Computing Common Misconceptions

EYFS to Year 6 | Diagnostic prompts and responsive teaching linked to the Park Road curriculum

Purpose: This document highlights misconceptions that may prevent pupils from building secure Computing knowledge. It is intended as a concise planning and assessment tool: teachers can anticipate likely errors, use the diagnostic prompts during lessons and revisit concepts when pupils can complete a task without explaining why it works.

WHOLE-SCHOOL MISCONCEPTIONS AT A GLANCE

Concept	Common misconception	Secure understanding pupils should develop
Technology	Technology only means computers, tablets or anything with a screen.	Technology includes designed systems and devices with different purposes, inputs and outputs.
Hardware and software	The screen is "the computer", or hardware and software are interchangeable.	Hardware is the physical equipment; software is the programs and instructions that run on it.
Algorithms and programs	An algorithm is the same as computer code, and vague instructions are good enough.	An algorithm is a precise ordered set of steps; a program is an algorithm expressed so a computer can execute it.
Debugging	A bug means failure, the computer is wrong, or the whole program must be restarted.	Debugging is a normal process of locating, explaining and correcting errors systematically.
Networks and the web	Wi-Fi, the internet, a browser and the World Wide Web are all the same thing.	Networks connect devices; the internet is a global network; the web is one service accessed through a browser.
Data	Data is always numerical, objective and automatically meaningful.	Data can take many forms and must be collected, organised, interpreted and checked for accuracy and bias.
Digital media	A polished product is automatically effective, accurate or free to reuse.	Digital content should be purposeful, accurate, suitable for its audience and used with permission.
Search and AI	The first search result or an AI-generated answer is automatically correct.	Digital outputs must be evaluated for relevance, reliability, bias, authorship and evidence.
Evaluation	If a program or product works once, it is finished.	Computing involves testing against criteria, gathering feedback, refining and explaining choices.

How to use: Select the misconception most relevant to the lesson. Present a deliberately incorrect example, ask pupils to explain or correct it, and use their reasoning rather than successful clicking alone as evidence of understanding.

EYFS and Year 1 Misconceptions

Early conceptual foundations | Language, cause and effect, precise instructions and purposeful technology use

Teaching emphasis: Use concrete devices, role-play, floor robots, unplugged activities and think-aloud modelling. In early Computing, misconceptions often arise because pupils focus on what a device looks like rather than what it does.

Year / term	Curriculum unit	Likely misconception	Teaching response / diagnostic check
EYFS A1	Computing through continuous provision	Technology means only tablets or computers; pressing any button will produce the intended result.	Compare screen and non-screen technology. Ask: "What is the input? What changed? What was the effect?"
EYFS A2	Using a computer	The mouse and cursor are unrelated, or clicking and dragging are the same action.	Model slow mouse movement and narrate the cursor response. Ask pupils to show a click, double-click and drag.
EYFS Sp1	All about instructions	Instructions can be followed in any order and still reach the same outcome.	Swap two steps in a familiar routine. Ask: "What went wrong, and which instruction must move?"
EYFS Sp2	Exploring hardware	"Hardware" means something hard or strong, and every device part has the same job.	Handle and name components. Ask: "Which part lets us give information, and which part shows the result?"
EYFS Su1	Programming Bee-Bots	A turn command moves the Bee-Bot into the next square, or the robot knows the intended destination.	Make turns visible on a grid and clear the memory before each route. Ask pupils to predict every single move.
EYFS Su2	Introduction to data	Data only means numbers, and there is only one correct way to sort objects.	Sort the same objects by two different criteria. Ask pupils to explain the rule and suggest another valid grouping.
Y1 A1	Improving mouse skills	The cursor is the mouse itself; repeated clicking is the best way to make something happen.	Use precise vocabulary and model control. Ask pupils to point to the physical mouse and then locate the cursor.
Y1 A2	Algorithms unplugged	An algorithm is already a computer program, and instructions such as "go over there" are precise enough.	Test an intentionally vague algorithm with a literal "robot". Ask pupils to improve each instruction.
Y1 Sp1	Rocket to the moon	The computer understands a plan automatically, or the first digital design should be kept unchanged.	Separate planning, creating, testing and improving. Ask: "What did the computer do, and what decision did you make?"
Y1 Sp2	Programming Bee-Bots	Reaching the destination proves the algorithm was efficient; turning and moving are the same.	Compare two correct routes and count commands. Ask: "Which is more efficient, and why?"
Y1 Su1	Digital imagery	Any image found online is free to use, and editing removes the need to credit the original.	Use child-safe image sources and discuss ownership. Ask: "Who created this, and do we have permission?"
Y1 Su2	Introduction to data	Each pictogram symbol always represents one item, and a graph explains why something happened.	Check the key before reading a chart. Ask: "What does the data show, and what can it not tell us?"

