PJS COMPUTING SKILL AND KNOWLEDGE PROGRESSION

Skills Progression					
Strand	**Sub-strand**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Computer Science	**Computational Thinking**	• Using decomposition to explain the parts of a laptop computer. • Using decomposition to explore the code behind an animation. • Using repetition in programs. • Using logical reasoning to explain how simple algorithms work. • Explaining the purpose of an algorithm. • Forming algorithms independently.	• Using decomposition to solve a problem by finding out what code was used. • Using decomposition to understand the purpose of a script of code. • Identifying patterns through unplugged activities. • Using abstraction to identify the important parts when completing both plugged and unplugged activities.	• Decomposing animations into a series of images. • Decomposing a story to be able to plan a program to tell a story. • Predicting how software will work based on previous experience. • Writing more complex algorithms for a purpose.	• Decomposing a program into an algorithm. • Using past experiences to help solve new problems. • Writing increasingly complex algorithms for a purpose.
	Programming	• Using logical thinking to explore more complex software; predicting, testing and explaining what it does.	• Creating algorithms for a specific purpose. • Coding a simple game. • Using abstraction and pattern	• Iterating and developing their programming as they work. • Confidently using loops in their programming.	• Debugging quickly and effectively to make a program more efficient. • Remixing existing code to explore a problem.

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		• Incorporating loops to make code more efficient. • Continuing existing code. • Making reasonable suggestions for how to debug their own and others' code.	recognition to modify code. • Incorporating variables to make code more efficient.	• Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected. • Writing code to create a desired effect. • Using a range of programming commands. • Using repetition within a program.	• Using and adapting nested loops. • Programming using the language Python. • Changing a program to personalise it. • Evaluating code to understand its purpose. • Predicting code and adapting it to a chosen purpose.
	Hardware	• Understanding what the different components of a computer do and how they work together. • Drawing comparisons across different types of computers. • Learning about the purpose of routers.	• Using tablets or digital cameras to film a weather forecast. • Understanding that weather stations use sensors to gather and record data which predicts the weather.	• Learning that external devices can be programmed by a separate computer. • Learning the difference between ROM and RAM. • Recognising how the size of RAM affects the processing of data. • Understanding the fetch, decode, execute cycle.	• Learning about the history of computers and how they have evolved over time. • Using the understanding of historic computers to design a computer of the future. • Understanding and identifying barcodes, QR codes and RFID. • Identifying devices and applications

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					that can scan or read barcodes, QR codes and RFID.
	Networks and Data Representation	• Understanding the role of the key components of a network. • Identifying the key components within a network, including whether they are wired or wireless. • Understanding that websites and videos are files that are shared from one computer to another. • Learning about the role of packets. • Understanding how networks work and their purpose. • Recognising links between networks and the internet. • Learning how data is transferred.	• Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.	• Learning the vocabulary associated with data: data and transmit. • Recognising that computers transfer data in binary and understanding simple binary addition. • Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations. • Relating binary signals (Boolean) to the simple character-based language, ASCII. • Understanding how bit patterns represent images as pixels.	• N/A

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Information Technology	**Using Software**	• Taking photographs and recording video to tell a story. • Using software to edit and enhance their video adding music, sounds and text on screen with transitions.	• Use online software for documents, presentations, forms and spreadsheets. • Using software to work collaboratively with others.	• Using logical thinking to explore software more independently, making predictions based on their previous experience. Using software programme Sonic Pi/Scratch to create music. • Using the video editing software to animate. • Identify ways to improve and edit programs, videos, images etc.	• Using logical thinking to explore software independently, iterating ideas and testing continuously. • Using search and word processing skills to create a presentation.
	Using Email and Search Engines	• Learning to log in and out of an email account. • Writing an email including a subject, 'to' and 'from.' • Sending an email with an attachment. • Replying to an email.	• Understanding why some results come before others when searching. • Understanding that information found by searching the internet is not all grounded in fact. • Searching the internet for data.	• Developing searching skills to help find relevant information on the internet. • Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns.	• Understanding how search engines work.

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	Using Data	• N/A	• Understanding that data is used to forecast weather. • Recording data in a spreadsheet independently. • Sorting data in a spreadsheet to compare using the 'sort by…' option. • Designing a device which gathers and records sensor data.	• Understanding how data is collected in remote or dangerous places. • Understanding how data might be used to tell us about a location.	• Understanding how barcodes, QR codes and RFID work. • Gathering and analysing data in real time. • Creating formulas and sorting data within spreadsheets.
	Wider use of Technology	• Understanding the purpose of emails. • Recognising how social media platforms are used to interact.	• Understanding that software can be used collaboratively online to work as a team.	• Learn about different forms of communication that have developed with the use of technology.	• Learning how 'big data' can be used to solve a problem or improve efficiency.
Digital Literacy		• Recognising that different information is shared online including facts, beliefs and opinions. • Learning how to identify reliable information when searching online.	• Recognising that information on the internet might not be true or correct and that some sources are more trustworthy than others. • Learning to make judgements about the accuracy of online searches.	• Identifying possible dangers online and learning how to stay safe. • Evaluating the pros and cons of online communication. • Recognising that information on the internet might not be true or correct	• Learning about the positive and negative impacts of sharing online. • Learning strategies to create a positive online reputation. • Understanding the importance of secure passwords and how to create them.

