

Concepts	KS1	Y3	Y4	Y5	Y6	KS3 (Year 7)
Computer Science						
Abstraction	n/a	n/a	n/a	<p>Abstraction A way of de-cluttering and removing unnecessary details to get a program functioning.</p> <p>Attempts to break down their task into smaller achievable steps.</p> <p>First introduction to decomposition and abstraction in Computer Science.</p> <p>Start coding at a basic level of abstraction to remove superfluous details from their program that do not contribute to the aim of the task.</p> <p>Understand the processes of decomposition and abstraction and can apply this knowledge when planning algorithms for a program.</p>	<p>Abstraction Identifying the important aspects of the task and then decomposing them in a logical way using knowledge of possible coding structures and applying skills from previous programs.</p>	<p>From Year 8</p> <p>Computational Thinking - Programming algorithms</p> <p>Find where information can be filtered out in generalising problem solutions (abstraction).</p>
Logic	<p>Logical reasoning is all about applying rules to problem solving. Logical reasoning to predict the behaviour of simple programs. A programmable floor robot can be programmed with simple instructions to move around the floor. In doing so, you will have understood and followed</p>	<p>Logical reasoning is especially important in Computer Science because much of the algorithm design work is done in your head. Logical reasoning will help to explain why something happens. It can be used to work out exactly what a program or computer system will do.</p> <p>Designs for programs show thinking of the structure of a</p>	<p>Logical reasoning is used to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</p> <p>Designs for programs show thinking of the structure of a simple program in logical, achievable steps with attention to specific events that initiate specific actions.</p>	<p>Logical methods are used to identify the approximate cause of any bugs but might need support to identify the specific line of code that is causing the problem.</p> <p>There will be testing and debugging of their self-designed programs in lessons.</p>	<p>Logical ways of decomposing and identifying the important aspects of the task (abstraction) using their knowledge of possible coding structures and applying skills from previous programs.</p> <p>Logical attempts to put the separate parts of a complex algorithm or program</p>	<p>Logic refers to algorithms and operational sequences.</p> <p>Computational logic is a term that describes the decision-making progress used in programming and writing algorithms; in other words, computational thinking is a way of looking at problems that allows a computer to help us solve them.</p>



	the constraints and rules of the robot.	simple program in logical, achievable steps.			together to explain the program as a whole. Logical methods will be used to identify the approximate cause of any bugs but might need support to identify the specific line of code that is causing the problem as the complexity of the programs increases. There will be testing and debugging of their self-designed programs in lessons	
Algorithms	<p>An algorithm is a precise, step-by-step set of instructions used to solve a problem or achieve an objective.</p> <p>An algorithm written for a computer to follow is called a program. These algorithms can be described once created. An awareness of the need to be precise in designs so that algorithms can be successfully translated into code.</p>	<p>A precise step by step set of instructions used to solve a problem or achieve an objective.</p> <p>Identify an error within a program that prevents it following the desired algorithm and then fix it.</p>	<p>A precise step by step set of instructions represented in different ways, including flowcharts.</p> <p>Plan an algorithm for a scene and use 2Code to program it.</p> <p>Turn a real-life situation into an algorithm for a program that has cause and effect and use the algorithm to write simple programs.</p> <p>identify an error within a program that prevents it following the desired algorithm and then fix it.</p>	<p>Types of commands, which are run on an object. They could be used to move an object or change a property.</p> <p>Understand what simulations are and can formulate and program an algorithm for an observed traffic light sequence.</p> <p>Understand the processes of decomposition and abstraction and can apply this knowledge when planning algorithms for a program.</p> <p>Write algorithms for and program simulations, they easily adapt code to.</p> <p>Understand the processes of decomposition and abstraction and naturally apply this knowledge when planning</p>	<p>A precise step by step set of instructions used to solve a problem or achieve an objective.</p> <p>Begin to be able to turn a more complex programming task into an algorithm by identifying the important aspects of the task (abstraction) and then decomposing them in a logical way using their knowledge of possible coding structures and applying skills from previous programs.</p> <p>Translating algorithms that include sequence, selection and repetition into code.</p> <p>Interpret a program in parts and can make logical</p>	<p>An algorithm is a step-by-step set of instructions to complete a given task.</p> <p>Understand that computers need precise instructions. Demonstrates care and precision to avoid errors.</p> <p>Demonstrate simple algorithms using loops, and selection. Detects and corrects errors i.e. debugging, in algorithms.</p> <p>Construct solutions (algorithms) that use repetition and two-way selection. Solve problems through decomposition.</p>