Year 2 and Year 3 Misconceptions

From basic systems and programming to networks, databases and purposeful digital communication

Teaching emphasis: Move pupils from naming visible features to explaining processes. Encourage them to trace what happens to instructions and data through a system, and to distinguish similar terms explicitly.

Year / term	Curriculum unit	Likely misconception	Teaching response / diagnostic check
Y2 A1	What is a computer?	Every electrical device is a computer, or the monitor alone is "the computer".	Compare devices using input, process, output and storage. Ask: "What information goes in, and what result comes out?"
Y2 A2	Algorithms and debugging	Errors are always the computer's fault, or debugging means guessing and changing several things at once.	Trace one step at a time and identify the first unexpected result. Ask pupils to explain the bug before changing code.
Y2 Sp1	Word processing	Repeated spaces should be used to align text, and work saves automatically.	Model formatting tools, cursor placement and deliberate saving. Ask: "Which tool changes layout without adding spaces?"
Y2 Sp2	ScratchJr	All sprites follow the same script, or blocks run simply because they are on the screen.	Link each script to its sprite and starting event. Ask: "What triggers this code, and which character will run it?"
Y2 Su1	Stop motion	Stop motion is filmed continuous video, and the size of each movement does not affect smoothness.	Show two sequences with small and large movements. Ask pupils which is smoother and identify why.
Y2 Su2	International Space Station	All recorded data is equally accurate and data gives an answer without context.	Compare readings, units and collection times. Ask: "Is this a fair comparison, and what extra information is needed?"
Y3 A1	Networks	Wi-Fi is the internet, and a file travels across a network as one complete object.	Build a physical network model and split a message into packets. Ask: "What connects the device locally, and what service are we using?"
Y3 A2	Programming Scratch	Coordinates work like ordinary counting from the corner, or bugs occur randomly.	Use the stage axes and trace values while a sprite moves. Ask: "Which coordinate changes, and where does the actual output first differ?"
Y3 Sp1	Emailing	Email is automatically private and safe, or "reply" and "reply all" have the same effect.	Use sample messages and recipient fields. Ask pupils who will receive each version and whether an attachment is appropriate.
Y3 Sp2	Journey inside a computer	The CPU stores all files permanently, and RAM and storage are the same.	Use a desk/workspace analogy carefully, then return to correct terms. Ask: "What is being processed now, and what must remain after shutdown?"
Y3 Su1	Video trailers	More transitions always improve a video, and a trailer should tell the entire story.	Evaluate examples against audience and purpose. Ask: "Does this choice build interest, or distract from the message?"
Y3 Su2	Comparison cards databases	Sorting changes the stored data, filtering deletes records, or a database is simply any table.	Show before-and-after views of the same records. Ask: "Has the data changed, or only what we can currently see?"

Year 4 and Year 5 Misconceptions

Increasing abstraction | Collaboration, web technologies, computational thinking, search, binary and physical computing

Teaching emphasis: Require pupils to explain underlying structures, not just operate software. Use contrasting examples to separate concepts that appear similar, such as loops and selection, webpages and websites, or search engines and browsers.

Year / term	Curriculum unit	Likely misconception	Teaching response / diagnostic check
Y4 A1	Collaborative learning	A shared file means everyone can edit it, and "the cloud" has no physical computers behind it.	Compare view, comment and edit permissions. Ask: "Where is the file stored, and what is this user allowed to do?"
Y4 A2	Further coding with Scratch	Loops and selection do the same job, or a variable is a value that cannot change.	Trace code with different inputs. Ask: "What repeats, what decision is made, and which value changes?"
Y4 Sp1	Website design	A website is one webpage, and effective web design is mainly about decoration.	Map a site structure and test navigation. Ask: "What does the user need to find, and how will they move between pages?"
Y4 Sp2	HTML	HTML is a general programming language that controls all appearance and behaviour, or closing tags are optional.	Relate tags to document structure and inspect paired tags. Ask: "What structure does this tag create, and where does it end?"
Y4 Su1	Computational thinking	Decomposition means solving isolated parts without recombining them, or the first working algorithm is always best.	Break down a problem, then show how parts connect. Compare algorithms for correctness, clarity and efficiency.
Y4 Su2	Investigating weather	Sensors are always accurate, and a larger dataset automatically proves a conclusion.	Check calibration, units, location and anomalies. Ask: "What might affect this reading, and does the data support the claim?"
Y5 A1	Search engines	A browser is a search engine, the first result is the most reliable, and crawlers see every webpage instantly.	Name the browser and search engine separately. Compare ranked results using source, date, evidence and purpose.
Y5 A2	Programming music	A loop always repeats forever, and a function is simply another name for a loop.	Trace finite and infinite repetition and call a reusable function. Ask: "What repeats, what is reused, and when does it stop?"
Y5 Sp1	Mars Rover 1	Binary is an arbitrary code with no place value, or more bits automatically means a computer is faster.	Build binary values using place value. Ask pupils to explain what a bit represents and what extra bits allow.
Y5 Sp2	BBC micro:bit	The program continues to run on the laptop, and inputs and outputs are interchangeable.	Disconnect and run the downloaded program on the device. Ask: "What triggers the system, and what result does it produce?"
Y5 Su1	Stop motion animation	Smooth animation depends only on frame rate, and onion skinning creates extra frames automatically.	Hold frame rate constant and vary movement size. Ask: "Which decisions improved continuity, and what did onion skinning help you judge?"
Y5 Su2	Mars Rover 2	A prototype should look like the final product, and evaluation is only a personal opinion.	Use low-fidelity prototypes to test functions. Ask pupils to evaluate against success criteria and user feedback.

