputation of the author, any indication that it has been checked or reviewed, absence of errors or logical inconsistencies. *(E.g. In We are adventure gamers, consider principles that could help in evaluating apps they explore. In We are network engineers, consider principles that could help in evaluating their own media resources and interface designs. In We are publishers, consider principles that could help in evaluating their own marketing materials.)*	We are adventure gamers We are network engineers We are publishers
	C.6.1.5. Understand the opportunities networks offer for communication and collaboration.	C.6.4.2. The child can use online tools to plan a collaborative project. The child can make use of an online tool to plan a collaborative project (such as developing an app). *(E.g. In We are computational thinkers, plan the app development project using online tools.)*	C.6.4.3. The child can use online tools to plan and carry out a collaborative project. The child can make use of an online tool to plan and carry out a collaborative project (such as developing an app). *(E.g. In We are computational thinkers, plan the app development project using online tools. In We are advertisers - We are publishers, use these tools to keep track of progress and share ideas.)*	C.6.4.4. The child can use online tools to plan, carry out and evaluate a collaborative project. The child can make use of an online tool to plan, carry out and then evaluate a collaborative project (such as developing an app). *(E.g. In We are computational thinkers, plan the app development project using online tools. In We are advertisers - We are publishers, use these tools to keep track of progress and share ideas. Use the tools to support an evaluation of their project in We are publishers.)*	We are computational thinkers We are advertisers We are network engineers We are travel writers We are publishers
Creating Content	C.6.1.1. Select, use and combine a variety of software (including internet services) on a range of digital devices.	The child can use and combine a range of **programs** on multiple devices. The child can use multiple **digital devices** (such as tablets and laptops or digital cameras and laptops) to achieve particular goals. The devices might include web **servers,** allowing them to use cloud-based applications. E.g. They might use local media to make a presentation using cloud-based presentation **software**, such as Google Slides, local media, cloud-based programming environments and a connected tablet or smartphone to help in developing and testing an app; a video camera, laptop-based editing **software** and online video streaming to create a marketing video for an app.	The child can select, use and combine a range of **programs** on multiple devices. The child can choose for themselves from a range of available **programs** on laptops, tablets or cloud-based services to achieve particular goals. E.g. They might choose which image editors and presentation **software** to use when making a presentation; which image and audio editors to use when creating media content for an app; which DTP, video editor and website tools to use when developing marking materials for an app. *(E.g. In We are adventure gamers, use a range of media to create an effective pitch presentation in software of their own choice.*	The child can show some understanding of the differences between, and relative merits of, different applications, **operating systems** and **hardware**. The child can discuss the differences between smartphones, tablets, laptops and **servers**. They should be able to compare and contrast different applications (e.g. Word and Google Docs). They should be able to compare and contrast **operating systems** they have used (e.g. Windows and iOS or Android). *(E.g. In We are adventure gamers and We are publishers, give explanations for why they chose particular packages to develop content.*	We are adventure gamers We are computational thinkers We are advertisers We are network engineers We are travel writers We are publishers