				algorithms for programs beyond the point at which it was taught.	attempts to put the separate parts of a complex algorithm or program together to explain the program as a whole.	
Debugging	Children know that correcting errors in an algorithm or program is called 'debugging'.	<p>Looking for any problems in the code, fixing and testing them.</p> <p>Beginning to understand how code is structured and are able to apply this knowledge when debugging.</p>	<p>Looking for any problems in the code, fixing and testing them.</p> <p>Identify an error within a program that prevents it following the desired algorithm and then fix it. Apply these techniques to own code to fix bugs.</p> <p>Intuitive attempts to debug own programs as they increase in complexity.</p>	<p>Looking for any problems in the code, fixing and testing them. Identify and remove errors from (computer hardware or software).</p> <p>Coding becomes more complex, and will require support to tackle debugging in a logical rather than a trial-and-error method.</p>	<p>Looking for any problems in the code, fixing and testing them. Identify and remove errors from (computer hardware or software).</p> <p>Demonstrate a secure understanding of the impact of changing the position of instructions and intention of easier debugging and less code error, as coding becomes more complex.</p> <p>Good structure to code with a view to debugging such as the use of tabs and functions to organise code and the naming of variables.</p>	<p>In computational thinking, demonstrate simple algorithms using loops, and selection. Detect and correct errors i.e. debugging, in algorithms.</p> <p>In programming, develop own program, and can demonstrate this by creating a simple program in an environment that does not rely on text. Detect and correct simple semantic errors i.e. debugging, in programs.</p>
Data Representation	<p>Data Facts and statistics collected together <i>that can</i> provide information.</p> <p>Pictogram A diagram that uses pictures to represent data.</p> <p>Collate Collect and combine (texts, information, or data).</p>	<p>Data Facts and statistics collected together for information.</p> <p>Database A collection of data organised in such a way that it can be searched, and information found easily. Database usually refers to data stored on computers.</p>	<p>Spreadsheet A computer program that represents information in a grid of rows and columns. Any cell in the grid may contain either data or a formula that describes the value to be inserted based on the values in other cells.</p>	<p>Encryption - The process of converting information or data into a code, especially to prevent unauthorized access.</p> <p>Cells An individual section of a spreadsheet grid. It contains data or calculations.</p> <p>Charts Use this button to create a variety of graph types for</p>	<p>Router A device which forwards data packets to the appropriate parts of a computer network.</p> <p>Network cables Used to connect and transfer data and information between computers and routers.</p> <p>Wireless The ability to transmit data</p>	<p>Data can be structured in tables to make it useful.</p> <p>Difference between data and information. Know why sorting data in a flat file can improve searching for information.</p> <p>Classy different types of data (text, number) and understand how these are used in different situations. Demonstrates how filters or single criteria searches can find information.</p> <p>Digital computers use binary to represent all data. Summarises the relationship</p>



				<p>the data in the spreadsheet.</p> <p>Record A collection of data about one item entered into a database.</p> <p>Statistics and reports To produce information about data in a database.</p> <p>Screenshot An image of the data displayed on the screen of a computer or mobile device.</p>	<p>from one device to another without using wires.</p> <p>Database A structured set of data held in a computer, especially one that is accessible in various ways.</p>	<p>between data representation and data quality.</p>
<p>Online Safety</p>	<p>Digital Footprint The information about a person that exists on the Internet as a result of their online activity.</p>	<p>Password A secret word, phrase or combination of letters, numbers and symbols that must be used to gain admission to a site or application such as a website.</p> <p>Spoof website A website that uses dishonest designs to trick users into thinking that it represents the truth.</p> <p>PEGI rating A rating that shows what age a game is suitable for.</p>	<p>Phishing Practice of sending email pretending to be from reputable companies in order to persuade individuals to reveal personal information, such as passwords and credit cards numbers.</p> <p>Digital footprint The information about a person that exists on the Internet as a result of their online activity.</p> <p>Identity theft When a person pretends to be someone else.</p> <p>Malware Software that is specifically designed to disrupt, damage, or gain unauthorized access to a computer system.</p>	<p>Online safety Refers to staying safe when having a presence online.</p> <p>Shared image A picture that is shared online for other people to see.</p> <p>Smart rules A set of rules based around the word SMART designed to help you stay safe when online.</p> <p>Password A string of characters that allows access to a computer system or service.</p> <p>Encryption The process of converting information or data into a code, especially to prevent unauthorized access.</p>	<p>Refresh concepts about risks online including sharing location, secure websites, spoof websites, phishing, and other email scams.</p> <p>Phishing The practice of sending email pretending to be from reputable companies in order to persuade individuals to reveal personal information, such as passwords and credit cards numbers. This will be built upon to now discuss the impact this could have.</p> <p>Spoof website A website that uses dishonest design to trick users into thinking that it represents the truth.</p>	<p>Importance of communicating safely and respectfully online, and the need for keeping personal information private.</p> <p>“Summarise the dangers of being online”</p> <p>What makes a good online citizen?</p>



			<p>Computer virus A piece of code which can copy itself and typically has a damaging effect on the device, such as corrupting the system or destroying data.</p> <p>Plagiarism When you use someone else's words or ideas and pass them off as your own.</p> <p>Healthy Screen-Time Children give reasons for limiting screen time and identify the positive and negative influences of technology on health and the environment</p>	<p>Bibliography A list of all the books and articles used in a piece of work.</p> <p>Reference A mention of a source of information in a book or article including online.</p> <p>Citations A quotation from or reference to a book, paper, or author, especially in an academic work.</p> <p>Reputable Having a good reputation.</p>	<p>Digital footprint Final review of the term. The information about a person that exists on the Internet as a result of their online activity. Share impacts upon themselves and upon others in the long-term.</p> <p>Screen time Time spent using a device such as a computer, television, or games console. Understand the positive and negative influences of technology on health and the environment.</p>	
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