

Substantive and Disciplinary Knowledge Progression

Subject:

	Nursery	Reception	Year 1	Year 2	YEAR 3
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Creative including animation, music pictures and games	Substantiative Knowledge - Colours and their names - Purposes of tools - Representation of marks - Creating art and music in different ways - Retelling stories. - Computing technology can be used to create art. Disciplinary Knowledge - Follow and give simple instructions	Substantiative Knowledge - Mixing colours - Noticing different materials have different properties - Music can vary in sound, pitch and tempo. - Performers can use voices to share meaning. Disciplinary Knowledge - Explore and experiment with materials - Make choices of how to represent art - Develop and refine work - Express ideas through creative media	Substantive Knowledge Digital Art: Art can be created using digital tools. Hardware Control: Computer mice, trackpads, or touchscreens are used to control activities on a screen. Digital Games: Digital tools can be used to play and make simple games. Sharing: Purple Mash allows a user to share work for others to use on digital display boards. Disciplinary Knowledge	Substantive Knowledge Digital Music: Music can be created digitally using software loops, beats, and tempos. Digital music can be edited infinitely, unlike traditional live recording. Digital Photography: Digital cameras capture images that can be instantly previewed, edited, cropped, and enhanced using software tools. Disciplinary Knowledge - Use 2Sequence or similar tools to combine different sounds, adjust the tempo (speed), and create a musical track.	

	- Predict what might happen next - Solve through trial and improvement - Ask a trusted adult for help when needed - Use technology to record self (voice, photo, video).	Use digital tools to create art – photos, drawing or music.	- Select colours and painting effects in <i>2Paint</i>. - Control a computer mouse or use a finger (device dependent) to perform tasks. - Use drag-and-drop methods to complete games (like <i>2DIY</i> jigsaws and placing activities). - Use the image gallery to create jigsaw images and use hotspots in placing games. - Share work to a Purple Mash Display Board and access shared work from others.	- Edit, crop, and apply digital filters to photographs or artwork within Purple Mash tools to change its mood or purpose. - Save and organize creative files into specific class or project folders.	
Data and Instructions	Substantive Knowledge - Items can be sorted. - Pictures can show information - We can learn from information - Instructions tell us what to do.	Substantive Knowledge - Items can be sorted in different ways. - Instructions must be in the right order. - Instructions can be improved to solve a problem. Disciplinary Knowledge - Spot similarities and	Substantive Knowledge Logic & Organization: Items can be grouped and sorted using a range of criteria, and a logical process should be used when doing so. Sorting is a way to organize items. Terminology: Sorting and grouping have different meanings.	Substantive Knowledge Binary Outcomes: Computers process information using yes/no or true/false logic. Binary Search Trees: A binary tree (or branching database) is a logical way to separate a group of objects by asking questions that only have two answers (Yes or No).	

	Disciplinary Knowledge - Sort items by colour, size, shape or type. - Count how many items are in a small group. - Answer simple information about what is collected.	differences in groups and patterns. - Predict what will happen. - Explain when something hasn't worked and why.	Algorithms in Sorting: An algorithm is a precise, step-by-step set of instructions to solve a problem. Humans and computers both use algorithms to sort items (like shapes). Data & Pictograms: Data is a collection of information used to help answer questions. A pictogram is a visual way of representing data digitally using pictures. Data Planning: Before collecting data, you must think about how it will be used and what information to collect. Disciplinary Knowledge - Identify criteria to sort items into groups (and containers) and check if items are sorted correctly. - Describe and explain how items	Graphing Data: Data can be displayed in various formats (like block graphs or bar charts) to make it easier to read and analyze than raw numbers. Disciplinary Knowledge - Use <i>2Question</i> to create a branching database that successfully differentiates between a group of objects or animals. - Formulate effective "Yes/No" questions that accurately split a data set in half. - Enter data into a graphing tool (like <i>2Graph</i>) to generate vertical or horizontal block graphs. - Interrogate graphs to answer comparative questions (e.g., "Which item was the least popular?").	
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			have been logically sorted. • Look at a human sorting algorithm and compare it to a computer program's sorting layout. • Collect and record data on a common theme (e.g., how children travel to school). • Create a pictogram using class data in <i>2Count</i> and input data efficiently. • Interpret and interrogate a pictogram by asking and answering questions about the categories.		
Coding	Substantive Knowledge • Instructions tell us what to do • Buttons lead to something else happening. Disciplinary Knowledge	Substantive Knowledge • Instructions tell us what to do • Instructions need to be followed in the correct order. • Mistakes can be fixed. Disciplinary Knowledge • Give a set of simple	Substantive Knowledge • Precise Instructions: Computer programs need precise, step-by-step instructions to follow (algorithms). If instructions are vague, outcomes will vary or fail. • Debugging: Instructions can be	Substantive Knowledge • Algorithms to Code: An algorithm is the plan written by a human; code is the implementation of that plan written in a language the computer understands. • Commands & Sequence: Computer	

