Key Areas of learning for Computing
Computer Science: The principles of information and computation, how digital systems work, and how to put this knowledge to use through programming.
Information Technology: Equipping pupils to use information technology to create programs, systems and a range of content.
Digital Literacy: able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.
Computing systems & networks: • 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
Data Handling: • Use digital devices to present numerical data in graphs or charts to make the information more easily accessible to the reader. Use spreadsheets, formulas, tables and graphs to aid calculations, models and investigations in science and maths. • 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.
Programming: • 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
Creating Media: • Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create content that accomplish given goals, including presenting information. • Are responsible, competent, confident and creative users of information and communication technology.
Online Safety: • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Curriculum Overview

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Year 3	Computing systems & networks: Networks and the Internet	Computing systems & networks: Journey inside a computer	Creating Media: Video trailers	Programming: Scratch	Online Safety
Year 4	Computing systems & networks: Collaborative learning	Programming: Further coding with Scratch	Data Handing: Investigating weather	Programming: Computational thinking	Online Safety
Year 5	Computing systems & networks: Search engines	Data Handing: Mars Rover 1	Creating Media: Stop motion animation	Programming: Scratch (music)	Online Safety
Year 6	Computing systems & networks: Bletchley Park	Data Handing: Big Data 1	Creating Media: History of computers	Programming: Crumble	Online Safety

The following tables show our knowledge, skills and vocabulary progression across these key areas of computing as children progress through our school.

Bold text: This refers to sticky knowledge within each section in the progression document as well as key vocabulary (Know). *Italics = Skills (Know how to...)*

Computing Curriculum Progression Priory Junior School

Computer Science					
	Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Computational thinking	Know that there are different levels of abstraction. **Know what an algorithm is.** *Know how to decompose a game to predict the algorithms used to create it.* *Know how to an algorithm. Know how to create a clear and precise algorithm*	Know the different parts of a laptop computer. **Know the purpose of an algorithm.** *Know how to use decomposition to explore the code behind an animation.* *Know how to use repetition in programs. Know how to use logical reasoning to explain how simple algorithms work. Know how to form algorithms independently*	*Know how to use decomposition to solve a problem by finding out what code was used.* *Know how to use decomposition to understand the purpose of a script of code.* *Know how to identify patterns through unplugged activities.* *Know how to use abstraction to identify the important parts when completing both plugged and unplugged activities.*	*Know how to decompose animations into a series of images.* *Know how to decompose a story to be able to plan a program to tell a story.* *Know how to predict how software will work based on previous experience.* *Know how to write more complex algorithms for a purpose.*	*Know how to decompose a program into an algorithm.* *Know how to use past experiences to help solve new problems.* *Know how to write increasingly complex algorithms for a purpose.*
Programming	*Know how to use logical thinking to explore software, predicting, testing and explaining what it does.* *Know how to use an algorithm to write a basic computer program*	*Know how to use logical thinking to explore more complex software; predicting, testing and explaining what it does.* *Know how to Incorporate loops to make code more efficient.* *Know how to continue existing code.*	*Know how to create algorithms for a specific purpose.* *Know how to code a simple game.* *Know how to use abstraction and pattern recognition to modify code.* *Know how to incorporate variables to make code more efficient.*	*Knowhow to tweak and develop their programming as they work.* *Know how to using loops in their programming.* *Know how to use a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.* *Know how to write code to create a desired effect.* *Know how to use a range of programming commands.* *Know how to use repetition within a program.*	*Know how to debug quickly and effectively to make a program more efficient.* *Know how to remix existing code to explore a problem.* *Know how to use and adapt nested loops.* *Know how to program using the Crumble.* *Know how to change a program to personalise it.* *Know how to evaulate code to understand its purpose.* *Know how to predict code and adapting it to a chosen purpose.*
Hardware	**Know what a computer is and that it's made up of different components**. Know that buttons cause effects and that technology follows instructions. Know that technology is doing what we want it to do via its output. Know how to use a keyboard to type.	**Know what the different components of a computer do and how they work together.** Know the purpose of routers. *Know how to make comparisons across different types of computers.*	Know that weather stations use sensors to gather and record data which predicts the weather. *Know how to use tablets or digital cameras to film a weather forecast*.	**Know that external devices can be programmed by a separate computer.**	Know about the history of computers and how they have evolved over time. *Know how to use the understanding of historic computers to design a computer of the future.* **Know what barcodes, QR codes and RFID can be used for.** Know devices and applications that can scan or read barcodes, QR codes and RFID.
Networks and data representatio n	N/A	**Know the role of the key components of a network.** Know the key components within a network, including whether they are wired or wireless. Know that websites and videos are files that are shared from one computer to another. Know about the role of packets. Know how networks work and their purpose. Know links between networks and the internet. **Know how data is transferred.**	**Know that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.**	Know the vocabulary associated with data: data and transmit. Know that computers transfer data in binary and understanding simple binary addition. Know that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.	N/A