		(E.g. In We are adventure gamers, use a range of media to create an effective pitch presentation. *In We are computational thinkers, use online project management software.* *In We are advertisers, combine Google Forms, Google Sheets and Google Slides.* *In We are travel writers, use an online development environment, local media and a smartphone, tablet or emulator.* *In We are publishers, use a range of media packages to market their app.)*	*In We are publishers, use a range of media packages of their own choice to market their app.)*	*In We are adventure gamers, We are network engineers and We are travel writers, compare the app development environment with Scratch, and the mobile operating system with the desktop* *operating system.)*	
	C.6.1.2. Design and create a range of programs, systems and content that accomplish given goals.	The child can create systems in response to a given goal. The child can plan and design a system with multiple, interrelated components with a given goal in mind. E.g. They could develop a smartphone app, taking into account **input**, **output** and connectivity, the **operating system**, the **algorithms**, code and user **interface** of their own **program**. *(E.g. In We are network engineers and We are publishers, create a smartphone or tablet app for an agreed* *purpose.)*	The child can design and create systems in response to a given goal. The child can plan, design and implement a system with multiple, interrelated components with a given goal in mind. E.g. They could develop a smartphone app, taking into account **input**, **output** and connectivity, the **operating system**, the **algorithms**, code and user **interface** of their own **program**. *(E.g. In We are adventure gamers, We are network engineers, We are publishers, design and build a smartphone or tablet app for an agreed purpose.)*	The child can design and create systems in response to a given goal, paying attention to the needs of a known audience. The child can plan, design and implement a system with multiple, interrelated components with a given goal and a known audience in mind. E.g. They could develop a smartphone app, taking into account **input**, **output** and connectivity, the **operating system**, the **algorithms**, code and user **interface** of their own **program**. They should evaluate how effectively their system meets the specified goal and the needs of their audience. *(E.g. In We are adventure gamers, We are advertisers, We are network engineers, We are publishers, design and build a smartphone or* *tablet app for an agreed purpose, taking into account the needs of a known audience.)*	We are adventure gamers We are advertisers We are network engineers We are publishers
	C.6.1.3. Collecting, analysing, evaluating and presenting data and information.	The child can analyse **data**. The child can analyse numerical **data** (typically using a spreadsheet) perhaps producing summary statistics, looking for relationships, trends and exceptions. E.g. They could conduct market research for a smartphone app and analyse the data they obtain. *(E.g. In We are advertisers, conduct market research into their planned app, analysing the data obtained.)*	The child can analyse and evaluate **data**. The child can evaluate the quality of numerical **data**, deciding the extent to which it is affected by systematic or random errors. They should analyse their data, perhaps producing summary statistics, looking for relationships, trends and exceptions. E.g. They could conduct market research for a smartphone app, and analyse and evaluate the data they obtain. (*E.g. In We are advertisers, conduct market research into their planned app, evaluating and analysing the data obtained.)*	The child can analyse, evaluate and interpret **data**, being aware of the limitations of any conclusions drawn. The child can evaluate the quality of numerical data, deciding the extent to which it is affected by systematic or random errors. They should analyse their data, perhaps producing summary statistics, looking for relationships, trends and exceptions. They should provide an interpretation of their data and discuss the limitations of their findings. E.g. They could conduct market research for a smartphone app, and evaluate, analyse and interpret the data they obtain. *(E.g. In We are advertisers, conduct market research into their planned app, analysing, evaluating and interpreting the data obtained.)*	We are advertisers
Searching	C.6.2.1. Use search technologies effectively.	The child can appreciate that a range of different search technologies are available. The child can show that they are aware of a range of different search technologies, including alternatives to Google (such as Bing or Yahoo) and site-specific search engines (such as those for the App Store or Google Play). E.g. They could name several search engines that could be used when researching available smartphone apps for a particular purpose. *(E.g. In We are adventure gamers, show awareness that a number of search engines can be used to find out about smartphone or tablet apps.)*	The child can make use of a range of search engines appropriate to finding information that is required. The child can show that they can use effectively a range of different search technologies, including alternatives to Google (such as Bing or Yahoo) and site-specific search engines (such as those for the App Store or Google Play). E.g. They could demonstrate how they would use a range of search engines when researching available smartphone apps for a particular purpose. *(E.g. In We are adventure gamers, use a number of search engines to find out about smartphone or tablet apps.)*	The child can appreciate that much information cannot easily be found using search engines. The child should be aware that not all questions can be answered using search engines. They should be able to give examples of 'ungoogleable' questions and consider some other ways in which these could be answered. *(E.g. In We are adventure gamers and We are advertisers, recognise that some questions are* *'ungoogleable' and other approaches to answering them are required.)*	We are adventure gamers We are advertisers
	C.6.2.2. Appreciate how search results are selected and ranked.	The child can appreciate that search engines rank results based on inbound links to a page. The child can demonstrate some awareness of the Page Rank **algorithm**, explaining that the ranking of a page is determined largely on the basis of the links pointing to that page in the engine's **cached** copy of the **web**.	The child can appreciate that search engines rank pages based on the number and quality of in-bound links. The child can demonstrate some awareness of the Page Rank **algorithm**, explaining that the quality of a page is determined largely on the basis of the number and quality of links pointing to that page in the engine's **cached** copy of the **web**, and that quality is itself determined recursively through	The child can appreciate that search engines now use many additional 'signals' to provide more relevant results. The child should be aware of the Page Rank **algorithm** used for ranking search results, but should also be able to discuss other signals used in ranking **algorithms**, such as bounce back rates, accessibility indicators, localisation and personalisation of search results.	We are adventure gamers We are publishers

		(E.g. In developing their website in We are publishers, recognise how its search rank can be improved by having links to it from other websites.)	Page Rank. *(E.g. In developing their website in We are publishers, recognise how its search rank can be improved by having links to it from other high-ranking websites.)*	*(E.g. In We are adventure gamers and We are publishers, recognise that search results may be personalised using many other factors.)*	

Year 6 Medium Term Plan

Unit	Expectations	Computing PoS	Subject Links
We are adventure gamers In this unit, the pupils learn a few commands of a text-based programming language (Python), enabling progression from Scratch. They create a simple, text-based adventure game.	• 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.	**English:** Using Python (or other text-based languages) helps reinforce the importance of spelling, punctuation and grammar. The pupils will need to interpret Python's error messages and spot the mistakes in their programs. **English:** The unit provides an excellent opportunity to develop the pupils' descriptive writing and storytelling. The context of the adventure game could be related to another area of the curriculum, to a class reader or to broader PSHE themes. Typically, adventure games use medieval 'swords and sorcery' settings, but you may prefer to give a clearer, curriculum-focused theme to pupils' work.