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		• Learning how to stay safe on social media. • Considering the impact technology can have on mood. • Learning about cyberbullying. • Learning that not all emails are genuine, recognising when an email might be fake and what to do about it.	• Identifying forms of advertising online. • Recognising what appropriate behaviour is when collaborating with others online. • Reflecting on the positives and negatives of time spent online. • Identifying respectful and disrespectful online behaviour.	and learning ways of checking validity. • Learning what to do if they experience bullying online. • Learning to use an online community safely.	• Learning strategies to capture evidence of online bullying in order to seek help. • Using search engines safely and effectively. • Recognising that updated software can help to prevent data corruption and hacking.

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Knowledge Progression				
Strand	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Computing Systems and Networks	• To know what a tablet is and how it is different from a laptop/desktop computer. • To understand what a network is and how a school network might be organised. • To know that a server is central to a network and responds to requests made. • To know how the internet uses networks to share files. • To know that a router connects us to the internet. • To know what a packet is and why it is important for website data transfer. • To know the roles that inputs and outputs play on computers.	• To understand that software can be used collaboratively online to work as a team. • To know what type of comments and suggestions on a collaborative document can be helpful. • To know that you can use images, text, transitions and animation in presentation slides.	• To know how search engines work. • To understand that anyone can create a website and therefore we should take steps to check the validity of websites. • To know that web crawlers are computer programs that crawl through the internet. • To understand what copyright is. • To know the difference between ROM and RAM.	• To understand the importance of having a secure password and what "brute force hacking" is. • To know that the first computers were created at Bletchley Park to crack the Enigma code to help the war effort in World War 2. • To know about some of the historical figures that contributed to technological advances in computing. • To understand what techniques are required to create a presentation using appropriate software.

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	• To understand that email stands for 'electronic mail.' • To know that an attachment is an extra file added to an email. • To understand that emails should contain appropriate and respectful content. • To know what some of the different components inside a computer are e.g. CPU, RAM, hard drive, and how they work together.			
Programming	• To know that Scratch is a programming language and some of its basic functions. • To understand how to use loops to improve programming. • To understand how decomposition is used in programming. • To understand that you can remix and adapt existing code.	• To understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch. • To know what a conditional statement is in programming. • To understand that variables can help	• To know that a soundtrack is music for a film/video and that one way of composing these is on programming software. • To understand that using loops can make the process of writing music simpler and more effective. • To know how to adapt their code	• To know that there are text-based programming languages such as Logo and Python. • To know that nested loops are loops inside of loops. • To understand the use of random numbers and remix Python code.

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		you to create a quiz on Scratch. • To know that combining computational thinking skills (sequence, abstraction, decomposition etc) can help you to solve a problem. • To understand that pattern recognition means identifying patterns to help them work out how the code works. • To understand that algorithms can be used for a number of purposes e.g. animation, games design etc.	while performing their music. • To know that a Micro:bit is a programmable device. • To know that Micro:bit uses a block coding language similar to Scratch. • To understand and recognise coding structures including variables. • To know what techniques to use to create a program for a specific purpose (including decomposition).	
Creating Media	• To know that different types of camera shots can make my photos or videos look more effective. • To know that I can edit photos and	• N/A	• N/A	• To know that radio plays are plays where the audience can only hear the action so sound effects are important. • To know that sound clips can be recorded

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	videos using film editing software. • To understand that I can add transitions and text to my video.			using sound recording software. • To know that sound clips can be edited and trimmed.
Data Handling	• N/A	• To 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'. • To know that a weather machine is an automated machine that responds to sensor data. • To understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.	• To know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock. • To know what numbers using binary code look like and be able to identify how messages can be sent in this format. • To understand that RAM is Random Access Memory and acts as the computer's working memory. • To know what simple operations can be used to calculate bit patterns.	• To know that data contained within barcodes and QR codes can be used by computers. • To know that infrared waves are a way of transmitting data. • To know that Radio Frequency Identification (RFID) is a more private way of transmitting data. • To know that data is often encrypted so that even if it is stolen it is not useful to the thief.
Online Safety	• To know that not everything on the internet is true: people share facts,	• To understand some of the methods used to encourage people to buy things online.	• To know different ways we can communicate online.	• To know that a 'digital footprint' means the information that

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	beliefs and opinions online. • To understand that the internet can affect your moods and feelings. • To know that privacy settings limit who can access your important personal information. Information, such as your name, age, gender etc. • To know what social media is and that age restrictions apply.	• To understand that technology can be designed to act like or impersonate living things. • To understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology. • To understand what behaviours are appropriate in order to stay safe and be respectful online.	• To understand how online information can be used to form judgements. • To understand some ways to deal with online bullying. • To know that apps require permission to access private information and that you can alter the permissions. • To know where I can go for support if I am being bullied online or feel that my health is being affected by time online.	exists on the internet as a result of a person's online activity. • To know what steps are required to capture bullying content as evidence. • To understand that it is important to manage personal passwords effectively. • To understand what it means to have a positive online reputation. • To know some common online scams.