Information Technology					
	Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Using software	*Know how to use word processing skills, including altering text, copying and pasting and using keyboard shortcuts.* *Know how to use word processing software to type and reformat text.* *Know how to use software (and unplugged means) to create story animations.*	*Know how to take photographs and record video to tell a story.* *Know how to use software to edit and enhance their video adding music, sounds and text on screen with transitions.*	*Know how to use online software for documents, presentations, forms and spreadsheets.* *Know how to use software to work collaboratively with others.*	*Know how to use logical thinking to explore software more independently, making predictions based on their previous experience.* *Know how to use software programme Scratch to create music.* *Know how to use the video editing software to animate.* *Know how to identify ways to improve and edit programs, videos, images etc. Know how to use 3D design software package TinkerCAD.*	*Know how to use logical thinking to explore software independently, iterating ideas and testing continuously.* *Know how to use search and word processing skills to create a presentation.*
Using email and internet searches	*Know how to search for appropriate images to use in a document.*		Know why some results come before others when searching. **Know that information found by searching the internet is not all grounded in fact**. *Know how to search the internet for data.*	*Know how to use search skills to help find relevant information on the internet.*	**Know how search engines work.**
Using data	*Know how to collect and input data into a spreadsheet.* *Know how to interpret data from a spreadsheet.*		Know that data is used to forecast weather. *Know how to record data in a spreadsheet independently.* *Know how to sort data in a spreadsheet to compare using the 'sort by…' option.* *Know how to design a device which gathers and records sensor data.*	Know how data is collected in remote or dangerous places. Know how data might be used to tell us about a location.	Know how barcodes, QR codes and RFID work. *Know how to gather and analyse data in real time.* *Know how to create formulas and sorting data within spreadsheets.*
Wider use of	**Know how computers are used in the wider world.**	Know how social media platforms are used to interact.	**Know that software can be used collaboratively online to work as a team.**	**Know different forms of communication that have developed with the use of technology.**	**Know how 'big data' can be used to solve a problem or improve efficiency.**

Digital Literacy					
	Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	Know whether information is safe or unsafe to be shared online. **Know strategies for checking if something they read online is true.** *Know how to be respectful of others when sharing online and ask for their permission before sharing content.* *Know how to create a strong password.* *Know how to stay safe when talking to people online and what to do if they see or hear something online that makes them feel upset or uncomfortable.*	**Know that different information is shared online including facts, beliefs and opinions.** Know the impact technology can have on mood. **Know about cyberbullying.** **Know that not all emails are genuine, recognising when an email might be fake and what to do about it.** Know how to identify reliable information when searching online. Know how to stay safe on social media.	**Know that information on the internet might not be true or correct and that some sources are more trustworthy than others.** Know different forms of advertising online. **Know what appropriate behaviour is when collaborating with others online.** Know the positives and negatives of time spent online. **Know the difference between respectful and disrespectful online behaviour.** *Know how to make judgements about the accuracy of online searches.*	**Know possible dangers online and learning how to stay safe.** Know the pros and cons of online communication. **Know that information on the internet might not be true or correct and learning ways of checking validity. Know what to do if they experience bullying online.** *Know how to use an online community safely*	**Know about the positive and negative impacts of sharing online.** **Know strategies to create a positive online reputation.** **Know that updated software can help to prevent data corruption and hacking.** **Know the importance of secure passwords.** *Know how to create secure passwords.* *Know how to capture evidence of online bullying in order to seek help.* *Know how to use search engines safely and effectively.*