	- Follow 1-2 step instructions - Make a simple prediction - Explore buttons and controls	instructions to a friend Use a bee-bot or programmable toy and make it move.	changed and corrected to improve them; this is known as debugging. Directional Controls: You can move a character (turtle) within specific computer environments using directional inputs. Disciplinary Knowledge - Follow simple instructions (e.g., painting given animals) and compare results with others to see how vague instructions cause differences. - Test if instructions have been followed correctly by comparing the physical result with the blueprint. - Identify where an on-screen character needs to go. - Formulate a list of movement instructions (forward, backward, turn) to get a	programs execute instructions in a strict sequence from top to bottom. Changing the order changes the outcome. Objects & Actions: In programming, an "object" is an item on screen (like a character), and an "action" is what you command that object to do (move, turn, sound). Events: An event is an action that triggers code to run (e.g., "When Clicked" or "When Key Pressed"). Disciplinary (Procedural) Knowledge - Use 2Code (Chimp level) to drag and drop command blocks to make an object move or change appearance. - Implement an "Event" command so that an object reacts when a user clicks it or hits a key. - Predict what a short sequence of code will do before running it.	
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			character from a start point to an end point. • Drag movement instructions into an algorithm box, then run and test them.	• Debug simple coding errors when a character moves in the wrong direction or fails to stop.	
Technology and the internet	Substantive Knowledge • See technology around the setting and home • Talk about how different technology can be used (e.g. what do we do with this ball). Disciplinary Knowledge • Identify things in nursery and how they are used	Substantive Knowledge • Technology helps us • The internet exists and can be helpful • Things in the classroom that are helpful and why. Disciplinary Knowledge • Explain what common technologies do for us	Substantive Knowledge • What is Technology? Technology is anything man-made that helps us solve a problem or do a task. Not all technology is electronic (e.g., a pair of scissors), but many modern technologies are. • Identifying Computers: A computer is a machine that takes an input (like pressing a button), processes it, and gives an output (like showing a picture on a screen). Many everyday objects contain hidden computers.	Substantive Knowledge • Information Technology (IT): IT refers specifically to technology that handles information—allowing us to create, store, share, and change data (e.g., computers, smartphones, the internet). • The Internet: The internet is a massive, worldwide network that connects computers together so they can share information and communicate. • Websites vs. The Web: The World Wide Web is a collection of webpages (like Purple Mash) that we can look at using the internet.	

			• Technology in the Real World: Technology is used all around us—at home (microwaves, TVs), in school (whiteboards, tablets), and in the community (traffic lights, shop tills). Disciplinary Knowledge • Walk around the school or home environment and accurately point out items that are examples of technology. • Categorize objects into "uses electricity/computer parts" and "does not use electricity." • Explain what a specific piece of technology does and how it helps a human (e.g., "<i>A toaster uses heat to cook bread quickly</i>").	• How IT Helps Us: IT allows people to work together from different places, find answers to questions instantly, and store huge amounts of work safely. Disciplinary Knowledge • Identify and group different types of technology into "Information Technology" (things that manage data like a laptop) and "Non-IT Technology" (things that just do a mechanical job like a kettle). • Explain in simple terms how the internet connects people (e.g., how an email travels from one computer to another). • Distinguish between a physical device (the hardware, like an iPad) and the internet connection that lets the device talk to other computers.	
Online Safety	Substantive Knowledge	Substantive Knowledge	Substantive Knowledge	Substantive Knowledge	

