**Progression of Skills and Knowledge in Computing**

**KNOWLEDGE, SKILLS AND UNDERSTANDING**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Programming** | **Using programmable toys** | **Programming on screen** | **Programming an animation** | **Developing and Producing a simple game** | **Developing an interactive game** | **Making a text-based adventure game** |
| Understand that toys can be controlled by entering a sequence of instructionsDevelop and record sequences of instructions as an algorithmProgram a toy to follow an algorithmPredict how programs will work | Clear understanding of algorithms as sequences of instructionsConvert simple algorithms to programsPredict what a simple program will doSpot and fix errors in their program | Create an algorithm for an animated scene in the form of a storyboardWrite a program in scratch to create the animationCorrect mistakes in their animation program | Develop an educational computer game using selection and repetitionUnderstand and use variablesDebug computer programsRecognise the importance of user interface design | Create original artwork and sound for a gameDesign and create a computer program for a computer game which uses sequence, selection, repetition and variablesUse iterative development techniques to improve their game | Learn some of the syntax of a text-based programming languageUse commands to display text on screen, accept typed user input, store and retrieve data using variables and select from a listPlan a text based adventure with multiple ‘rooms’ and user interactionThoroughly debug the program |
| **Computational Thinking** | **Filming the steps of a recipe** | **Exploring how computer games work** | **Finding and correcting bugs in programs** | **Prototyping an interactive toy** | **Cracking codes** | **Mastering algorithms for searching, sorting and mathematics** |
| Break down a process into simple steps as an algorithmUse different features of a video cameraUse a video camera to capture moving imagesDevelop collaborative skillsDiscuss work and think about how it can be improved | Describe what happens in computer gamesUse logical reasoning to make predictions on what a program will doTest predictionsThink critically about a gameBe aware of how to use games safely | Develop strategies for finding errors in programsBuild up resilience and strategies for problem solvingIncrease knowledge and understanding of ScratchRecognise a number of common types of bug in software | Design and make an on screen prototype of a computer controlled toyUnderstand different forms of input and outputDesign, write and debug the control and monitoring program for their toy | Be familiar with semaphore and Morse CodeUnderstand the need for private information to be encryptedEncrypt and decrypt messages in simple ciphersAppreciate the need to use complex passwords and to keep them secureHave some understanding of how encryption works on the web | Develop the ability to reason logically about algorithmsUnderstand how some key algorithms can be expressed as programsUnderstand that some algorithms are more efficient than others for the same problemUnderstand common algorithms are more efficient than others of the same problemsUnderstand common algorithms for sorting and searchingAppreciate algorithmic approaches to problems in mathematics |
|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Creativity** | **Illustrating an eBook** | **Taking, selecting and editing digital images** | **Videoing performance** | **Producing digital music** | **Fusing geometry and art** | **Creating short television ads** |
| Use the web safety to find ideas for an illustrationSelect and use appropriate painting tools to create and change images on the computerCreate an illustration for a particular purposeKnow how to save and retrieve and change their workReflect on work | Consider the technical and artistic merits of photographsUse a digital camera or camera appTake digital photographsEdit and enhance their photographs | Gain skills in shooting live videoEdit video clipsUnderstand the qualities of effective video | Use one or more program to edit musicCreate and develop a musical compositionDevelop an awareness of how music can enhance work in other media | Develop an appreciation of the links between geometry and artBecome familiar with the tools and techniques of a vector graphics programDevelop an understanding of turtle graphicsExperiment with tools and refine and develop their workDevelop awareness of computer generated are | Think critically about how video is used to promote a causeStoryboard an effective advert for a causeWork collaboratively to shoot audible original footage and source additional content, acknowledging intellectual property rightsWork collaboratively to edit the assembled content to make an effective advert |
| **Computer Networks** | **Finding images using the web** | **Researching a topic** | **Making and sharing a short screencast presentation** | **Editing and Writing HTML** | **Creating a web page** | **Exploring computer networks including the internet** |
| Find and use pictures on the webKnow what to do if they find a picture that causes concernGroup images based on binary (yes/no)Organise images into two groupsSort images according to a criteriaAsk questions about images | Search the internet for informationImprove note taking through mappingDevelop presentation skills through creating and delivering a short multimedia presentation | Understand the physical hardware connections necessary for computer networks to workUnderstand some features of internet protocolsUnderstand some diagnostic tools for investigating network connectionsDevelop a basic understanding of how domain names are converted to IP addresses | Understand how the internet makes the web possibleUse HTML tags for elementary mark upUse hyperlinks to connect ideas and sourcesUnderstand the risks of using the web | Develop research skills to know what information is appropriateUnderstand some elements of how search engines select and rank ideasQuestion the plausibility and quality of informationDevelop and refine ideas and textShow their understanding of safety and responsible use of technology | Appreciate that computer networks transmit and receive information digitallyUnderstand the basic hardware needed for computer networks to workUnderstand key features of internet communications protocolsDevelop a basic understanding of how domain names are converted to numerical IP addresses |
|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Communication & Collaboration** | **Producing a talking book** | **Communication clues** | **Communicating safely on the internet** | **Producing a wiki** | **Sharing experiences and opinions** | **Create a Yearbook** |
| Use sound recording to record soundsDevelop skills in saving and storing sounds on the computerUnderstand how a talking book differs from a paper bookShare recordings with an audience | Understand that email can be used to communicateDevelop skills in opening, composing and sending emailsOpening and listening to audio filesUse appropriate language in emailsDevelop skills in editing and formatting text in emailsBe aware of e-safety when using email | Develop a basic understand of how email worksGain skills in using emailBe aware of issues surrounding emails, including ‘netiquette’ and safetyWork with a remote partnerExperience video conferencing | Understand the conventions for collaborative online work, particularly in wikisBecome familiar with Wikipedia, including potential problems with its useUse a wiki too to write for a target audience | Become familiar with blogs as a medium and a genre of writingCreate a sequence of blog posts on a themeIncorporate additional material in a blogComment on the posts of othersDevelop a critical, reflective view of a range of media | Manage or contribute to large collaborative projects, facilitated using online toolsWrite and review contentSource digital media while demonstrating safe, respectful and responsible useDesign and produce a high quality a high-quality print document |
| **Productivity** | **Creating a card electronically** | **Recording Bug Hunt data** | **Collecting and analysing data** | **Presenting the weather** | **Creating a virtual space** | **Using media and mapping to document a trip** |
| Develop basic keyboard skills through typing and formatting textDevelop basic mouse skillsUse the web to find and select imagesDevelop skills in storing and retrieving filesDevelop sills in combining text and images | Sort and classify a group of items by answering questionsCollect data using tick charts or tally chartsUse simple charting software to produce pictograms and other basic chartsTake, edit and enhance photographsRecord information on a digital map | Understand some elements of survey designUnderstand some ethical and legal aspects of online data collectionUse the web to facilitate data collectionGain skills in using charts to analyse dataGain skills in interpreting results | Understand different measurements techniques for weather both analogue and digitalUse computer based data logging to automate the recording of some weather dataUse spread sheets to create chartsAnalyse data, explore inconsistencies in data and make predictionsPractise using presentation software | Understand the work of architects, designers and engineers working in 3DDevelop familiarity with a simple CAD toolDevelop spatial awareness by exploring and experimenting with a 3D virtual environment | Research a location online using a range of resources appropriatelyUnderstand the safe use of mobile technology, including GPSCapture images, audio and video while on locationShowcase shared media content through a mapping layer |