Computing systems and networks progression

	Year 2	Year 3	Year 4	Year 5	Year 6
Knowledge & skills	Know the difference between a desktop and laptop computer. o know that people control technology. Know that computers often work together. Know that I can make text a different style, size and colour. *Know how to type and reformat text.*	Know what a tablet is and how it is different from a laptop/desktop computer. **Know what a network is and how a school network might be organised.** **Know how the internet uses networks to share files.** Know what a packet is and why it is important for website data transfer. Know the roles that inputs and outputs play on computers. Know what some of the different components inside a computer are e.g. CPU, RAM, hard drive, and how they work together.	**Know that software can be used collaboratively online to work as a team**. know what type of comments and suggestions on a collaborative document can be helpful. Know that you can use images, text, transitions and animation in presentation slides. *Know how to use online software for documents, presentations, forms and spreadsheets.* *Know how to use software to work collaboratively with others.*	**Know how search engines work.** Know that anyone can create a website and therefore we should take **steps to check the validity of websites.** **Know what copyright is.** Know the difference between ROM and RAM. *Know how to find relevant information on the internet.*	**Know the importance of having a secure password** and what "brute force hacking" is. Know that the first computers were created at Bletchley Park to crack the Enigma code to help the war effort in World War 2. *Know how to create secure passwords.* *Know how to evaluate code to understand its purpose.* *Know how to remix existing code to explore a problem.*
Vocabulary progression	Computer, device, desktop, mouse, tablet, keyboard, monitor	cables, **component**, connection, corrupted, data, desktop, device, fibre, file, internet, laptop, **network**, network map, network switch, packets, radio waves, router, server, tablet, text map, The Cloud, web server, website, website trackers, WiFi, wired, wireless, Wireless Access Points, World Wide Web algorithm, assemble, **CPU (central processing unit),** data, decompose, desktop, disassemble, GPU (graphics processing unit), hard drive, HDD (hard disk drive), infinite loop, **input**, keyboard, laptop, memory, microphone, monitor, mouse, **output**, photocopier, program, QR code, RAM (random access memory), ROM (read only memory), storage, tablet device, technology, touchscreen, touchpad	animations, average, bar chart, **collaboration**, comment, conditional formatting, contribution, data, edited, email account, **format**, freeze, icon, images, insert, link, multiple choice, numerical data, pie chart, presentations, resolved, reviewing comments, share, slides, software, spreadsheets, suggestions, **survey**, teamwork, themes, transitions (Microsoft version add in: rating)	algorithm, appropriate, **copyright**, correct, credit, data leak, deceive, fair, fake, inappropriate, incorrect, index, information, keywords, network, privacy, rank, real, **search engine**, TASK, **web crawler**, website	acrostic code, **brute force hacking**, caesar cipher, chip and pin system, cipher, code, combination, contribute, convince, date shift cipher, discovery, hero, invention, Nth Letter Cipher, password, Pig Latin, Pigpen cipher, present, scrambled, secret, **secure**, technological advancement, trial and error