Year 6 and Online Safety Misconceptions

Preparing pupils for KS3 | Complex systems, AI, Python, big data, product design and informed digital citizenship

Teaching emphasis: Challenge overconfident explanations. By Year 6, pupils should justify claims using technical vocabulary, test evidence and recognise that digital systems reflect human choices, limitations and ethical considerations.

Year / term	Curriculum unit	Likely misconception	Teaching response / diagnostic check
Y6 A1	Bletchley Park and the history of computers	A code and a cipher are identical, or encrypted information is impossible to break.	Compare substitution, codes and keys. Ask pupils what information an attacker would need and why some methods are stronger.
Y6 A2	Exploring AI	AI thinks and understands like a person, and generated output is neutral or automatically factual.	Use examples of pattern-based prediction, hallucination and bias. Ask: "What data or human choices may have shaped this output?"
Y6 Sp1	Intro to Python	Python behaves exactly like block coding, indentation is cosmetic, or variables store only numbers.	Predict and run short snippets. Ask pupils to identify syntax, data type, control flow and the first line causing an error.
Y6 Sp2	Big Data 1	A barcode or QR code contains all the information shown after scanning, and RFID needs line of sight.	Separate identifiers from linked database records. Compare scanning technologies and ask where the retrieved information is stored.
Y6 Su1	Big Data 2	GPS depends only on mobile internet, real-time means instantaneous, and more data always produces fairer decisions.	Model satellites, networks and processing delay. Evaluate accuracy, missing data, privacy and possible bias.
Y6 Su2	Inventing a product	Innovation must be completely new, and a persuasive pitch matters more than evidence from testing.	Start with a user need and evaluate iterations. Ask: "What problem is solved, what evidence supports the design, and what changed after feedback?"

ONLINE SAFETY: MISCONCEPTIONS TO REVISIT THROUGHOUT THE YEAR

Phase	Likely misconception	Teaching response / diagnostic check
EYFS	Anyone who is friendly online is a trusted adult; permission given once applies forever.	Use familiar scenarios. Rehearse stopping, asking a known adult and checking permission each time.
Year 1	A deleted post disappears completely; an online "friend" is the same as a known friend.	Use the idea of copies and screenshots. Ask who knows the person offline and what should never be shared.
Year 2	Personal information means only a full address; a strong password can be shared with a friend.	Sort personal and non-personal information. Revisit private passwords and trusted-adult help.
Year 3	Spam is only advertising; information online is either obviously true or obviously false.	Compare scam, spam and genuine messages. Separate fact, opinion, belief and unsupported claim.
Year 4	A padlock proves all website content is trustworthy; privacy settings guarantee privacy.	Explain secure connection versus reliable content. Review audience, screenshots, sharing and data collection.
Year 5	Being anonymous means untraceable; app permissions mean an app is automatically safe.	Discuss digital traces and permission choices. Check why an app requests access and whether it is necessary.
Year 6	Two-factor authentication makes an account impossible to compromise; deepfakes and AI content are always easy to spot.	Frame security as risk reduction. Triangulate evidence, inspect sources and avoid relying on appearance alone.

Phase	Likely misconception	Teaching response / diagnostic check

Alignment note: The unit sequence follows Park Road Academy's Computing overview. The conceptual focus is informed by Kapow Primary's spiral Computing curriculum and the statutory Computing programme of study. The misconceptions are concise teaching prompts written for Park Road; they are not reproduced Kapow lesson text.