We are computational thinkers In this unit, the pupils participate in some hands-on unplugged activities that help them to develop an understanding of some important algorithms. They also investigate these when implemented as Scratch or Snap! programs.	• 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.	There are some very close connections here with mathematics. Pupils play the 'Guess my number' game, using systematic techniques that can be expressed as algorithms. These games can also be used to develop mathematical fluency if the pupils ask different types of questions. Putting lists of numbers into order is also important in mathematics. Ordering decimals, percentages and fractions is a common mathematical task at this level. Understanding or developing algorithms for checking whether a number is a prime, or to work out the highest common factor of a pair of numbers, further develops the pupils' understanding of these important mathematical ideas.
We are advertisers In this unit, the pupils review existing adverts or promotional films, create a storyboard, shoot original footage, source other media and edit a final version of their movie.	• 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.	**English:** Pupils practise elements of composition (planning, drafting, writing, evaluating and editing). **PSHE:** Pupils could take a particular PSHE issue and make a film to raise awareness of this. It would be possible to take ideas and issues from history, geography, science, RE or almost any other subject as a basis for film-making.

We are network technicians In this unit, the pupils use unplugged activities to develop their understanding of networks; they learn about the domain name system and explore the school's network nfrastructure.	• 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.	**English:** Pupils write what they learn about the internet. **Design and technology:** Complex systems such as the internet and computer networks illustrate engineering ideas. **Science:** This unit can be linked to the electricity content of the curriculum. **Geography:** In following the route taken by data packets, children can practise geography skills.
We are travel writers In this unit, the pupils document an educational visit. They research their destination and explore different routes. While there, they capture photographs, audio	• 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	**Geography:** Pupils explore digital mapping for the educational visit and work with latitude and longitude GPS coordinates. **Maths:** Pupils compare the cost of different travel plans. **English:** Pupils create audio, video and written content to document their visit. **Art and design:** Pupils think carefully about taking and editing digital photographs to record their visit. The visit itself may have clear curriculum links, which can be further exploited in writing it up.

and video. On return they add this content to a digital map.		concerns about content and contact.	
We are publishers In this unit, the pupils produce a class yearbook or school magazine using desktop publishing tools. They source, write, edit and combine images and text from a range of sources.	• 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.	**English:** This unit provides a meaningful experience in which the children write for a specific audience while honing spelling, punctuation and grammar skills. **Art and design:** The design elements of the project can draw on the pupils' own talents developed in art and design. The magazine or yearbook could include space for the pupils to discuss their subject work in detail and to reflect on their learning in these areas.

Year 6 Greater Depth Opportunities

Unit	Greater Depth activities/extensions
We are adventure gamers	• Pupils can do much more with Python than create text-based adventures. They could perhaps revisit some of the Turtle graphics work from Year 5 – We are artists, using Python's Turtle library to recreate their drawings using Python, or their educational games from Year 4 – We are software developers, to make text-based versions of these in Python. It would be possible to rewrite the cryptography programs from Year 5 – We are cryptographers using Python too. • The program pupils create for a choose your own adventure game could be easily adapted to make a classification key or branching database, for example to identify minibeasts, as this also uses a very similar binary-tree data structure.
We are computational thinkers	• Prime numbers lie at the heart of current approaches to cryptography and security on the internet – this could form the basis for an independent study project for some pupils. • Other problems in computer science appear to be very hard to solve, such as the 'travelling salesman' problem of finding the shortest route to visit a particular set of cities. While hard to find the shortest route for large numbers of cities, the pupils could explore finding short routes for a small number of cities using a map or Google Maps. • The pupils could think about how they might program a computer to solve a *Countdown*-style problem (where pupils are given a target number to make using arithmetic operations on a random set of six numbers) and related problems such as 'The 24 Game', where you have to make 24 using four numbers supplied.
We are advertisers	• Encourage the pupils to look critically at the techniques used in video in general and advertising in particular. What sort of approaches are used to sell and persuade? Are these effective? • There are many ways in which pupils can continue to apply their video recording and editing skills across, and beyond, the curriculum. For example some pupils could make videos of school events, create short films of lesson introductions or short dramatic pieces based on particular texts or concepts. • The pupils could explore other aspects of marketing, e.g. moving beyond video to create posters or websites to promote their cause. • Another approach to video work is animation, both stop-motion and scripted or programmed animation. If pupils work in the latter, they could enter the annual Manchester University Animation Competition.

We are network technicians	• Look for other opportunities for the pupils to use the Command Prompt. • Look for other ways in which the pupils could use a Raspberry Pi (we have 6) – there are plenty of ideas in the books we have in the suite and much interest in using these simple, low-cost computers in education.
We are travel writers	• GPS technology on handheld GPS receivers or smartphones could be used to help plan activities for an educational visit. With a large open space, and subject to conducting a thorough risk assessment, the pupils could be given a number of locations to visit, perhaps collecting tokens or answering questions to reveal the next point on the route. The popular smartphone-enabled hobby of geocaching builds on this idea: www.geocaching.com/ (account required). • Use virtual reality headsets to provide pupils with an immersive virtual visit. See Google Expedition Pioneers for early experiments with this technology in school: www.google.co.uk/edu/expeditions/.
We are publishers	• The unit focuses on a traditional printed publication. It's worth encouraging pupils to think about the future of this medium, comparing it to PDFs, iBooks or ePubs on tablet computers or e-readers. Pupils could work in iBooks Author to produce a much more interactive version of the magazine or yearbook here, distributing this electronically. • Pupils could also apply the collaboration and design ideas to develop online content, perhaps for a class or school website. Encourage them to compare and contrast these different media.