Data handling progression

	Year 2	Year 3	Year 4	Year 5	Year 6
Knowledge & Skills	Know that you can enter simple data into a spreadsheet. Know what data to use to answer certain questions. *Know how to use a keyword to type.*		**Know that computers can use different forms of input to sense the world around them so that they can record and respond to data.** This is called 'sensor data'. Know that a weather machine is an automated machine that responds to sensor data. Know that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.	Know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock. **Know what numbers using binary code look like** and be able to identify how messages can be sent in this format. Know what simple operations can be used to calculate bit patterns.	**Know that data contained within barcodes and QR codes can be used by computers.** Know that Radio Frequency Identification (RFID) is a more private way of transmitting data. **Know that data is often encrypted so that even if it is stolen it is not useful to the thief.**
Vocabulary progression	Data, digital content		accurate, backdrop, climate zone, cold, heat sensor, lightning, measurement, pinwheel, presenter, rain, satellite, script, sensitive, **sensor data**, solar panel, tablet/digital camera, temperature, thermometer, tornado, warm, weather, weather forecast, wind	8-bit binary, addition, ASCII, **binary code**, boolean, byte, communicate, construction, CPU, data transmission, decimal numbers, design, discovery, distance, hexadecimal, input, instructions, internet, Mars Rover, moon, **numerical data**, output, planet, radio signal, RAM, research, scientist, sequence, signal, simulation, space, subtraction, technology, transmit	algorithms, barcode, binary, Boolean, brand, chips, commuter, contactless, data, **encrypted**, infrared, MagicBand, privacy, proximity, **QR code**, QR scanner, radio waves, **RFID**, signal, **systems/data analyst**, transmission, wireless

Programming progression of knowledge					
	Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Programming	Know what machine learning is and how it enables computers to make predictions. Know that loops in programming are where you set a certain instruction (or instructions) to be repeated multiple times. Know that coding is writing in a special language so that the computer understands what to do. Know that the character in ScratchJr is controlled by the programming blocks.	**Know that Scratch is a programming language and some of its basic functions.** Know how to use loops to improve programming. Know how decomposition is used in programming. Know that you can remix and adapt existing code.	**Know that a variable is a value that can change** (depending on conditions) and know that you can create them in Scratch. Know what a conditional statement is in programming. Know that pattern recognition means identifying patterns to help them work out how the code works. **Know that algorithms can be used for a number of purposes e.g. animation, games design etc.**	Know that a soundtrack is music for a film/video and that one way of composing these is on programming software. **Know that using loops can make the process of writing music simpler and more effective.**	Know that there are text-based programming languages such as Logo and Python. **(We use Crumble)** **Know that nested loops are loops inside of loops.**
Vocabulary progression	abstraction, **algorithm**, bug, clear, correct, code data, debug, decompose, error, key features, loop, predict, unnecessary, Scratch JR	**algorithm**, animation, application, code, **code block**, coding application, **debug**, **decompose**, interface, game, loop, predict, **program**, remixing code, repetition code, review, Scratch, sprite, tinker	broadcast block, code blocks, conditional, coordinates, **decomposition**, features, game, information, negative numbers, orientation, parameters, position, program, project, **script**, sprite, stage, tinker, **variables** abstraction, algorithm, code, **computational thinking**, decomposition, input, logical reasoning, output, pattern recognition, script, sequence, variable	beat, bugs, **coding**, command, debug, decompose, error, instructions, loop, melody, mindmap, music, output, performance, pitch, play, predict, **programming**, rhythm, tempo, timbre, tinker, tutorials, typing Scratch; plan, repeat, scratch, soundtrack, spacing	algorithm, code, command, design, **import**, indentation, input, instructions, loop, output, patterns, random, remix, repeat, shape adapt, algorithm, bugs, coding, debugging, design, edit, electronic, evaluate, facts, image rights, images, inputs, **nested loops**, manipulation, opinions, output, photos, product, program, repetition, screenshot, search engine, selection, sequence, snippets, software, structures, variables,

Creating Media progression of knowledge					
	Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Creating Media	Know that an animation is made up of a sequence of photographs.	Know that different types of camera shots can make my photos or videos look more effective. **Know that I can edit photos and videos using film editing software**. Know that I can add transitions and text to my video.		Know that stop motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph. Know that decomposition of an idea is important when creating stop-motion animations. **Know that editing is an important feature of making and improving a stop motion animation.**	Know that radio plays are plays where the audience can only hear the action so sound effects are important. **Know that sound clips can be recorded using sound recording software.** **Know that sound clips can be edited and trimmed.**
Vocabulary progression	Animation, digital device, frames, moving images, still images	application, **camera angle**, clip, **edit**, film editing software, graphics, import, key events, photo, plan, recording, sound effects, storyboard, time code, **trailer**, **transition**, video, voiceover		**animation**, animator, background, character, decomposition, design, edit, evaluate, flip book, **fluid movement**, **frame**, model, moving images, **still image**, storyboard, thaumatrope, zoetrope (Option 1 add in: digital device, onion skinning, stop motion) (Option 2 add in: effects, photos, script)	**background noise**, computer, devices, **file**, graphics, hard drive, hardware, memory storage, mouse, operating system, overlay, play, processor, **radio play**, RAM, record, reverb, ROM, script, smartphone, sound, **sound effects**, touch screen, track, trackpad