	• What is being kind • Who are trusted adults Disciplinary Knowledge • Explain who trusted adults are and how we can talk to them if worried • Being kind to everyone.	• Not everything we hear or see is the truth • Stranger danger and the safety around this. Disciplinary Knowledge • Follow rules independently • Signed and heard the AUP • Demonstrate respectful behaviour offline as well as when using devices. • Ask for help when needed.	• The Permission Rule: It is vital to ask a trusted adult for permission before using a device, opening a new app, or clicking on something unfamiliar online. • Personal Belongings Online: Digital work, profiles, and logins belong to an individual. Just like physical property, you must respect other people's work online. • Identity Protection: Real names and photos should be protected. Avatars and usernames are tools that keep real identities hidden and safe. • The Safe Space Concept: Software spaces like Purple Mash have secure "walls" (logins) designed specifically to keep pupils safe while they learn. Disciplinary Knowledge	• Digital Footprints: What you do, say, or share online leaves a permanent digital trail that represents who you are to the outside world. • Online Bullying (Behavior): Bullying can happen online just like it does in the playground. Sending unkind messages, excluding people from digital games, or destroying someone's digital work is online bullying. • Impact of Words: Words typed on a screen have the same emotional impact as words spoken face-to-face. They can make people feel sad, anxious, or unsafe. • Information Trustworthiness: Not everything seen on a screen or the internet is true, real, or accurate. Disciplinary Knowledge • Practice writing and sending kind, polite, and respectful digital	
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			• Demonstrate asking for permission before opening an internet browser or tool. • Create a secure online identity by building a customized avatar instead of using a photo. • Log in and out correctly to keep a private profile secure from others. • Express how they feel if something unexpected pops up on the screen and identify which adult to tell.	messages (using tools like <i>2Email</i> or <i>2Respond</i>). • Recognize online bullying behaviors in mock scenarios and accurately select the correct reporting pathway. • Demonstrate how to find and click a "Report" or "Help" button if they see something unkind online. • Stop and think before sharing information, identifying which details are safe (like a favorite color) versus unsafe (like a home address) to put online.	
Vocabulary	Device Instruction Photo Video Draw Sound Listen Safe Kind Trusted adult	Tablet Computer Record Information Help Private Respect Predict Fix direction	• Log In • Log Out • Password • Avatar • 2Do • Alert • Algorithm • Instruction • Command • Debug • Data • Sort • Pictogram	• Digital Footprint • Private Information • Email • Attachment • Code • Sequence • Object • Action • Event • Binary • Binary Tree • Graph	

Pupils are taught about:	<u>The Foundation Stage</u> By the end of Nursery, children understand that technology is part of everyday life and can be used to play, learn, create and communicate. They recognise and name some familiar devices and know that they should be used carefully and with the support of a trusted adult. They know basic rules for staying safe, including asking an adult for help and telling an adult if something worries them. By the end of Reception, children understand that technology has different purposes and can be used to create, communicate, record and find information. Children understand the importance of keeping personal information private, treating others kindly and following agreed rules, with some application to technology. They know that not everything they hear or see is true and can confidently identify trusted adults who can help them stay safe and make responsible choices.	<u>Key Stage 1</u> Here are the generalized Composite Knowledge goals for Key Stage 1 as a whole, mapped directly to the statutory targets of the UK National Curriculum for Computing. Instead of separating by year group, these represent the complete, overarching complex outcomes a pupil should achieve by the end of Key Stage 1. 1. Digital Literacy & Online Safety Composite Knowledge Goal Pupils can independently manage their own secure profile on a learning network, navigate an interactive dashboard to complete tasks, and apply appropriate digital communication boundaries. They can determine what information constitutes private data and can demonstrate how to use direct reporting mechanisms if they encounter confusing, unkind, or unsafe content. Statutory National Curriculum Links • Target: <i>Use technology safely and respectfully, keeping personal information private.</i> • Target: <i>Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.</i> 2. Computer Science (Algorithms & Programming) Composite Knowledge Goal Pupils can plan and predict the outcome of a sequential multi-step problem, translate that plan into unambiguous instructions (code) for a digital device or on-screen object, and systematically	<u>Key Stage 2</u>		

		isolate and correct flaws (debug) when the resulting execution does not match their logical prediction. Statutory National Curriculum Links • Target: <i>Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.</i> • Target: <i>Create and debug simple programs.</i> • Target: <i>Use logical reasoning to predict the behaviour of simple programs.</i> 3. Information Technology (Data & Content Management) Composite Knowledge Goal Pupils can purposefully interact with hardware devices to collect, store, and manipulate digital assets. They can group real-world information logically by specific properties or binary choices, organize that data structurally within a software tool, and retrieve their stored work from a cloud or local directory to present their findings. Statutory National Curriculum Links • Target: <i>Use technology purposefully to create, organise, store, manipulate and retrieve digital content.</i> • Target: <i>Recognise common uses of information technology beyond school.</i>	
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