Online Safety progression of knowledge					
	Year 2	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Online Safety	Know the difference between online and offline. Know what information I should not post online. Know that you should ask permission from others before sharing about them online and that they have the right to say 'no.'	**Know that not everything on the internet is true: people share facts, beliefs and opinions online.** Know that the internet can affect your moods and feelings. **Know that privacy settings limit who can access your important personal information- information, such as your name, age, gender etc.** **Know what social media is and that age restrictions apply.**	Know some of the methods used to encourage people to buy things online. **Know that technology can be designed to act like or impersonate living things.** Know that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology. **Know what behaviours are appropriate in order to stay safe and be respectful online.**	**Know different ways we can communicate online.** Know how online information can be used to form judgements. **Know some ways to deal with online bullying.** **Know that apps require permission to access private information and that you can alter the permissions.** **Know where I can go for support if I am being bullied online or feel that my health is being affected by time online.**	**Know that a 'digital footprint' means the information that exists on the internet as a result of a person's online activity.** **Know what steps are required to capture bullying content as evidence.** **Know that it is important to manage personal passwords effectively.** Know what it means to have a positive online reputation. **Know some common online scams.**
Vocabulary progression	accept, comment, consent, content, deny, emojis, offline, online, password, permission, personal information, pop-ups, pressure, private information, reliable, share, terms and conditions, trusted adult	accurate, **age restricted**, autocomplete, beliefs, **block**, content, digital devices, fact, **fake news**, internet, opinion, password, persuasive, **privacy settings**, reliable, report, requests, search engine, security questions, sharing, smart devices, social media platforms, social networking, wellbeing	accuracy, advantages, advertisements, belief, bot, chatbot, computer, distractions, fact, hashtag, implications, **in-app purchases**, **influencer**, opinion, program, recommendations, **reliable**, risks, screen time, search results, snippets, sponsored, trustworthy	accurate information, advice, **app permissions**, application, apps, bullying, communication, emojis, health, in-app purchases, information, judgement, memes, mental health, mindfulness, online communication, opinion, organisation, password, **personal information**, positive contributions, **private information**, real world, **strong password**, summarise, support, technology, trusted adult, wellbeing	**anonymity**, **antivirus**, biometrics, block and report, consent, copy, **digital footprint**, digital personality, financial information, **hacking**, inappropriate, **malware**, online bullying, online reputation, password, paste, personal information, personality, **phishing**, privacy settings, private, reliable source, report, reputation, respect, scammers, screengrab, secure, settings, software updates, **two factor authentication**, URL, username

Useful Resources:

Barefoot Computing – computer science curriculum resources

https://www.barefootcomputing.org/my-barefoot-my-curriculum

BBC Computing KS2 – great for introducing new terminology in an easy to understand context

https://www.bbc.co.uk/bitesize/subjects/zvnrq6f

Be Internet Awesome (Google)

https://beinternetawesome.withgoogle.com/en_uk/toolkit

STEM computing resources – ideas for activities to introduce a range of concepts

https://www.stem.org.uk/primary-computing-resources

Code-IT – lots of planning ideas and resources across curriculum, especially good for Scratch and Crumble

http://code-it.co.uk/csplanning.html

Childnet – safety resources

https://www.childnet.com/resources/online-safety-and-computing

Kid Smart – safety and how to report concerns

http://www.kidsmart.org.uk/beingsmart/

NSPCC – keeping children safe online

https://www.nspcc.org.uk/preventing-abuse/keeping-children-safe/online-safety/